

Approved: 11-27-02  
Chg 1: 11-19-06

**SUBJECT: AVIATION MANAGEMENT AND SAFETY**

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1. **OBJECTIVE.** To establish the framework for an efficient, effective, secure, and safe aviation program in the Department of Energy (DOE) and its contractor aviation operations. Except for certain airspace rules that apply to all aircraft and certificates issued by the Federal Aviation Administration (FAA), [reference FAA Act of 1958, Title 49 United States Code (U.S.C.), Subtitle VII] the FAA has no regulatory jurisdiction over “public aircraft” operations. Therefore, for federally owned or operated aircraft DOE must be self-regulating [refer to 49 U.S.C. 410125(a)37]. However, when a federally owned aircraft is carrying personnel not essential to the performance of a governmental function, for which the aircraft was dispatched or when an aircraft operation is conducted for compensation from outside of the Federal Treasury, then for that operation, the aircraft is considered a “civil” aircraft and is required to comply with the applicable sections of the Federal Aviation Regulations, Title 14 Code of Federal Regulations (CFR) Chapter 1, Parts 21, 43, 61, 65, 91, 119 and DOE policy.
2. **CANCELLATION.** DOE O 440.2A, *Aviation*, dated 3-8-02. Cancellation of an Order does not, by itself, modify or otherwise affect any contractual obligation to comply with such an Order. Canceled Orders incorporated by reference in a contract remain in effect until the contract is modified to delete the reference to the requirements in the canceled Orders.
3. **APPLICABILITY.**
  - a. **All Departmental Elements.** Except for the exclusions in paragraph 3c., this Order applies to (1) any Departmental elements that are involved with the management, operation, and/or maintenance of aircraft and related services and (2) facilities that obtain commercial aviation services (CAS) (see Attachment 3, Definitions). See Attachment 1 for a complete list of Departmental elements; this list automatically includes Departmental elements created after the Order is issued.

The Administrator of the National Nuclear Security Administration (NNSA) will assure that NNSA employees and contractors comply with their respective responsibilities under this Order. Nothing in this Order shall be construed to interfere with the NNSA Administrator’s authority under Section 3212(d) of Public Law (P.L.) 106-65 to establish Administration-specific policies,

unless disapproved by the Secretary.

b. DOE Contractors.

- (1) Except for exclusions in paragraph 3c, the Contractor Requirements Document (CRD), Attachment 2, sets forth requirements of this Order that will apply to contractors whose contracts include the CRD.
- (2) This CRD must be included in major facilities and support service contracts that apply to contractors responsible for managing, operating, and/or maintaining DOE Federal aircraft or major facilities management contracts or facility subcontracts that obtain CAS to support programmatic needs. This includes aviation activities that may take place outside the physical boundaries of a DOE facility.
- (3) The office identified in Section 5, Responsibilities, is responsible for notifying the contracting officer of which contracts are affected. Once notified, the contracting officer is responsible for incorporating the CRD into each affected contract.
- (4) Regardless of the performer of the work, the contractor is responsible for compliance with the requirements of the CRD after it is incorporated into the contract. The contractor is responsible for flowing down the requirements of the CRD to subcontracts at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

c. Exclusions. The management and safety requirements in paragraph 4 of this Order do not apply to—

- (1) Aircraft owned by the Armed Forces or operated on behalf of the U.S. Government by Armed Forces personnel as defined by United States Code (U.S.C.) Title 10;
- (2) Aircraft owned and operated by the National Guard;
- (3) Aircraft owned and operated by other governmental agencies when used by DOE programs during emergency events where loss of life or property is imminent, if the manager in charge approves the operation and certifies that this is the only reasonable option;
- (4) Aircraft owned and operated by another governmental agency in a nonemergency if—
  - (a) the requirements for applying the Federal Flight Safety Standards Guidelines are established in a governing document (e.g., a memorandum of agreement or memorandum of understanding) and

- (b) the governmental agency meets the standards established by the field element; and
  - (c) the aviation program manager of the using organization approves the operation.
- (5) Scheduled airline operations conducted by U.S. air carriers, and
  - (6) Naval Propulsion Program.

4. REQUIREMENTS.

- a. Aviation Implementation Plans. Each DOE program or field element that has management responsibility for (1) assigned Federal aircraft (see Attachment 3, Definitions) or (2) uses commercial aviation services (CAS; see Attachment 3, Definitions) must develop and publish an aviation implementation plan (AIP; see Attachment 3, Definitions) detailing the standards, operating parameters, airworthiness criteria, security procedures and safety systems of its planned aviation operations. As a minimum, the AIP will address all applicable requirements of this Order and other related requirements established by DOE policy.
  - (1) The AIP must be submitted to the Director of the Office of Aviation Management (OAM). The OAM Director must review and approve the AIPs submitted by DOE elements that are not part of the NNSA. The OAM Director will review and make recommendations for or against approval to the Administrator for Nuclear Security on the AIPs submitted by NNSA elements. If a difference of opinion develops between the OAM Director and the NNSA Administrator regarding whether an AIP should be approved they will bring the issue to the Secretary or Deputy Secretary for resolution or direction.
  - (2) Significant changes in management, operations, or maintenance standards require revision and a subsequent approval of the AIP.
  - (3) Each AIP must be reviewed and updated, if necessary, at least annually.
  - (4) All affected DOE elements, except as provided in paragraph 3c, must submit an AIP for complying with this Order within 180 days of the issuance of this Order, except as provided in the following paragraphs.
  - (5) Amendments or changes to a previously approved AIP must be submitted to the OAM Director for a subsequent approval or review within 90 days of the issuance of this Order.
  - (6) Implementation plans and changes are considered reviewed or approved if the OAM Director has not responded within 90 days of receipt of the AIP document.

- b. DOE Elements. DOE elements that use CAS for the performance of governmental missions or travel associated with DOE official business must require the provider or contractor to comply with the civil standards (Title 14 CFR, Chapter 1, 49 CFR Chapter XII, 49 CFR Subchapter C, and/or DOE Department of Transportation Special Permits or exemptions) applicable to the type of operations conducted while in service to the Department or its contractor.
- c. Former Military Aircraft. Former military aircraft owned or operated by the Department, other than aircraft operations excluded by paragraph 3c, must have an FAA- accepted or FAA-approved continued airworthiness maintenance and inspection program (Title 14 CFR, Chapter 1, Part 91.409, paragraph g), applicable to the type and model aircraft operated, before entering service to the Department.
- d. DOE Federal Aircraft. Departmental Federal aircraft in service to DOE must be operated and maintained in accordance with the applicable parts of Title 14 CFR Chapter 1, 49 CFR Chapter XII, 49 CFR Subchapter C, and/or DOE Department of Transportation Special Permits or exemptions, and/or equivalent international standards appropriate for the operations and type of aircraft in service and Departmental policy.
- e. Aviation Program Managers and Safety Officers. All Federal personnel assigned as aviation program managers and ASOs must meet the qualifications established in the “Departmental Aviation Program Manager’s and ASO’s Functional Qualification Standards” and the qualifications established by the assigned position descriptions for those positions within 18 months of their assignment. The qualifications must be commensurate with assigned duties and the individual qualification record must be on file.
- f. Passenger Manifests. DOE elements will maintain passenger manifests. A copy of the manifest will be kept at the office of the responsible authority for two fiscal years following the year during which the flight occurred. As a minimum, the manifest will consist of the full name of each passenger for each leg of the flight, a person to be contacted in the event of an emergency (who is not aboard the flight), and a telephone number for the emergency contact. The field element may provide a substitute process for listing the emergency contact information, as long as the process provides for prompt notification of next of kin in the event of an incident or accident.
- g. Weight and Balance Limits. DOE elements must ensure that aviation operations perform weight and balance calculations to ensure that aircraft are within the manufacturer’s and FAA- or military-established weight and balance limitations for each operation, flight, or mission profile for which the aircraft are to be operated.
- h. Flight Program Standards. Field element managers of DOE aviation programs that operate Federal aircraft (see Attachment 3, Definitions) must establish

comprehensive flight program standards based on paragraph 4d, and ensure that requirements, processes, and/or procedures are established for management/administrative, operations, maintenance/inspection, security and training functions as described below.

(1) Management/Administration.

(a) Field element managers must establish—

- 1 a management structure, appropriate in size and scope, that is responsible for the administration, operation, safety, training, maintenance, security and financial needs of Federal aircraft operations;
- 2 roles, responsibilities, and authorities of assigned managers, pilots, maintenance personnel, flight crewmembers, flight safety personnel, and dispatchers, as applicable;
- 3 procedures to track and record flight crewmember duty time, flight time, and training;
- 4 procedures to track and record maintenance personnel duty time and training; and
- 5 cost accounting systems that record the costs of operations, utilization, and maintenance, including—
  - a cost elements defined within the General Services Administration's (GSA's) Cost Accounting Guide;
  - b costs that support Office of Management and Budget (OMB) Circular A-11, Exhibit 300;
  - c costs required by Federal Management Regulation or successor regulation promulgated by GSA; and
  - d costs associated with the type of aircraft operation, benefiting activity, and mission for each flight.

(b) Aviation management personnel must—

- 1 have qualifications commensurate with their duties, responsibilities, and authorities;
- 2 have experience similar to the civil requirements established for management personnel conducting similar flight operations; and/or

- 3 meet the qualifications and training requirements defined in paragraph 4e.

(2) Operations.

(a) Field element managers must establish—

- 1 basic qualifications and currency requirements for the pilots, crewmembers, maintenance personnel, and other mission-related personnel, as required by the organization's approved AIP;
- 2 duty and flight time limits appropriate to the type of operation being conducted, (e.g., limit employee is on call, standby, or ready reserve);
- 3 methods or processes for proving compliance with DOE and or manufacturer safety-of-flight notices and operational bulletins;
- 4 procedures to provide for timely notification of management and initiation of search and rescue operations in case of a lost or downed aircraft;
- 5 passenger safety briefings that fulfill the requirements set forth in 14 CFR Part 135.117 or 121.571, and a process for informing personnel of their rights established in the National Transportation Safety Board (NTSB) document *Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies*, Appendix F (NTSB/SPC-99-04);
- 6 appropriate emergency procedures and equipment, including personnel and aircraft evacuation procedures;
- 7 a program for ensuring aviation life support equipment, if required for a specific mission, is inspected and serviceable;
- 8 written policies and procedures for the type of aircraft operations conducted; and
- 9 an operations management tracking and review process (using existing data systems where possible) that provides managers information on key elements of performance (DOE G 440.2B-1A) on a recurring and systematic basis. Examples are mission and non-mission capable rates, departure reliability, number of flights and flight hours by

pilot per month, air crewmember training status per crewmember per month, pilot proficiency (events) per pilot per month, and aircraft cost effectiveness, etc.

- (b) It is the Department's policy that supplemental (part-time) pilots (see Attachment 3, Definitions) must not be used as an alternative to full-time pilots. However, it is recognized that there are certain limited instances where a supplemental pilot may provide an aircraft cost-effective supplemental capacity to meet specific unfulfilled flight crewmember requirements. The qualifications and processes for using supplemental pilots must be incorporated into the field element's AIP and the contractor's, if applicable, aviation procedures or operations manual. The use of a supplemental pilot is prohibited unless the pilot meets the following criteria:
- 1 holds an appropriate pilot rating for the operation being conducted and a type rating, if required;
  - 2 has a valid FAA Class II or Class I medical certificate, as prescribed by Title 14 CFR, Chapter 1;
  - 3 for instrument ratings:
    - a airplane pilots must hold a current airplane instrument rating; and
    - b helicopter pilots must hold a current helicopter instrument rating, if the operation requires flight under instrument conditions;
  - 4 has a minimum 1500 hours as a pilot-in-command in the category and class of aircraft to be flown;
  - 5 has a minimum 500 hours as pilot-in-command in the make and model aircraft to be flown;
  - 6 logs at least 15 hours as a pilot in the make and model of aircraft to be flown during the 45 days preceding initial assignment as a flight crewmember and, thereafter, maintain pilot proficiency and qualifications in accordance with the field element's requirements, if the pilot is used on a recurring basis;
  - 7 completes an initial training course, conducted by the field organization, that includes orientation flights in the type of mission to be flown, and addresses crew resource

management and any identified hazards associated with the area or type of operation;

- 8 passes an initial check ride given by the individual in the field organization designated as the chief pilot or check airman, before any flight operations;
- 9 has a minimal impact on the ability of the full-time flight crewmembers to maintain proficiency; and
- 10 is limited to assignment as second-in-command pilot duties only.

(c) An organization may use the field element's designated aviation manager or ASO, but not both, as an incidental pilot (see Attachment 3, Definitions), on a closely controlled and limited basis, to supplement or assess flight operations. The qualifications and processes for using these staff members must be included in the field element's AIP and, if applicable, the contractor's aviation procedures or operations manual. The use of the aviation manager or safety officer is prohibited unless the pilot meets the following criteria:

- 1 holds an appropriate pilot rating for the operation being conducted and a type rating, if required;
- 2 has a valid FAA Class II or Class I medical certificate, as prescribed by Title 14 CFR, Chapter 1;
- 3 for instrument ratings:
  - a airplane pilots must hold a current airplane instrument rating; and
  - b helicopter pilots must hold a helicopter instrument rating, if the operation requires flight under instrument conditions;
- 4 has a minimum 1200 hours as a pilot in the category and class of aircraft to be flown;
- 5 has a minimum 500 hours as pilot-in-command in the category and class of aircraft to be flown;
- 6 logs at least 15 hours as a pilot in the make and model of aircraft to be flown during the 45 days preceding assignment as a flight crewmember or complete a formal



initial qualification training course in the make and model of aircraft to be flown;

- 7 completes a training course, conducted by the organization, that includes orientation flights in the type of mission to be flown that addresses crew resource management and any identified hazards associated with the area or type of operation and the flight mission profile to be performed;
- 8 passes an initial check ride given by the field organization before any flight operations;
- 9 maintains pilot proficiency and qualifications in accordance with the field element's requirements;
- 10 has a minimal impact on the ability of the full-time flight crewmembers to maintain proficiency; and

(d) The Director, OAM, may approve contract or subcontract supplemental pilots or an incidental pilot to act as pilots-in-command of Federal aircraft, other than the Administrator, NNSA, on an individual basis. The Administrator, NNSA may approve contract or subcontract supplemental pilots or an incidental pilot to act as pilots-in-command of NNSA aircraft on an individual basis based on review and recommendation by the Director, OAM.

(3) Maintenance/Inspection Programs.

(a) Field element managers must establish—

- 1 aircraft maintenance and inspection programs to ensure the safety of flights in accordance with either applicable manufacturers' programs, FAA-approved inspection programs, or continuous maintenance programs established under 14 CFR 91, 121 or 135;
- 2 processes or procedures to obtain applicable technical support, including appropriate engineering documentation and testing, for aircraft, powerplant, propeller, or appliance repairs, modifications, or equipment installations;
- 3 quality control processes for the purchase and acquisition of replacement parts, ensuring that parts purchased or acquired have the necessary documentation to determine airworthiness and traceability;
- 4 procedures to record and track maintenance actions; inspections; flight hours, cycles, and calendar times of

retirement life components, parts and for Critical Safety Items (CSI) (i.e., Department of Defense surplus/excess aircraft parts);

- 5 policies and procedures on returning aircraft to service after maintenance and inspection;
- 6 requirements, processes, and procedures for the operation of aircraft with inoperable equipment; and
- 7 procedures or processes to ensure the integrity and quality control of maintenance actions by ensuring that maintenance performed by one qualified individual on a critical area of an aircraft is checked and documented by another qualified individual who did not perform the work. Critical areas must include as a minimum the following:
  - a removal, rigging, or installation of a component or part of a flight control;
  - b removal or installation of any component or part of a main drive or tail rotor drive system;
  - c removal or installation of a component or part of a main or tail rotor hub assembly;
  - d removal, disassembly, reassembly or installation of a power turbine, compressor, gearbox, combustion section or a removal and installation of a complete powerplant assembly;
  - e removal, rigging, or installation of a fuel control or governor of a powerplant;
  - f removal or installation of a propeller governor or reduction gearbox;
  - g removal or installation of a component or part of a fuel system;
  - h removal or installation of a propeller assembly or blade;
  - i removal, rigging, or installation of any component or part associated with the landing gear of a fixed-wing aircraft;

- j removal or installation of internal or external mission equipment by technicians or scientists not rated under Title 14 CFR, Chapter 1, Part 65; and
          - k procedures for maintenance of any of the identified critical systems when an aircraft is away from home base.
  - (b) Field element managers must comply with the Department's safety-of-flight notices, FAA airworthiness directives, and or mandatory manufacturers' bulletins applicable to the types of aircraft, engine(s), propeller(s), and appliances in their aircraft operations.
  - (c) Field element managers must implement a maintenance management tracking and review process (using existing data systems where possible) that provides managers information on key elements of performance (DOE G 440.2B-1A) on a recurring and systematic basis. Examples include aircraft availability and non-availability rates, non-available maintenance and non-available supply rates, maintenance effectiveness, scheduling effectiveness; parts and supply logistics effectiveness; cost effectiveness; and reliability rates of aircraft, powerplants, propellers, and systems.
  - (d) Each field element must report to the FAA within 72 hours after a field element discovers any serious defect in, or other recurring unairworthy condition of, an aircraft, powerplant, or propeller, or any component of any of them. The field element must file the report using the Web-based, Internet-accessible FAA Service Difficulty Reporting System or the FAA accepted Helicopter Association International's Maintenance Malfunction Information Report System. The report must describe the defect or malfunction completely without withholding any pertinent information. If the defect or malfunction could result in an imminent hazard to flight, the field element must use the most expeditious method it can to inform the FAA and the OAM.
- (4) Training.
- (a) Flight crewmembers and maintenance personnel must complete initial training and recurrent training appropriate for their responsibilities and relevant to the types of aircraft and operations/missions conducted by the Department. The training must—
    - 1 be events based;

- 2 measure performance;
    - 3 meet FAA standards and minimum standards established by the field element;
    - 4 include measures taken to correct identified deficiencies;
    - 5 be tracked per pilot and mechanic;
    - 6 be tracked per aircraft type, make, and model; and
    - 7 be documented to provide for outside oversight and appraisal.
  - (b) Flight crewmembers and maintenance personnel must demonstrate proficiency in operational and maintenance tasks relevant to the types of aircraft and operations/missions conducted by the Department. The field element manager must establish the tasks or skills to be measured and proficiency goals for each.
  - (c) Flight dispatchers and cabin safety personnel must complete initial training and recurrent training appropriate for their responsibilities and relevant to the types of aircraft and operations/missions conducted by the Department.
  - (d) Field element training programs must address the applicable sections of 14 CFR Part 121 Subpart N for large aircraft operations or 14 CFR Part 135 Subpart H for small aircraft or the recommendations in DOE G 440.2B-2 Chapter VII to provide sufficient detail to describe the requirements, management, and record keeping processes.
- i. Safety Programs. Field element managers of DOE aviation programs that operate Federal aircraft (see Attachment 3, Definitions) must establish comprehensive, integrated aviation safety programs. Field element managers must—
- (1) define the work (e.g., the type(s) of aircraft operations to be conducted, missions, area(s) of operations);
  - (2) establish risk analysis and risk management procedures to identify hazards, including associated potential event initiated accidents and implement safety administrative and/or engineering controls to prevent or mitigate postulated hazards related accidents in order to mitigate hazards and manage risk to an acceptable level;
  - (3) conduct work along with associated required operations within established controls;

- (4) conduct internal assessments and oversight to verify that the standard elements required by this Order are implemented;
  - (5) establish a system for providing internal feedback on safety issues; communicating and reporting hazards, incidents, and accidents; and disseminating safety/accident prevention and related information;
  - (6) participate in the DOE's Aircraft Accident Incident Reporting System and any other accident or incident reporting systems prescribed by DOE policy;
  - (7) participate in the Department's Aviation Management and Safety Awards Program; and
  - (8) develop an accident response plan that includes—
    - (a) procedures for notifying NTSB and DOE of accidents and incidents defined by 49 CFR 830, "Notification and reporting of aircraft accidents or incidents and overdue aircraft, and preservation of aircraft wreckage, mail, cargo, and records"; DOE O 225.1A, *Accident Investigation*; and DOE O 232.1A, *Occurrence Reporting and Processing of Operations Information*, and
    - (b) procedures that address DOE responsibilities established in the Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies, NTSB Report Number SPC-99-04.
- j. Remotely Operated Aircraft (ROA) Standards for Operations and Airworthiness. DOE elements conducting ROA operations (see Attachment 3, Definitions) outside the scope of Title 14 CFR, Chapter 1, must establish policies and procedures to ensure the safety, airworthiness, and effectiveness of their aviation operations. The OAM Director must review and concur with the policies and procedures submitted by DOE elements that are not part of the NNSA. The OAM Director will review and make recommendations for or against approval to the Administrator for Nuclear Security on ROA policies and procedures submitted by NNSA elements. If a difference of opinion develops between the Director, OAM, and the NNSA Administrator regarding whether a ROA policy or procedure should be approved, they will bring the issue to the Secretary or Deputy Secretary for resolution or direction.
- (1) **Fail-safe Principles.** Fail-safe principles will govern the design of ROA flight critical systems. The flight critical systems must be independent and/or adequately redundant with back-up features that will provide for safe functioning of the ROA in the event of flight critical system failure.

- (2) Failure Detection. Any system design must provide a failure detection apparatus (preflight and in-flight built-in-test) that will notify the ROA operator of a flight critical system failure.
- (3) Flight Control and Navigation Software Verification and Validation. All ROA flight control and navigation system software verification and validation activities must be performed in accordance with Radio Technical Commission for Aeronautics (RTCA) Design Objective 178B or current RTCA or other FAA standards.
- (4) Flight Control System. The flight control system must include the ROA operator controls, sensors, computers, and actuation parts necessary to control the ROA flight trajectory throughout the entire mission profile and ensure the following:
  - (a) adequate stability throughout the expected flight envelope;
  - (b) any single failure of the flight control system will not significantly affect the operator's ability to control ROA recovery;
  - (c) provisions for possible revision to degraded modes of operation are incorporated into flight control system design; and
  - (d) the ROA will remain controllable in the event of propulsion system failure.
- (5) Electrical System. The electrical system must provide sufficient power and endurance to ensure safe operations and recovery throughout all phases of flight. In the event of an emergency, the electrical system or emergency power supply should be of sufficient capacity to enable recovery at either the intended or a predetermined/alternate recovery area.
- (6) Communications System/Data Link(s). Approval for all frequencies used in ROA operations must be obtained from the Federal Communications Commission. In addition, the following must be met:
  - (a) The maximum range of the communication link must be determined and sustained by the ROA operator.
  - (b) Any single failure of the communications system (uplink or downlink) must not affect normal control of the ROA.
  - (c) Uplinks/downlinks are sensitive to electromagnetic interference and must be adequately protected from this hazard.
  - (d) Aircraft designs must incorporate provisions for recovery of the ROA in the event of temporary or total loss of the communication system.

- (7) Navigation System. The aircraft navigation system must meet the required navigation performance standards for the airspace classification in which the operations are to be conducted (see Attachment 4, Table 2). Navigation system designs must also consider the complexity and level of air traffic operations found in the airspace in which the ROA will operate. Operation of ROAs in the National Airspace System (NAS) must have FAA approval (see Attachment 4), except within the boundaries of the NAS classified as restricted airspace or warning areas.
- (8) Propulsion System. All essential elements of the propulsion system, including the engine, engine controls, propeller, propeller components, actuators, and essential sensors, must meet documented reliability standards established by industry or U.S. specifications or comply with Attachment 4.
- (9) Aircraft Control Station. Manned aircraft cockpit features (e.g., control placement and ease of control column forces) do not have to be duplicated exactly.
  - (a) Station design must facilitate control of the ROA by the internal pilot and provide for unambiguous operations and clear indications of ROA flight status.
  - (b) Design criteria must minimize the potential for human error. All “conventional” flight indications and warnings necessary to ensure safe control of the ROA flight path must be provided. In particular, the ROA pilot must be informed of any degraded mode of operations due to any failure, including cases in which there is an automatic switching to an alternate or degraded mode of operation.
  - (c) The control station must include a diagnostic and monitoring capability for the status of the ROA. Real-time, direct communication/surveillance and/or latent data transmission capability must be provided in the absence of failure.
  - (d) For operations in controlled airspace, direct communication with the FAA controlling agency should be incorporated into the ROA control station system design.
  - (e) If more than one ROA operation is occurring at the same time and the ROAs are being controlled from the same terminal: conduct an evaluation of the tasks required by the operator/pilot; determine if adequate controls and monitors exist; and verify that operator workload is such that control can be maintained to operate the simultaneous ROA operations. Considerations should be given to

whether one or more of the ROAs are under autonomous control or manual control by the operator pilot.

- (f) If an external operator pilot, (other than the operator in the control station) is used during the takeoff and landing phases of the flight receives flight parameter information from the aircraft control station through an intercommunication system, the intercommunication system between the operator and the control station must be as reliable as conventional aircraft communication systems.
- (10) Flight Termination System. The ROA operator must have a means of safely terminating flight of the aircraft in all phases of flight operations. The flight termination system must avoid the use of explosives to the maximum extent possible.
- (11) Airworthiness. A statement indicating compliance with the listed or otherwise identified sections of Attachment 4 or compliance with 14 CFR Part 21.17 (b), will be submitted by the ROA operator or manufacturer.
  - (a) An operator or manufacturer may substitute alternate data in place of the data listed in Attachment 4. The data must specifically address the substituted paragraph(s) and note the substitution in the compliance statement. The alternate data must also provide a level of safety at least equivalent to the level of safety specified in Attachment 4, Table 1. All alternate data must be documented and a DOE Flight Readiness Review Board will make the final determination regarding the justification and merit of the proposed alternate data.
  - (b) FAA Advisory Circulars 43.13-1B and 43.13-2A, Change 2, must be used by repairmen or technicians in the fabrication, installation, and repair of the airframe and components.
- k. Safety Documentation. DOE elements must prepare aviation safety documentation for each mission that has risks not normally accepted by the public. Risks not normally accepted by the public, is defined as an aircraft operation (other than aerial transportation of personnel and cargo, aerial patrols, aerial photography, aerial survey, and aerial application) that is not regulated or cannot comply with the applicable parts of 14 CFR Chapter 1, the Federal Aviation Regulations or 49 CFR Subchapter C.
- l. Hiring Commercial Aviation Services (CAS). DOE elements involved in CAS operations must ensure that CAS providers are evaluated by the appropriate DOE organization or designee before the initiation of flight operations and, if a continuing need exists, evaluations must be conducted every 24 months thereafter.



- m. Use of Company and Private Aircraft. The use of company and private aircraft by Senior Federal Officials and political appointees must be coordinated through the OAM for DOE General Counsel's approval.
- n. Reporting Requirements. The following reporting requirements are established to ensure Federal aircraft and CAS are effectively used, program needs are met, and accurate information is obtained to report accountability to appropriate oversight entities.
  - (1) Each field element operating, using, or sponsoring the use of Government aircraft must appoint a responsible individual to maintain the required records and reports of aircraft use and the other required reports established by this Order. The name of the responsible individual must be provided to OAM.
  - (2) Every use of Federal or CAS aircraft requires quarterly reporting of flight and alert hours, operations and administrative overhead costs, scheduled and unscheduled maintenance costs, and other relevant information to the Federal Aviation Interactive Reporting System or successor system as required by the Federal Management Regulation (41 CFR Part 102-33) or successor regulation promulgated by GSA. Accepted providers must be reported to OAM or the DOE Accepted Operator Database as soon as possible.
  - (3) Each field element shall report the travel of Senior Federal officials and non-Federal travelers (see Attachment 3, Definitions), on-board Federal or CAS aircraft semi-annually to the OAM. This information is required for consolidation and reporting to GSA and OMB in the Senior Federal Travel report. The report will include the following information:
    - (a) Traveler's name with indication that the traveler is either a senior Federal official or a non-Federal traveler, whichever is appropriate;
    - (b) The traveler's organization and title or other appropriate descriptive information, e.g., dependent, press, etc.;
    - (c) Name of the authorizing agency;
    - (d) The official purpose of the trip;
    - (e) The destination(s);
    - (f) For personal or political travel, the amount that the traveler must reimburse the Government (i.e., the full coach fare or appropriate share of that fare); and
    - (g) For official travel, the comparable city-pair fare (if available to the traveler) or full coach fare if a city-pair fare is not available.

## (4) OMB Circular A-11, Exhibit 300 Reports:

- (a) Capital asset plans for aircraft acquisitions and aircraft investments are prepared in accordance with OMB A-11, Section 7, Part 300.
- (b) Capital asset plans (Exhibit 300 and supporting documentation), involving aircraft, prepared by DOE organizations will be submitted to the OAM for review and then forwarded to DOE Budget Examiners, if required. For NNSA organizations, the capital asset plans (Exhibit 300 and supporting documentation), involving aircraft, are submitted to the OAM for review and recommendation to the Administrator, NNSA.
- (c) A field element or program must submit a capital asset plan for each aircraft acquisition, included in the program capital asset portfolio. Aircraft acquisitions in excess of \$5,000,000.00 will be subject to DOE O 413.3 Chg 1, Program and Project Management for the Acquisition of Capital Assets.
- (d) The information you must report will depend on whether you are reporting a new investment or an ongoing investment.

1 New Investments:

- a If you are reporting a new investment, i.e., proposed for Base Year (BY) or later, you must complete Exhibit 300 Part I, except for Sections I.H.3 and I.H.4.
- b These investments should identify in life-cycle documentation the dates these issues will be addressed as the investment matures.
- c All of the areas on the Exhibit 300 must be part of the program's planning and the business case (Exhibit 300) updated as soon as the information is known.
- d Exhibit 300s, officially submitted to OMB twice yearly, should be management tools used within a program and updated as the information is available.

2 On-going Investments:

- a If an initial (new investment) Exhibit 300 has never been submitted for the aviation program, then the

program office must submit an Exhibit 300 for the aviation program as an “on-going” investment.

- b Include all information to establish the performance measures for the aviation program, cost-benefit, etc., in accordance with OMB A-11.

- 3 The program office or field element may elect to group aircraft such as emergency response aircraft, security aircraft, etc., rather than submitting Exhibit 300s for each aircraft the program owns or controls.

o. Use of Government Aircraft for Official Travel.

- (1) DOE will primarily use scheduled commercial airlines for official travel and transportation of persons. Exceptions to this policy may be made when—
  - (a) No regularly scheduled commercial airline service is reasonably available to fulfill the program or field element travel requirement (i.e., able to meet the traveler’s departure and/or arrival requirements within a 24-hour period, unless you demonstrate that extraordinary circumstances require a shorter period);
  - (b) the cost of CAS provider or Federal aircraft services is less than the cost of scheduled commercial airlines (the cost of the commercial airfare to be used for the comparison is the Government rate or the lowest fare available, if there is no government rate available for the date of travel, quoted to the traveler on the date the traveler learned about the trip);
  - (c) the mission requirements (see Attachment 3, Definitions) necessitate the use of Government aircraft (see Attachment 3, Definitions); or
  - (d) the safety of scheduled commercial airlines (or other modes of travel) in foreign countries cannot be verified or is found to be unacceptable.
- (2) Traveler safety is the paramount consideration and will not be compromised for convenience or cost factors. All use of a Government aircraft must be in compliance with the Federal Travel Regulations, this Order, and applicable policies from OMB.
- (3) General policy and procedures for procuring accepted government aircraft for passenger transportation that is not mission requirements travel.

- (a) Travel aboard Government aircraft requires a determination by the travel approving official that such travel is necessary and that funds are available. Before approving the use of Government aircraft, the approving official must consider the availability and relative cost of Federal and commercial aviation service providers compared with the cost of scheduled commercial airline services.
- (b) No person may be carried aboard a Government aircraft without a proper travel authorization.
- (c) Field elements must maintain passenger manifests for flights, as required by paragraph 4f.
- (d) Aircraft owned by another agency and CAS, other than United States scheduled commercial carriers, may provide passenger service to the Department only after verification of safety and procedures standards by DOE aviation personnel, except Armed Forces aircraft used for reimbursable travel. Accepted providers will be listed in the DOE Accepted Operator Database and the information made available to all interested persons.
- (e) Government aircraft must not be procured, dispatched, or used for personal convenience, political travel purposes, or unofficial travel. Incidental travel for political events may be authorized only by the DOE Headquarters Office of General Counsel GC.
- (f) Except for mission requirements travel (see Attachment 3, Definitions), no Senior Federal official or non-Federal travelers may travel aboard a Government aircraft without the prior written approval of GC or his or her principal deputy. All required use travel, regardless of the traveler, must be approved in advance and in writing by GC or his or her principal deputy. Except for mission requirements travel and required use travel, all other Federal travelers who are not Senior Federal officials or non-Federal travelers may travel aboard a Government aircraft with the prior written approval of the individual's travel approving official (who must be one organizational level above the traveler). The authority to approve such travel cannot be delegated. Records will be retained for two fiscal years following the year of the flight.
- (g) Except for mission requirements travel, Government aircraft may only be used for required use travel or if the Government aircraft is more cost effective than the lowest available commercial airfare on the date that the traveler learned of the proposed travel.

p. Accepted Aircraft Operators.

- (1) Each field element must procure CAS in accordance with its approved procurement procedures and AIP.
- (2) Before using a Government aircraft (Except DOE Federal aircraft), the aircraft and aircraft operator must be accepted. Accepted aircraft and operators are those that have been evaluated by the Department and found to meet DOE aviation safety and operational standards.
- (3) Departmental Federal aircraft may be approved for official travel, including mission requirements travel. These aircraft will be listed in the "Accepted Operator Database." Field elements operating Federal aircraft that regularly transport passengers must receive information from OAM before the program budget year for planning Headquarters support flight time. Each field element must budget for the appropriate level of activity.
- (4) The Department occasionally relies on the aircraft support of other Federal, State, and local government agencies. Verification of the operator's compliance with government aviation safety standards, except for the exclusion in paragraph 3(c)(3), is required before personnel can travel or conduct missions on other Government aircraft, including the use of foreign government aircraft.
- (5) Accepting Commercial Operators:
  - (a) CAS providers must be evaluated by appropriate DOE aviation authorities before being used. Accepted CAS providers are listed in a database maintained by OAM titled "Accepted Operator Database."
  - (b) If an organization wishes to use a CAS provider that is not listed in the "Accepted Operator Database", it must contact OAM for assistance in gaining approval for use of the operator.

q. Common Procedures That Apply to Official Travel.

- (1) Each traveler and the travel approving authority must consider the most cost-effective means of travel commensurate with accomplishment of the official travel (see Attachment 3, Definitions).
- (2) Cost effectiveness will be determined by the total cost to taxpayers of each available mode of travel, including the cost of the transportation (the cost of the commercial airfare to be used for the comparison is the Government rate or the lowest fare available, if there is no government rate available, for the date of travel, quoted to the traveler on the date the traveler learned

about the trip) and related factors such as the per diem and the employee's lost work time with each option.

- (3) The travel approving authority will retain documentation of the cost analysis for two fiscal years following the year of travel.

r. Special Procedures That Apply to Official Travel other than Mission Requirements Travel.

- (1) Except for mission requirements travel, all travel by Senior Federal officials or non-Federal travelers aboard Government aircraft requires approval by the appropriate travel approving official and by the General Counsel or his/her principal deputy. All required use travel regardless of the identity of the traveler requires the approval by the appropriate travel approving official and GC or his or her principal deputy. Such approvals must be in advance and in writing. In an emergency situation, an after-the-fact written determination is permitted, but a verbal approval must be obtained prior to the travel. Travel aboard Government aircraft for purposes of attending meetings, site visits, or conferences or making speeches or attending training not associated with operation or duties on-board the aircraft are examples of travel that are subject to this approval process. GC must maintain records of such approvals for two fiscal years following the year of the flight.
- (2) Except for mission requirements travel, all travel that is not required use travel by all Federal travelers, who are not Senior Federal officials or non-Federal travelers, aboard Government aircraft requires approval by the appropriate travel approving official, who must be one organizational level above the traveler. Such approval must be in advance and in writing. In an emergency situation, an after-the-fact written determination is permitted, but a verbal approval must be obtained prior to the travel. The travel approving official must maintain records of such approvals for two fiscal years following the year of the flight.
- (3) Each field element must report travel of Senior Federal official and non-Federal traveler (see Attachment 3, Definitions) on-board Government aircraft semi-annually to the OAM, see section 4 paragraph n. (3).
- (4) The office supporting the travel will submit passenger manifests for approval of travel. Requests for passenger approval must include the full name, title, and organization of each individual scheduled to be on the aircraft, supporting documentation, and a travel determination ready for the signature of the appropriate official. This documentation must be submitted at least ten working days, when practical, prior to the trip to the Office of the Assistant General Counsel for General Law for travel involving Senior Federal officials or non-Federal travelers.

- (5) Failure to timely submit the request and information required by paragraph r. (4) may be grounds to disapprove the travel.
- (6) The Office of the General Counsel will—
  - (a) coordinate with the appropriate offices to verify that travel meets the standards for travel;
  - (b) forward approval for travel to the servicing DOE aviation office and the requesting office or, if warranted, provide reasons for disapproval;
  - (c) determine whether reimbursement is due to the Government for any travel or portion of the travel. When reimbursement is required, the Office of the General Counsel will coordinate with the appropriate official to collect the reimbursement; and
  - (d) retain copies of approvals/disapprovals for two years for future travel audits.

s. Foreign Air Carriers.

- (1) The use of foreign aircraft, whether Government, scheduled airline, or CAS provider, presents special problems for DOE travelers. Foreign operators may not meet the high standards of safety and oversight required of operators in the United States. While most nations, including the United States, subscribe to the standards of the International Civil Aviation Organization (ICAO), compliance of foreign air carriers is dependent on the ability and expertise of the governments of the nations wherein they reside to provide proper oversight. Monitoring and reporting of a foreign country's ability to properly oversee aviation standards is conducted by FAA. DOE accepts FAA's International Aviation Safety Assessment (IASA) program determination of a foreign government's ability to oversee its flag air carriers as meeting the ICAO standards and therefore acceptable for DOE use. To be fully acceptable under these criteria, the oversight country must be rated as "level 1" by IASA. Individual foreign airlines that demonstrate an unusually high accident history may be deemed unacceptable for passenger travel by OAM even though their host countries meet the oversight criteria.
- (2) Foreign CAS providers may not be subject to the same oversight as scheduled commercial carriers in the same country. Military aircraft are not subject to the ICAO standards.
- (3) DOE employees or their contractors planning foreign travel should review the safety standards of the CAS providers they intend to use. Specific assistance for this is available from OAM. If a CAS provider does not

meet DOE safety standards, passengers must be informed in writing by the official approving the travel. The travelers must be informed that they are undertaking an uncommon risk by using the substandard carrier.

- (4) Foreign CAS providers may be assessed and evaluated by contacting OAM for assistance.

5. RESPONSIBILITIES.

a. Secretary of Energy.

- (1) Appoints the Director, OAM, as the Senior Aviation Management Official (SAMO).
- (2) Establishes an Aviation Board of Directors that will be made up of full-time Federal employees.

b. Administrator of Nuclear Security.

- (1) Approves AIPs submitted by NNSA elements after receiving a recommendation from the Director, OAM.
- (2) Implements effective aviation operations, airworthiness, and safety programs that meet the requirements of this Order.
- (3) Identifies the major facilities management or support service contracts to which the CRD applies.
- (4) Notifies the contracting office to incorporate the CRD into the affected major facilities management or support service contracts via the Laws, regulations, and DOE directives clauses of the contracts.
- (5) Ensures the effectiveness of contractor aviation operations, airworthiness, and safety programs.

c. Director, Office of Aviation Management.

- (1) Serves as the DOE Senior Aviation Management Official.
- (2) Provides recommendations to the Secretary of Energy and the Administrator, NNSA for the safe, efficient, and reliable management of aircraft used by DOE.
- (3) Chairs the DOE Aviation Board of Directors.
- (4) Nominates candidates for Board membership to the Director, Office of Management.



- (5) Develops and implements policies, systems, and practices to maintain the highest standards of aviation safety, effectiveness, and efficiency, that provide for the highest professional standards of aircraft safety, operations, and airworthiness.
- (6) Defines the aviation mission requirements, in collaboration with DOE program offices and field activities.
- (7) Approves the selections of the types of aviation assets or services required to carry out the respective aviation missions for DOE elements and independent operating entities that are not part of the NNSA, based on OMB Circular A-11 Exhibit 300 and A-76 studies and in collaboration with DOE program offices and field activities. The OAM Director will review and make recommendations for or against selections submitted by NNSA elements to the NNSA Administrator. If a difference of opinion develops between the Director, OAM, and the Administrator for the NNSA regarding selections of the types of aviation assets or services required, they will bring the issue to the Secretary or Deputy Secretary for resolution or direction.
- (8) Reviews, in collaboration with cognizant DOE offices, the use of aviation assets to ensure the safe and efficient management of the Department's aviation services and resources.
- (9) Provides for the final approval for the acquisition and disposal of Departmental aviation assets.
- (10) Assists the program offices and field elements with aviation budget preparation, developing and verifying aviation requirements; conducts appropriate studies and reviews; assures timely and accurate reporting; and implements the highest safety standards and procedures.
- (11) Provides technical assistance and guidance, if available, and is the focal point for the collection, retention, evaluation, and dissemination of aviation information.
- (12) Represents the Department to other Government agencies concerning aviation operations and reporting.
- (13) Approves AIPs for non-NNSA elements of DOE and makes recommendations to the Administrator for NNSA on the AIPs submitted by NNSA elements.
- (14) Reviews OMB A-11, Exhibit 300 submissions and requirements documents for accuracy, completeness, and validation.

- (15) Is the approving authority for any deviations from or waivers to or from the requirements of this order for non-NNSA elements of DOE and makes recommendations regarding any deviations or waivers to the Administrator for NNSA for NNSA elements.
- (16) Is responsible for conducting aviation safety and management oversight of DOE aviation programs, including those of the NNSA, and:
  - (a) Coordinates resolution of applicable policy findings identified in the final audit/appraisal reports with cognizant secretarial officers and heads of field elements;
  - (b) Coordinates with cognizant secretarial officers and heads of field elements to assist in resolving other findings applicable to the OAM identified in the final audit/appraisal reports;
  - (c) Reviews draft audit/appraisal reports for factual accuracy regarding policies and/or activities of the OAM;
  - (d) In coordination with the responsible SO, implements and tracks to completion corrective actions within the prescribed time frames for findings related to policies or activities of the OAM; and
  - (e) Determines the effectiveness of the corrective action implementation and reports to the responsible SO any deficiencies.
- d. DOE Aviation Board of Directors. Recommends broad policy and procedures for the procurement, operations, safety, security and disposal of Federal aircraft and aviation services to the Director, OAM.
- e. Assistant Secretary for Environment, Safety and Health. Coordinates, tracks and reports the status of corrective actions to completion and effective resolution of findings identified by the OAM during the conduct of oversight audit/appraisal activities.
- f. Office of Independent Oversight (SP-40). Coordinates with the OAM in developing and implementing an aviation safety and management audit and appraisal protocol process for independent aviation program oversight.
- g. Heads of Departmental Elements that conduct aviation operations or acquire CAS aircraft within their programs.
  - (1) Develop and implement effective aviation operations, airworthiness, security and safety programs that meet the requirements of this Order.
  - (2) Identify the contracts to which the CRD applies.

- (3) Notify the contracting office to incorporate the CRD into the affected contracts via the laws, regulations, and DOE directives clauses of the contracts.
  - (4) Ensure the effectiveness of contractor aviation operations, airworthiness, and safety programs.
  - (5) Appoint an Aviation Program Manager or ASO or both, depending upon the scope of operations, number of aviation operations conducted or aircraft assigned.
  - (6) Recommends a person to the Director, OAM for appointment to the Aviation Board of Directors.
  - (7) Ensures OMB A-11, Exhibit 300 submissions for aircraft acquisitions or steady state programs are prepared and submitted annually.
- h. Office Supporting Travel. When a Headquarters Senior Federal official determines a need to use a government aircraft, he or she will contact the OAM for support. All other travelers contact the field element office supporting the travel or local Aviation Manager. The office supporting the travel will—
- (1) Contact OAM or local aviation manager in a timely manner of the traveler's intended need for air travel.
  - (2) Provide OAM or local aviation manager and GC, as appropriate, with the following information at least ten working days before the scheduled travel date:
    - (a) purpose of the proposed travel (e.g., mission requirements travel, required use travel, political travel, non-official travel, Presidentially directed travel);
    - (b) dates and itinerary of travel;
    - (c) names, titles and affiliations of persons traveling;
    - (d) reason why each traveler must be present;
    - (e) any special aircraft requirements including aircraft type, special seating, secure phones, catering, etc.; and
    - (f) names of organizations or individuals responsible for reimbursement, including reimbursement for any non-official travel.
  - (3) Assist OAM with arrangements for international travel.

- i. Office of General Counsel. GC has certain responsibilities regarding travel by Senior Federal officials and non-Federal travelers, including approving their air travel on government aircraft. It also has responsibility for approving all required use travel regardless of the identity of the traveler. It is important to note that GC does not approve the aircraft itself but approves the travel of travelers. GC—
  - (1) approves the travel of all Senior Federal officials and non-federal travelers on trips using government aircraft, other than mission requirements travel,
  - (2) coordinates in a timely manner with OAM for approval of the Senior Federal officials and non-federal traveler to travel aboard government aircraft when required,
  - (3) ensures that the purpose of the proposed travel meets legal requirements,
  - (4) retains copies of travel approvals for at least two fiscal years after the current year for audit purposes,
  - (5) will seek approval for the use of aircraft for required use travel from the Office of the Counsel to the President, if required, and
  - (6) determines whether reimbursement to the Government is required for non-Federal travelers.
- j. Office of Aviation Management.
  - (1) Supports the Director, OAM in carrying out the responsibilities assigned by the Secretary.
  - (2) Supports the Office of the Secretary, other Headquarters offices, and field elements as requested, by assisting in determining appropriate aircraft resources to meet travel needs, planning specific trips, conducting safety analyses, conducting cost comparisons of available transportation modes, and procuring or arranging the procurement of necessary services.
  - (3) Tasks the field element or operation office to provide flight itinerary information if Federal aircraft are to be used for travel.
  - (4) Has authority for aircraft charter procurement to support Headquarters offices for a total cost not to exceed \$25,000.
    - (a) Coordinates the appropriate fund sites for government aircraft services with the Office of Management, the Chief Financial Officer, and the NNSA, if applicable; requests reservations and obligation of funds; procures charters; and coordinates schedules,

approvals, and services with the traveler's offices, the Office of the General Counsel, and the travel approving authority.

(b) Coordinates any procurement in excess of \$25,000 with the Headquarters Office of Procurement.

(5) If the source of travel services is foreign, OAM will coordinate the procurement with all relevant parties and the U.S. Embassy of the country(ies) involved.

k. Aviation Program Manager (APM).

(1) Establishes goals for the field aviation program based on the anticipated requirements of the Department, the field element, and other Departmental organizations that may require aviation services.

(2) Implements DOE aviation management and safety policy and establishes the field element's standards for the aviation program that will ensure an effective, safe, secure and cost-efficient operation in accordance with this Order.

(3) Develops the organization's Aviation Implementation Plan (AIP) and annually reviews the AIP to ensure that it is current.

(4) Provides direction to aviation contractors in accordance with the contract statement of work and the CRD attached to this Order regarding required aviation service requirements. This includes the types of missions that are required and the regulations, policies, and standards that contractors are to follow.

(5) Reviews, evaluates, and monitors cost, performance, and technical competency of aviation contractors.

(6) May be appointed, or has collateral duties, as an ASO for the field element aviation program or provides direction to the ASO based on the needs of the program.

(7) Provides required reports and information to the Department regarding field element aviation activities, including reports required by Office of Management and Budget (OMB) Circulars A-11 Section 300, Preparation, Submission and Execution of the Budget; A-76, Performance of Commercial Activities; and A-126, Improving the Management and Use of Government Aircraft; and reports required by section 4 paragraph n. of this Order.

(8) Complies with Department, Federal, and State requirements concerning aviation activities.

- (9) Acts as a voting member of the Department's Aviation Board of Directors.
- (10) Implements an integrated safety management system as required by DOE P 450.4, *Safety Management System Policy*.
- (11) Conducts assessments of CAS providers and/or aviation support services to ensure the safety of aircraft operations.

1. Aviation Safety Officer (ASO).

- (1) Develops and implements a field aviation safety program appropriate to the scope of operations, including instituting safety goals and publicizing them with program participants.
- (2) Gathers, trends, and analyzes aviation safety performance data to ensure the safety of the field aviation program.
- (3) Implements an integrated safety management system as required by DOE P 450.4.
- (4) Conducts periodic assessments of aviation activities to ensure that requirements, policies, and procedures are implemented and followed. Conducts assessments of CAS providers and/or aviation support services to ensure the safety of aircraft operations.
- (5) Prepares reports documenting assessment findings, concerns, and recommendations and tracks corrective actions to help prevent similar occurrences.
- (6) Participates as directed in aviation accident or incident investigations. Provides assistance to accident investigation boards during their investigations.
- (7) Identifies and reports safety concerns to the aviation manager and works to eliminate potential hazards.
- (8) Reports safety concerns directly to the field element manager when he/she believes that the field element manager's intervention is required.
- (9) Develops Aviation Safety Documents (ASD) for aviation activities that are outside the scope of activities covered by established regulations and policy. ASDs will address potential hazards associated with the activity and methods to mitigate these hazards.
- (10) Ensures that aviation personnel report mishaps, hazards, and concerns to the Occurrence Reporting and Processing System (ORPS) or the Aircraft Accident Incident Reporting System (AAIRS).

- (11) Participates in the Department's Aviation Safety Awards Program to ensure that organizations and personnel are recognized for their contributions toward providing the Department with a safe aviation program.

m. Flight Readiness Review Board (FRRB).

- (1) The purpose of a Board is to evaluate the safety, design, operational planning, and functional adequacy of the aircraft operations that are not regulated or cannot comply with the applicable parts of 14 CFR Chapter 1, the Federal Aviation Regulations or 49 CFR Subchapter C.
- (2) A Board must be appointed by the field element's aviation manager or designee, or ASO. The aviation manager or designee must act as a coordinator for the Board; all Board deliverables must come through the field element's ASO.
- (3) A Board must be composed of subject matter experts as determined by the field element's designee, aviation manager, or safety officer.
  - (a) As a minimum, the Board must be composed of a Board Chair and two members.
  - (b) Concurrence with the selection of the Board membership must be obtained from the program under review.
  - (c) The input and assistance of Board advisors and consultants may be solicited and used; however, the deliverables are the sole responsibility of the Board.
- (4) Prior to the initiation of flight operations, conduct an independent review of the total project to assure that adequate planning and preparation have been accomplished to achieve the desired results under acceptable safety conditions.
- (5) Provide technical recommendations to the responsible program.
- (6) Maintain effective communications among Board members, program, field element personnel, and OAM, if applicable.
- (7) The Board must submit a formal report of Board findings and recommendations to the affected program(s), field element's manager and the OAM. The report must be submitted timely enough to allow for effective implementation of recommendations.

n. Contracting Officer. The contracting officer, after being notified of the affected contracts, will incorporate the CRD into the affected contracts by way of the

laws, regulations, and directives clauses found in the Department of Energy Acquisition Regulations.

6. DEFINITIONS. Refer to Attachment 3 of this Order.

7. REFERENCES.

- a. “Title XXXII of P.L. 106-65, National Nuclear Security Administration Act, as amended by,
  - (1) P.L. 106-377, the Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 2001;
  - (2) P.L. 106-398, the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001;
  - (3) P.L. 107-107, the National Defense Authorization Act for Fiscal Year 2002;
  - (4) P.L. 108-136, the National Defense Authorization Act for Fiscal Year 2004; and
  - (5) P.L. 108-375, the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005.
- b. U.S. Code Title 49, Subtitle VII, Part A, “Air Commerce and Safety”
- c. Title 14 C.F.R, Chapter I, “Federal Aviation Administration, Department Of Transportation”
- d. Title 49 C.F.R Chapter I, Subchapter C, “Hazardous Materials”
- e. Title 49 C.F.R Chapter VIII, “National Transportation Safety Board”
- f. Title 49 C.F.R. Chapter XII, “Transportation Security Administration, Department Of Homeland Security”
- g. Title 41 C.F.R. Subtitle C, Chapter 102, “Federal Management Regulation”
- h. Title 41 C.F.R. Subtitle F, Chapter 300, Part 300-3, “Glossary of Terms”
- i. Title 41 C.F.R. Subtitle F, Chapter 301, Parts 301-10, “Transportation Expenses, and 301-70, Internal Policy And Procedure Requirements”
- j. DOE P 226.1, *Department of Energy Oversight Policy*, dated 06-10-2005
- k. DOE O 151.1C, *Comprehensive Emergency Management*, dated 11-02-05
- l. DOE O 224.2 , *Auditing of Programs and Operations*, dated 03-22-01



- m. DOE O 225.1A, *Accident Investigations*, dated 11-26-97
  - n. DOE O 226.1, *Implementation of Department of Energy Oversight Policy*, dated 09-15-2005
  - o. DOE O 231.1A Chg 1, *Environment, Safety and Health Reporting*, dated 06-03-04
  - p. DOE O 413.1A, *Management Control Program*, dated 04-18-02
  - q. DOE O 413.2A, *Laboratory Directed Research and Development*, dated 01-08-01
  - r. DOE O 413.3 Chg 1, *Project Management for the Acquisition of Capital Assets*, dated 10-13-00
  - s. DOE O 414.1C, *Quality Assurance*, dated 06-17-05
  - t. DOE O 430.1B, *Real Property Asset Management*, dated 09-24-03
  - u. DOE O 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, dated 03-27-98
  - v. DOE O 452.1C, *Nuclear Explosive and Weapon Surety Program*, dated 09-20-05
  - w. [DOE O 452.4A](#), *Security and Control of Nuclear Explosives and Nuclear Weapons*, dated 12-17-01
  - x. [DOE O 460.1B](#), *Packaging and Transportation Safety*, dated 04-04-03
  - y. [DOE O 460.2A](#), *Departmental Materials Transportation and Packaging Management*, dated 12-22-04
  - z. [DOE O 461.1A](#), *Packaging and Transfer or Transportation of Materials of National Security Interest*, dated 04-26-04
  - aa. DOE O 481.1C, *Work for Others (Non-Department of Energy Funded Work)*, dated 01-24-05
  - bb. DOE O 522.1, *Pricing of Departmental Materials and Services*, dated 11-03-04
  - cc. DOE O 551.1B, *Official Foreign Travel*, dated 08-19-03
8. CONTACT. Questions concerning this Order should be directed to DOE Headquarters OAM at 202-586-5532.



SAMUEL W. BODMAN  
Secretary of Energy

**DEPARTMENTAL ELEMENTS TO WHICH DOE O 440.2B IS APPLICABLE**

Office of the Secretary  
National Nuclear Security Administration  
Office of Chief Financial Officer  
Office of Chief Information Officer  
Office of Civilian Radioactive Waste Management  
Office of Congressional and Intergovernmental Affairs  
Office of Economic Impact and Diversity  
Office of Electricity Delivery and Energy Reliability  
Office of Energy Efficiency and Renewable Energy  
Office of Energy Information Administration  
Office of Environment, Safety and Health  
Office of Environmental Management  
Office of Fossil Energy  
Office of General Counsel  
Office of Hearings and Appeals  
Office of Human Capital Management  
Office of Inspector General  
Office of Intelligence and Counterintelligence  
Office of Legacy Management  
Office of Management  
Office of Nuclear Energy, Science and Technology  
Office of Policy and International Affairs  
Office of Public Affairs  
Office of Science  
Office of Security and Safety Performance Assurance  
Bonneville Power Administration  
Southeastern Power Administration  
Southwestern Power Administration  
Western Area Power Administration

## **CONTRACTOR REQUIREMENTS DOCUMENT**

### **DOE O 440.2B, AVIATION MANAGEMENT AND SAFETY**

1. Regardless of the performer of the work, the Department of Energy (DOE) contractor is responsible for compliance with the requirements of the Contractor Requirements Document (CRD) after it is incorporated into the contract. The contractor is responsible for flowing down the requirements of the CRD to subcontracts at any tier to the extent necessary to ensure the contractor's compliance with the requirements.
2. Contractors that use Commercial Aviation Services (CAS), as defined in Attachment 2, in support of programmatic needs must have a program that complies with the field office Aviation Implementation Plan and the following requirements:
  - a. Requires the provider or contractor that provides CAS to comply with the civil standards (Title 14 CFR, Chapter 1, 49 CFR, Chapter XII, and 49 CFR Subchapter C, and DOE DOT Special Permit(s) or exemptions) applicable to the type of operations conducted while in service to the Department or its contractor.
  - b. Ensures the provider or contractor that provides CAS has a Federal Aviation Administration- (FAA-) accepted or FAA approved continued airworthiness maintenance and inspection program [Title 14 CFR, Chapter 1, Part 91.409 (g)], applicable to the type and model aircraft operated, if operating former military aircraft, other than (1) aircraft owned by the Armed Forces or operated on behalf of the U.S. Government by Armed Forces personnel as defined by United States Code (U.S.C.) Title 10 or (2) aircraft owned and operated by the National Guard.
  - c. Requires a passenger manifest be completed and maintained.
    - (1) A copy of the manifest will be kept at the office of the responsible authority for two fiscal years following the year during which the flight occurred; and
    - (2) As a minimum, the manifest will consist of the full name of each passenger for each leg of the flight, a person to be contacted in the event of an emergency (who is not aboard the flight), and a telephone number for the emergency contact. The contractor may provide a substitute process for listing the emergency contact information, as long as the process provides for prompt notification of next of kin in the event of an incident or accident.
  - d. Requires CAS providers perform weight and balance calculations to ensure that aircraft are within the manufacturers and FAA- or military-established weight and balance limitations for each operation, flight, or mission profile for which the aircraft are to be operated.

- e. Establishes a comprehensive, integrated aviation safety program. The program will—
  - (1) define the work (e.g., the type(s) of aircraft operations to be conducted, missions, area(s) of operations);
  - (2) establish risk analysis and risk management procedures to identify hazards, including associated potential event initiated accidents and implement safety administrative and/or engineering controls to prevent or mitigate postulated hazards related accidents in order to mitigate hazards and manage risk to an acceptable level;
  - (3) conduct work along with associated required operations within established controls;
  - (4) conduct internal assessments and oversight to verify that the standard elements required are implemented;
  - (5) establish a system for providing internal feedback on safety issues; communicating and reporting hazards, incidents, and accidents; and disseminating safety/accident prevention and related information;
  - (6) participate in the DOE's Aircraft Accident Incident Reporting System and any other accident or incident reporting systems prescribed by DOE policy;
  - (7) participate in the DOE Aviation Safety Awards Program; and
  - (8) develop an accident response plan that includes—
    - (a) procedures for notifying National Transportation Safety Board (NTSB) and DOE of accidents and incidents (49 CFR 830, "Notification and reporting of aircraft accidents or incidents and overdue aircraft, and preservation of aircraft wreckage, mail, cargo, and records"; DOE O 225.1A, Accident Investigation; and DOE O 232.1A, Occurrence Reporting and Processing of Operations Information), and
    - (b) procedures that address the contractor's support of DOE responsibilities established in the Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies, NTSB Report Number SPC-99-04.
- f. Develops aviation safety documentation for each mission that has risks not normally accepted by the public. Risks not normally accepted by the public, is defined as an aircraft operation, other than aerial transportation of personnel and cargo, aerial patrols, aerial photography, aerial survey, and aerial application,

that is not regulated or cannot comply with the applicable parts of 14 CFR Chapter 1, the Federal Aviation Regulations or 49 CFR Subchapter C.

- g. Ensures CAS providers are evaluated by a qualified aviation person or Department's designee before the initiation of flight operations and, if a continuing need exists, evaluations must be conducted every 24 months thereafter.
- h. Requires the CAS provider to give passenger safety briefings (Title 14 CFR Chapter 1, Part 135 or 121) and have a process for informing personnel of their rights established in the National Transportation Safety Board (NTSB) document *Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies*, Appendix F (NTSB/SPC-99-04)
- i. Establishes reporting requirements to ensure CAS are effectively used, program needs are met, and accurate information is obtained to report accountability to appropriate oversight entities. Requirements related to reporting are as follows:
  - (1) Each contractor operating, using, or sponsoring the use of Government aircraft (see Attachment 3, Definitions) must appoint a responsible individual to maintain the required records and reports of aircraft use and the other required reports established by this Order. The name of the responsible individual must be provided to the field element manager or designee.
  - (2) Each contractor is required to submit quarterly reports of flight hours, costs, utilization, and other relevant information to the field's Aviation Program Manager or designee as required by Federal Management Regulation or successor regulation promulgated by GSA.
  - (3) Each contractor must report accepted providers to the Office of Aviation Management (OAM) or the DOE Accepted Operator Database as soon as possible.
- j. Requires a contractor working under a contract with DOE, that is paid at a rate equal to or more than the minimum rate for the Senior Executive Service and has senior executive responsibilities to obtain approval from the DOE Offices of General Counsel prior to traveling on-board government aircraft, other than mission requirements travel. (Personnel in this category are listed in the contract under "Key Management Personnel.")
- k. Establish an internal cost-analysis, review and approval process for the acquisition and use of commercial aviation providers to support Departmental non-mission travel requirements. The contractor must:
  - (1) Maintain records, including cost comparisons, approvals, actual use and costs, for a minimum of two years from the date of the flight.

- (2) Report actual use and costs data to the Federal Aviation Manager for reporting to Federal Aviation Interactive Reporting System (FAIRS) or successor system.
3. Contractors that operate and maintain Federal aircraft must have a program that complies with the field element Aviation Implementation Plan and includes:
  - a. Management/Administration.
    - (1) The contractor must establish—
      - (a) a management structure, appropriate in size and scope, that is responsible for the administration, operation, safety, training, maintenance, security and financial needs of DOE-owned aircraft operations;
      - (b) roles, responsibilities, and authorities of assigned managers, pilots, maintenance personnel, flight crewmembers, flight safety personnel, and dispatchers, as applicable;
      - (c) procedures to track and record flight crewmember duty time, flight time, and training;
      - (d) procedures to track and record maintenance personnel duty time and training; and
      - (e) cost accounting systems that record the costs of operations, utilization, and maintenance [see General Services Administration's (GSA's) Cost Accounting Guide; Office of Management and Budget (OMB) Circulars A-11, Exhibit 300; A-76; Federal Management Regulation or successor regulation promulgated by GSA; and costs associated with the type of aircraft operation, benefiting activity, and mission for each flight]
    - (2) Aviation management personnel must—
      - (a) have qualifications commensurate with their duties, responsibilities, and authorities;
      - (b) have experience similar to the civil requirements established for management personnel conducting similar flight operations; and/or
      - (c) meet the qualifications and training requirements defined in paragraph 4, if the management personnel act in any capacity as a flight crewmember.

b. Operations.

- (1) The contractor must establish—
  - (a) basic qualifications and currency requirements for the pilots, crewmembers, maintenance personnel, and other mission-related personnel, as required by the DOE field element's approved AIP;
  - (b) duty and flight limits appropriate to the type of operation being conducted, (e.g., limits on the time an employee is on call, standby, or ready reserve);
  - (c) methods or processes for proving compliance with DOE and manufacturer safety-of-flight notices and operational bulletins;
  - (d) procedures to provide for timely notification of management and initiation of search and rescue operations in case of a lost or downed aircraft;
  - (e) passenger safety briefings [Title 14 CFR Chapter 1, Part 135 or 121] (required by Federal Aviation regulations) and a process for informing personnel of their rights established in the National Transportation Safety Board (NTSB) document Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies, Appendix F (NTSB/SPC-99-04);
  - (f) appropriate emergency procedures and equipment, including personnel and aircraft evacuation procedures;
  - (g) a program for ensuring aviation life support equipment, if required for a specific mission, is inspected and serviceable;
  - (h) written policies and procedures for the type of aircraft operations conducted;
  - (i) an operations management tracking and review process (using existing data systems where possible) that provides managers information on key elements of performance (i.e., performance indicators) on a recurring and systematic basis. Examples are mission and non-mission capable rates, departure reliability, number of flights and flight hours by pilot per month, air crewmember training status per crewmember per month, pilot proficiency (events) per pilot per month, and aircraft cost effectiveness, etc.; and
  - (j) policies that require Federal aircraft in service to the Department be operated and maintained in accordance with the applicable parts of Title 14 Code of Federal Regulations (CFR) Chapter 1, 49 CFR



Chapter XII, 49 CFR Subchapter C or DOE DOT Special Permit(s) and exemptions, and/or equivalent international standards appropriate for the operations and type of aircraft in service.

- (2) It is the Department's policy that supplemental pilots (see Attachment 3, Definitions) not be used as an alternative to full-time pilots. However, it is recognized that there are certain limited instances where a supplemental pilot may provide a cost effective supplemental capacity to meet specific unfulfilled flight crewmember requirements. The qualifications and processes for using supplemental pilots must be in accordance the field element AIP and incorporated into the contractor's, if applicable, aviation procedures or operations manual. The use of supplemental pilots is prohibited unless the pilots meet the following criteria:
- (a) hold an appropriate pilot rating for the operation being conducted and a type rating, if required;
  - (b) have a valid FAA Class II or Class I medical certificate, as prescribed by Title 14 CFR, Chapter 1;
  - (c) For instrument ratings,
    - 1 Airplane pilots must hold an instrument rating and be current; and
    - 2 Helicopter pilots must hold an instrument rating, if the operation requires flight under instrument conditions;
  - (d) have a minimum 1500 hours as a pilot-in-command in the category and class of aircraft to be flown;
  - (e) have a minimum 500 hours as pilot-in-command in the make and model aircraft to be flown;
  - (f) log at least 15 hours as a pilot in the make and model of aircraft to be flown during the 45 days preceding initial assignment as a flight crewmember and, thereafter, maintain pilot proficiency and qualifications in accordance with the field element's requirements, if the pilot is used on a recurring basis;
  - (g) complete an initial training course, conducted by the organization, that includes orientation flights in the type of mission to be flown, and addresses crew resource management and any identified hazards associated with the area or type of operation;
  - (h) pass an initial check ride given by the individual in the field organization designated as the Chief Pilot or Check Airman, before any flight operations;

- (i) have a minimal impact on the ability of the full-time flight crewmembers to maintain proficiency; and
  - (j) be limited to assignment as second-in-command pilot duties only.
- (3) The contractor must obtain the approval from the Contracting Officer and the field element Aviation Manager or designee, for contract or subcontract supplemental pilots to act as pilots-in-command of Federal aircraft on an individual basis.

c. Maintenance/Inspection Programs.

- (1) The contractor must establish—
  - (a) aircraft maintenance and inspection programs to ensure the safety of flights in accordance with either applicable manufacturers' programs, FAA-approved inspection programs, or continuous maintenance programs [see 14 CFR 91, 121 or 135];
  - (b) processes or procedures to obtain applicable technical support, including appropriate engineering documentation and testing, for aircraft, powerplant, propeller, or appliance repairs, modifications, or equipment installations;
  - (c) quality control processes for the purchase and acquisition of replacement parts, ensuring that parts purchased or acquired have the necessary documentation to determine airworthiness;
  - (d) procedures to record and track maintenance actions; inspections; the flight hours, cycles, and calendar times for retirement life components, parts and for Critical Safety Items (i.e., Department of Defense surplus/excess);
  - (e) policies and procedures on returning aircraft to service after maintenance and inspection;
  - (f) requirements, processes, and procedures for the operation of aircraft with inoperable equipment; and
  - (g) procedures or processes to ensure the integrity and quality control of maintenance actions by ensuring that maintenance performed by one qualified individual on critical areas of an aircraft are checked and documented by another qualified individual who did not perform the work. Critical areas must include as a minimum the following:
    - 1 removal, rigging, or installation of a component or part of a flight control;

- 2 removal or installation of any component or part of a main drive or tail rotor drive system;
  - 3 removal or installation of a component or part of a main or tail rotor hub assembly;
  - 4 removal, disassembly, reassembly or installation of a power turbine, compressor, gearbox, combustion section or a removal and installation of a complete powerplant assembly;
  - 5 removal or installation of a fuel control or governor of a powerplant;
  - 6 removal or installation of a propeller governor or reduction gearbox;
  - 7 removal or installation of a component or part of a fuel system;
  - 8 removal or installation of a propeller assembly or blade;
  - 9 removal, rigging, or installation of any component or part associated with the landing gear of a fixed-wing aircraft;
  - 10 removal or installation of internal or external mission equipment by technicians or scientists who do hold and Airframe and Powerplant certificate (see 14 CFR, Chapter 1, Part 65); and
  - 11 procedures for maintenance of any of the identified critical systems when an aircraft is away from home base.
- (2) The contractor must comply with the Department's safety-of-flight notices, FAA airworthiness directives, and or mandatory manufacturers' bulletins applicable to the types of aircraft, engine(s), propeller(s), and appliances in their aircraft operations.
- (3) The contractor must implement a maintenance management tracking and review process (using existing data systems where possible) that provides managers information on key elements of performance (i.e., performance indicators) on a recurring and systematic basis. Examples include aircraft availability and non-availability rates, non-available maintenance and non-available supply rates, scheduling effectiveness; parts and supply logistics effectiveness; cost effectiveness; and reliability rates of aircraft, powerplants, propellers, and systems.

- (4) The contractor must report to the FAA within 72 hours after a contractor discovers any serious defect in, or other recurring unairworthy condition of, an aircraft, powerplant, or propeller, or any component of any of them. The contractor must file the report using the Web-based, Internet-accessible FAA Service Difficulty Reporting System or the FAA accepted Helicopter Association International's Maintenance Malfunction Information Report System. The report shall describe the defect or malfunction completely without withholding any pertinent information. If the defect or malfunction could result in an imminent hazard to flight, the contractor must use the most expeditious method it can to inform the FAA and the DOE Aviation Manager or Safety Officer.

d. Training.

- (1) Flight crewmembers and maintenance personnel must complete initial training and recurrent training appropriate for their responsibilities and relevant to the types aircraft and operations/missions conducted by the DOE. The training must—
  - (a) be events based;
  - (b) measure performance;
  - (c) meet FAA standards and minimum standards established by the field element;
  - (d) include measures taken to correct identified deficiencies;
  - (e) be tracked per pilot and mechanic;
  - (f) be tracked per aircraft type, make, and model; and
  - (g) be documented to provide for outside oversight and appraisal.
- (2) Flight crewmembers and maintenance personnel must demonstrate proficiency in operational and maintenance tasks relevant to the types of aircraft and operations/missions conducted by the Department. The contractor must establish the tasks or skills to be measured and proficiency goals for each.
- (3) Flight dispatchers and cabin safety personnel must complete initial training and recurrent training appropriate for their responsibilities and relevant to the types of aircraft and operations/missions conducted by the DOE.
- (4) The training programs must address the applicable sections of 14 CFR Part 121 Subpart N for large aircraft operations or 14 CFR Part 135 Subpart H for small aircraft or the recommendations in DOE G 440.2B-2

Chapter VII to provide sufficient detail to describe the requirements, management, and record keeping processes.

- e. A comprehensive, integrated aviation safety program. Each contractor must—
  - (1) define the work (e.g., the type(s) of aircraft operations to be conducted, missions, area(s) of operations);
  - (2) establish risk analysis and risk management procedures to identify hazards, including associated potential event initiated accidents and implement safety administrative and/or engineering controls to prevent or mitigate postulated hazards related accidents in order to mitigate hazards and manage risk to an acceptable level;
  - (3) conduct work along with associated required operations within established controls;
  - (4) conduct independent, internal assessments and oversight to verify that the standard elements required by this Order are implemented;
  - (5) establish a system for providing internal feedback on safety issues; communicating and reporting hazards, incidents, and accidents; and disseminating safety/accident prevention and related information;
  - (6) participate in the DOE's Aircraft Accident Incident Reporting System and any other accident or incident reporting systems prescribed by DOE policy;
  - (7) participate in the DOE Aviation Management and Safety Awards Program; and
  - (8) develop an accident response plan that includes—
    - (a) procedures for notifying NTSB and DOE of accidents and incidents [see definitions provided at 49 CFR 830, "Notification and reporting of aircraft accidents or incidents and overdue aircraft, and preservation of aircraft wreckage, mail, cargo, and records"; DOE O 225.1A, *Accident Investigation*; and DOE O 232.1A, *Occurrence Reporting and Processing of Operations Information*] and
    - (b) procedures that address the contractor's support of DOE responsibilities established in the Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies, NTSB Report Number SPC-99-04.
- f. Establishing policies and procedures to ensure the safety and airworthiness, for contractors that conduct Remotely Operated Aircraft (ROA) operations (see

Attachment 3, Definitions), outside the scope of Title 14 CFR, Chapter 1. The policies and procedures, which must be reviewed by the Departmental field element and have concurrence from the Director, OAM. The OAM Director must review and concur with the policies and procedures submitted by DOE elements that are not part of the National Nuclear Security Administration (NNSA). The OAM Director will review and make recommendations for or against approval to the Administrator, NNSA on ROA policies and procedures submitted by NNSA elements. If a difference of opinion develops between the Director, OAM, and the Administrator, NNSA regarding whether a ROA policy or procedure should be approved they will bring the issue to the Secretary or Deputy Secretary for resolution or direction. The following requirements must be established:

- (1) Fail-safe Principles. Fail-safe principles will govern the design of ROA flight critical systems. The flight critical systems must be independent and/or adequately redundant with back-up features that will provide for safe functioning of the ROA in the event of flight critical system failure.
- (2) Failure Detection. Any system design must provide a failure detection apparatus (preflight and in-flight built-in-test) that will notify the ROA operator of a flight critical system failure.
- (3) Flight Control and Navigation Software Verification and Validation. All ROA flight control and navigation system software verification and validation activities must be performed in accordance with Radio Technical Commission for Aeronautics (RTCA) Design Objective 178B or current RTCA or other FAA standards.
- (4) Flight Control System. The flight control system must include the ROA operator controls, sensors, computers, and actuation parts necessary to control the ROA flight trajectory throughout the entire mission profile and ensure the following:
  - (a) adequate stability throughout the expected flight envelope;
  - (b) any single failure of the flight control system will not significantly affect the operator's ability to control ROA recovery;
  - (c) provisions for possible revision to degraded modes of operation are incorporated into flight control system design; and
  - (d) the ROA will remain controllable in the event of propulsion system failure.
- (5) Electrical System. The electrical system must provide sufficient power and endurance to ensure safe operations and recovery throughout all phases of flight. In the event of an emergency, the electrical system or

emergency power supply should be of sufficient capacity to enable recovery at either the intended or a predetermined/alternate recovery area.

- (6) Communications System/Data Link(s). Approval for all frequencies used in ROA operations must be obtained from the Federal Communications Commission.
  - (a) The maximum range of the communication link must be determined and sustained by the ROA operator.
  - (b) Any single failure of the communications system (uplink or downlink) must not affect normal control of the ROA.
  - (c) Uplinks/downlinks are sensitive to electromagnetic interference and must be adequately protected from this hazard.
  - (d) Aircraft designs must incorporate provisions for recovery of the ROA in the event of temporary or total loss of the communication system.
- (7) Navigation System. The aircraft navigation system must meet the required navigation performance standards for the airspace classification in which the operations are to be conducted (see Attachment 4, Table 2). Navigation system designs must also consider the complexity and level of air traffic operations found in the airspace in which the ROA will operate. Operation of ROAs in the National Airspace System (NAS) must have FAA approval (see Attachment 4), except within the boundaries of the NAS classified as restricted airspace or warning areas.
- (8) Propulsion System. All essential elements of the propulsion system, including the engine, engine controls, propeller, propeller components, actuators, and essential sensors, must meet documented reliability standards established by industry or U.S. specifications or comply with Attachment 4.
- (9) Aircraft Control Station. Manned aircraft cockpit features (e.g., control placement and ease of control column forces) do not have to be duplicated exactly.
  - (a) Station design must facilitate control of the ROA by the internal pilot and provide for unambiguous operations and clear indications of ROA flight status.
  - (b) Design criteria must minimize the potential for human error. All “conventional” flight indications and warnings necessary to ensure safe control of the ROA flight path must be provided. In particular, the ROA pilot must be informed of any degraded mode

of operations due to any failure, including cases in which there is an automatic switching to an alternate or degraded mode of operation.

- (c) The control station must include a diagnostic and monitoring capability for the status of the ROA. Real-time, direct communication/surveillance and/or latent data transmission capability must be provided in the absence of failure.
  - (d) For operations in controlled airspace, direct communication with the FAA controlling agency must be incorporated into the ROA control station system design.
  - (e) If more than one ROA operation is occurring at the same time and the ROAs are being controlled from the same terminal, conduct an evaluation of the tasks required by the operator/pilot: determine if adequate controls and monitors exist; and verify that operator workload is such that control can be maintained to operate the simultaneous ROA operations. Considerations should be given to whether one or more of the ROAs are under autonomous control or manual control by the operator pilot.
  - (f) If an external operator pilot, (other than the operator in the control station) is used during the takeoff and landing phases of the flight and receives flight parameter information from the aircraft control station through an intercommunication system, the intercommunication system between the operator and the control station must be as reliable as conventional aircraft communication systems.
- (10) Flight Termination System. The ROA operator must have a means of safely terminating flight of the vehicle or aircraft in all phases of flight operations. The flight termination system must avoid the use of explosives to the maximum extent possible.
- (11) Airworthiness. A statement indicating compliance with the listed or otherwise identified sections in Attachment 4 or compliance with 14 CFR Part 21.17 (b), as applicable, must be submitted by the ROA operator or manufacturer.
- (a) An operator or manufacturer may substitute alternate data in place of the data listed in Attachment 4. The data must specifically address the substituted paragraph(s) and note the substitution in the compliance statement. The alternate data must also provide a level of safety at least equivalent to the level of safety specified in Attachment 4, Table 1. All alternate data must be documented; a DOE Flight Readiness Review Board will make the final



determination regarding the justification and merit of the proposed alternate data.

- (b) FAA Advisory Circulars 43.13-1B and 43.13-2A, Change 2, must be used by repairmen or technicians in the fabrication, installation, and repair of the airframe and components.
- g. Aviation safety documentation for each mission that has risks not normally accepted by the public must be developed. Risks not normally accepted by the public, is defined as an aircraft operation (Other than aerial transportation of personnel and cargo, aerial patrols, aerial photography, aerial survey, and aerial application) that is not regulated or cannot comply with the applicable parts of 14 CFR Chapter 1, the Federal Aviation Regulations or 49 CFR Subchapter C.
- h. Requirements for a CAS provider or subcontractor that provides CAS to comply with the civil standards (Title 14 CFR Chapter 1, 49 CFR Chapter XII, 49 CFR Subchapter C or DOE DOT Special Permits or exemptions) applicable to the type of operations conducted while in service to the Department or its contractor.
- i. An FAA-accepted or FAA-approved continued airworthiness maintenance and inspection program [Title 14 CFR, Chapter 1 Part 91.409 (g)], applicable to the type and model aircraft operated, if operating former military aircraft, other than (1) aircraft owned by the Armed Forces or operated on behalf of the U.S. Government by Armed Forces personnel as defined by United States Code (U.S.C.) Title 10 or (2) aircraft owned and operated by the National Guard.
- j. Requirements for a passenger manifest to be completed and maintained.
  - (1) That a copy of the manifest will be kept at the office of the responsible authority for two fiscal years following the year during which the flight occurred; and
  - (2) As a minimum, the manifest will consist of the full name of each passenger for each leg of the flight, a person to be contacted in the event of an emergency (who is not aboard the flight), and a telephone number for the emergency contact. The contractor may provide a substitute process for listing emergency contact information, as long as the process provides for prompt notification of next of kin in the event of an incident or accident.
- k. Requirements to perform weight and balance calculations for Federal and CAS providers to ensure that aircraft are within the manufacturer's and FAA- or military-established weight and balance limitations for each operation, flight, or mission profile for which the aircraft are to be operated.

- l.
- m. CAS providers to be evaluated by a qualified aviation person or DOE designee before the initiation of flight operations. If a continuing need will exist, evaluations must be conducted every 24 months thereafter.
- n. Accurate information be obtained to facilitate the reporting accountability to appropriate oversight entities.
  - (1) Each contractor operating, using, or sponsoring the use of Government aircraft must appoint a responsible individual to maintain the required records and reports of aircraft use and the other required reports established by this Order. The name of the responsible individual must be provided to field office manager or designee.
  - (2) Each contractor is required to submit quarterly reporting of flight and alert hours, operations and administrative overhead costs, scheduled and unscheduled maintenance costs, and other relevant information to the Federal Aviation Interactive Reporting System or successor system as required by Federal Management Regulation ([41 CFR part 102-33) or successor regulation promulgated by GSA. Accepted CAS providers must be reported to OAM or the DOE Accepted Operator Database as soon as possible.
- o. Establish an internal cost-analysis, review and approval process for the acquisition and use of commercial aviation service providers to support Departmental non-mission travel requirements. The contractor must:
  - (1) Maintain records, including cost comparisons, approvals, actual use and costs, for a minimum of two years from the date of the flight.
  - (2) Report actual use and costs data to your Aviation Management Office for reporting to FAIRS or successor system.
- p. Requirements for a contractor working under a contract with DOE, that is paid at a rate equal to or more than the minimum rate for the Senior Executive Service and has senior executive responsibilities listed as “Key Management Personnel” in the contract to obtain approval from the DOE Offices of General Counsel prior to traveling on-board Government aircraft, for other than mission requirements travel. (Personnel in this category are found listed in the contract under “Key Management Personnel.”)

### DEFINITIONS

1. (Aircraft) Accident. An occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked and in which any person suffers death or serious injury or the aircraft receives substantial damage
2. Accepted Commercial Aviation Services. A commercial aircraft service provider that has been reviewed by representatives of the Department and found to meet the safety and operational standards established by the Department for aviation operations. A list of accepted commercial aircraft service providers may be found in the “Accepted Operator Database” maintained by OAM. DOE Federal aircraft are included in this database; however, regularly scheduled domestic airlines are not reviewed by the Department and are not included in the database.
3. Approving Official. An individual delegated the authority to approve planned official travel within an office or division and who determines that the travel is necessary and that funds are available. This person is also responsible for reviewing travel vouchers to ensure that the traveler performed the travel as authorized.
4. Aviation Implementation Plan (AIP). A written document prepared to identify the programs, management roles, responsibilities, and authorities, practices, procedures, and other actions necessary to implement aviation operations in compliance with all applicable laws, regulations, Orders, and requirements and in a manner commensurate with the hazards associated with the particular workplace, including the schedules for implementing such actions to achieve compliance, if necessary. The AIP may be in any form that is logical in its presentation, such as an aircraft operations manual, field notice, policy, order, etc..
5. Charter Aircraft. An aircraft operated and maintained by a commercial aviation service provider that is hired by an executive Agency under a contractual agreement specifying performance and a one-time exclusive use.
6. Commercial Aviation Services. Include the following:
  - a. leased aircraft;
  - b. aircraft chartered or rented for exclusive use;
  - c. full services (i.e., aircraft maintenance providers, aircraft, and related aviation services for exclusive use) contracted for or obtained through an inter-service support agreement (ISSA), regardless of the length of the contract or agreement;  
or
  - d. aviation services (i.e., services but not aircraft) obtained by commercial contract or ISSA, except those services acquired to support a Federal aircraft.

7. Company Aircraft. Any of the following: Corporate owned, privately owned, or aircraft owned by a non-profit organization or union that is not engaged in commercial purposes or for hire to the general public.
8. Crewmember. A person assigned to operate or assist in operating a government aircraft during flight time. Crewmembers perform duties directly related to the operation of the aircraft (e.g., as pilots, co-pilots, flight engineers, navigators) or duties assisting in the operation of the aircraft (e.g., as cabin safety specialists, crew chiefs).
9. Critical Safety Item. Any part, assembly, or installation containing a critical characteristic whose failure, malfunction or absence could cause a catastrophic failure resulting in loss or serious damage to the aircraft or an uncommanded engine shutdown resulting in an unsafe condition. These items may also be referred to as Flight Safety Critical Aircraft Part (FSCAP).
10. DOE Element. Any of the following: Program Secretarial Offices, Power Marketing Administrations, National Security Administration, Operations Offices, Special Projects Offices, National Laboratories, etc., that are part of the United States Department of Energy.
11. Federal Aircraft. An aircraft that an executive Agency owns, bails, or borrows for any length of time.
12. Federal Traveler. For the purposes of this order, 41 CFR 301-10.260-266 and 301-70.800-910, a person who travels on a Government aircraft and who is either
  - a. A civilian employee in the Government service;
  - b. A member of the uniformed or foreign services of the United States Government; or
  - c. A contractor working under a contract with an executive agency.
13. Flight Crewmember. A pilot, flight engineer, flight navigator or cabin safety personnel assigned to duty in an aircraft during flight time.
14. Flight Readiness Review Board. A Flight Readiness Review Board is a body of experts that advises Departmental managers on the hazards of a proposed aviation operation.
15. Government Aircraft. Any (Federal or Commercial Aviation Service) aircraft owned, leased, chartered, or rented by of an executive Agency other than a branch of the Armed Forces or an intelligence agency.
16. (Aircraft) Incident. An occurrence associated with the operation of an aircraft, other than an accident, that affects or could affect the safety of operations.
17. Incidental Pilot. A full-time Federal employee of DOE that is responsible for managing and operating DOE Federal aircraft; is assigned as an aviation management or safety

professional that is responsible for the direct management or oversight of DOE Federal aircraft with a position description other than a GS-2181, Pilot; and is qualified and proficient to act as a flight crewmember performing flight crewmember duties.

18. Mission Personnel. Are either flight crewmembers, crewmembers or qualified non-crewmembers (see definitions).
19. Mission Requirements. In relation to use of Government aircraft at the Department of Energy, means activities that constitute the discharge of the Department's official responsibilities. Examples of Mission requirements include, but are not limited to: Aerial Survey, such as atmospheric sampling, biological surveys, radiological surveys, natural resource management, oceanic, atmospheric, and geological research, etc.; Aerial Photography, for consequence management, decommissioning of facilities, construction, law enforcement, etc.; Aerial Patrols, such as law enforcement and intelligence activities, power line patrols, pipeline patrols, security, search and rescue, etc.; Transportation, such as transportation of prisoners, detainees, illegal aliens, mission personnel, fire fighting, rescue operations, cargo, etc.; Research and Development such as aeronautical and space research, aerial sensor development, etc.; Rotorcraft External Load operations such as fire fighting, agriculture management, construction, etc.; Training such as flight or mission crew training. Travel aboard Government aircraft for purposes of attending meetings, site visits, training not associated with operation of the aircraft or duties on-board the aircraft, or conferences or making speeches are examples of travel that are not mission requirements travel.
20. Official Travel. Means (i) travel to meet mission requirements, (ii) required use travel, and (iii) other travel for the conduct of agency business.
21. Non-Federal traveler. For the purposes of this Order and 41 CFR 301-10.260 through 301-10.266 and 41 CFR 301-70.800 through 301-70.910, an individual who travels on a government aircraft, but is not a Federal traveler. Dependents and other family members of Federal travelers who travel on Government aircraft are considered to be non-Federal travelers within this order and the Federal Travel Regulation.
22. Passenger. Any individual on-board an aircraft who is not a flight crewmember, crewmember, or qualified non-crewmember.
23. Private Aircraft. Aircraft owned by an individual, corporation or company that is not engaged in commercial purposes or for hire to the general public.
24. Qualified Non-Crewmember. A person flying onboard a Government aircraft whose skills, duties or expertise are essential to performing or associated with performing the (non-travel related) Governmental mission requirement for which the aircraft was dispatched. Qualified non-crewmembers may be researchers, flight directors, electronics technicians, system operators, photographers, law enforcement agents, fire fighters, agricultural engineers, emergency medical personnel, biologists, etc.

25. Required Use Travel. Travel of an executive agency officer or employee for which the use of Government aircraft is required to meet bona fide communications or security needs of the Agency or exceptional scheduling requirements. An example of a bona fide communications requirement is having to maintain continuous 24-hour secure communications with the traveler. Bona fide security requirements include, but are not limited to, life threatening circumstances. Exceptional scheduling requirements include emergencies and other operational considerations which make commercial transportation unacceptable.
26. Senior Federal Official. An individual who is paid according to the Executive Schedule established by 5 U.S.C. 53, Subchapter II, including Presidential appointees who are confirmed by the Senate; employed in the U.S. Government's Senior Executive Service or an equivalent "senior" service; who is a civilian employee of the Executive Office of the President; who is appointed by the President to a position under section 105(a)(2)(A), (B), or (C) of title 3 U.S.C. or by the Vice President to a position under section 106(a)(1)(A), (B), or (C) of title 3 U.S.C; or who is a contractor working under a contract with an executive agency, is paid at a rate equal to or more than the minimum rate for the Senior Executive Service, and has senior executive responsibilities. The term senior Federal official, as used in this Order and the Federal Travel Regulation does not mean an active duty military officer.
27. Sponsoring Agency. A U.S. Government Agency with primary responsibility for the mission under which the travel was initiated.
28. Supplemental Pilot. A pilot that is not a permanent (full-time) employee of the DOE or the contractor responsible for managing and operating Federal aircraft, who is hired on a temporary basis to augment an organization's flight operations.
29. Remotely Operated Aircraft (ROA). For the Department of Energy, a ROA is a powered aircraft; with a 61-knot or less V<sub>so</sub> stall speed as defined in Title 14 CFR Chapter 1, Part 23, Sec. 23.49; or is a rotorcraft with a 6-pound per square foot main rotor disc loading limitation, under sea level standard day conditions; has a vehicle gross weight of 500 pounds to 12,500 pounds; is capable of flight beyond visual line of sight under remote or autonomous control for civil (non-Department of Defense) purposes. An ROA is not operated for sport or hobby and does not transport passengers or crew. In addition, this definition, for DOE purposes, also means the same as unmanned aerial system (UAS) and unmanned aerial vehicle (UAV).

## **REMOTELY OPERATED AIRCRAFT OPERATIONS AND AIRWORTHINESS**

### **BACKGROUND**

Starting in 1994, Department of Energy (DOE) Headquarters aviation personnel initiated a review of DOE policies and standards for Remotely Operated Aircraft (ROA) operations. Working with Federal Aviation Administration (FAA) Headquarters personnel, field, laboratory, and FAA field representatives DOE developed an interim ROA guidance that was implemented on December 22, 1994. That guidance is now codified within DOE O 440.2B, *Aviation Management and Safety*. This attachment provides more detailed information for the field to comply with the requirements of the Order regarding ROA operations and airworthiness.

Experience has been gained with ROAs operated by the Department of Defense (DoD) in Special Use Airspace. However, because civilian use of ROAs in the National Airspace System (NAS) is limited, there is a lack of civilian experience in ROA operations and a lack of data relating to ROA use in non-DoD operations. In as far as DOE operations, the terms unmanned aerial vehicle (UAV) and unmanned aerial system (UAS) are synonymous with remotely operated aircraft (ROA).

ROAs incorporate state-of-the-art technologies that require more complex designs, fabrication techniques, and systems integration when compared to manned light aircraft. These include—

- Airframe structural design
- Design and testing practices
- Materials and components selection and applications
- Flight controls and programming
- Data communication/telemetry links
- Navigation systems
- Power management
- Configuration control
- Pilot and air crew training and procedures
- Flight testing programs definition and management
- ROA maintenance and inspection requirements
- Hazardous materials
- Operational hazards mitigation

- Ground-station operations and maintenance procedures

## **FINDINGS**

1. ROAs conducting research missions cannot be expected to operate at an equivalent level of safety as certified, manned aircraft because there is nobody onboard the aircraft. In lieu of an onboard pilot, there is a multitude of complex onboard and ground systems between the pilot and the controls of the aircraft.
2. Since ROA systems are more complex, higher skill levels are needed to support ROA operations. Therefore, proficiency and currency are important requirements for the pilots/operators, maintenance technicians, and logistics personnel.
3. ROA mission safety has been achieved primarily through the reliability of system components (hardware/software) and the ability to design, test, install, operate and maintain them correctly.
4. ROA mission success depends heavily on the availability of several systems external to the aircraft such as satellites, ground control stations, and relay aircraft.
5. Given total system complexity, the checklists for the aircraft, payload, ground station, etc., are more complex, and pre-flight preparations are time consuming.
6. ROAs rely on radio communications and are susceptible to interference and jamming.
7. ROA operations and training are unique and require highly specialized pilots and other operational personnel.
8. Operators of ROAs should have a comparable level of training and aeronautical experience on the safe use of their specific ROA as a comparable type of manned aircraft.
9. The ROA pilot/operator should comply with the experience and proficiency requirements contained in FAR 61 with appropriate modifications recommended by the ROA manufacturer/owner and concurred with by the Flight Readiness Review Board. Also, a third-class medical certificate should be held by the ROA pilot.
10. The Title 14 CFR, Chapter 1, "Federal Aviation Regulations" (FAR) parts validation review substantiated the following:
  - a. The use of applicable sections of Parts 21, 23, 33, 35, and 43 along with Part 91 and Advisory Circular 43.13-1B and 43.13-2A, change 2, do provide valid guidance and baseline reference material for evaluating ROAs until formal FAA standards are developed.
  - b. When evaluating a new ROA design, the use of selected portions of FAR Part 23 for small fixed-wing aircraft in combination with subjective evaluations by Designated Engineering Representatives (DERs) and Designated Airworthiness Representatives (DARs) is recommended until FAA regulations are published.



For other types of aircraft compliance with 14 CFR Part 21.17(b) in combination with subjective evaluations by DERs and DARs is recommended.

- c. The ROA flight readiness review process adopted by DOE should incorporate the use of the FAR 23 checklist (see Table 1), developed as a guide to ensure compliance with DOE requirements.
- d. The results of the 1994 review directed toward evaluating the completeness of DOE policy follows:
  - (1) Part 21. The ROA manufacturer/operator should install components, hardware, parts, avionics, and should use manufacturing processes that meet the intent of 14 CFR 21. A compliance statement by the manufacturer/operator should indicate that the ROA meets the design and construction requirements of applicable sections of 14 CFR 21. The manufacturer/operator should use FAA DERs in the areas of structures, powerplant, flight test, systems and equipment, and a DAR to validate that the proposed aircraft meets the requirements of DOE airworthiness interim guidance for ROAs until FAA procedures have been established and approved.
  - (2) Part 23. See Table 1.
  - (3) Part 33. It is recommended that DOE require a DER report from the manufacturer/operator stating that the engines meet an acceptable safety standard. This report should include the methods and results of the tests required by the 33.49 endurance test.
  - (4) Part 35. It is recommended that DOE require a DER (Powerplant/Propeller) report from the manufacturer/operator stating that the propeller(s) meet an acceptable safety standard.
  - (5) Part 43. Maintenance practices vary greatly with the design and construction of each ROA. Standard aircraft maintenance practices should be followed to the maximum extent possible. Information should be obtained from the manufacturer of the vehicle and should be used as a basis to establish inspection and repair programs. The remote piloted aspect of the ROA makes it more difficult to evaluate inflight failures. A sound maintenance program is extremely vital to the safe operation of the ROA. Maintenance and repair of the ROA should follow the guidance in FAR 43.2 through 43.16. Personnel performing maintenance should be certificated in accordance with FAR 65. Maintenance of ground control equipment should be governed by manufacturers' recommended inspection and overhaul periods.
    - (a) Requirements for the ROA total system (aircraft, control van, antennas, etc.) maintenance should be established and should

require training prior to performing any maintenance. This training should be developed and provided by the ROA manufacturer.

- (b) The following inspections and procedures should be developed by the manufacturers and accomplished by the ROA operator:
  - 1 Pre-flight. The manufacturer should develop functional test to be performed prior to ROA dispatch.
  - 2 Post-flight inspection. These procedures should be developed by the manufacturer and should include functional test of systems following any flight to determine system performance and condition.
  - 3 Built-in test. Aircraft internal software procedures to determine the level of airworthiness established by predetermined critical system or components should be accomplished after each flight.
  - 4 Inspections. An inspection procedure should be established which would include a complete inspection of the aircraft within a 12-month period.
- (c) Permanent aircraft maintenance records should be established for each ROA (aircraft). These records should contain aircraft total time, engine total time, and propeller total time. Any maintenance, repairs, preventive maintenance, or alterations performed to the aircraft should be entered in this record and signed by the person performing the work.
- (6) Part 91. FAR Part 91, "General Operating and Flight Rules," should apply generally to include Subparts A, B, C, D, E and J. Each ROA manufacturer or operator should submit a complete set of operational manuals, checklists, etc., and maintenance procedure manuals, checklists, etc., to the FRRB for approval. In addition, each ROA manufacturer should obtain any waivers to Part 91 through the process in Subpart J, above. Other than operations within Class A airspace, restricted and warning areas will require a chase aircraft (FAA handbook 7610.4H) with direct communication with the controlling source facilities. Important planning and operational considerations are included below:
  - (a) Mission profiles with specific objectives should be prepared and briefed prior to conducting operations (i.e. training, flight test, engineering support, familiarization, etc.). Standard mission profiles should be developed for regularly scheduled/conducted

flights. Other special mission profiles should be constructed and briefed on a case-by-case basis.

- (b) ROAs should avoid flying over populated areas to the maximum extent possible.
- (c) FAA Part 91 weather minimums should be complied with for all flight operations. Pilots should maneuver the aircraft to remain clear of clouds during departure, enroute, and recovery.
- (d) Prior to conducting operational flights in a new location, a frequency request should be submitted and approved, to avoid inadvertent frequency interference and possible loss of aircraft control.
- (e) When operating at an airfield with an operating control tower, standard FAA procedures should be observed. A memorandum of agreement should be signed between airfield operations and the operator ensuring applicable procedures will be complied with. Procedures listed in the Airman's Information Manual should be followed.
- (f) Contractor Standard Operating Procedures manuals need to address peculiar malfunction/emergency handling of ROAs.
- (g) NOTAMS should be used to block airspace and advise others of ROA limitations, etc.
- (h) Mission Coordination considerations:
  - 1 Certification of authorization (COA) for flight is required from the FAA for flights outside of airspace designated as restricted or warning areas. (Reference FAA Order 7610.4J, Chapter 12, Section 9)
  - 2 Submission of request to nearest FAA facility for review and determination:
    - a 60 days in advance of planned operation.
    - b Define mission requirements (specific).
    - c Use FAA Form 7711.2 or 7711.1 (Reference FAA Order 7210.3S, Chapter 18, obtain forms from FSDO).
  - 3 Flight notification (flight plan) required for all operations in controlled airspace.

- 4 Discrete transponder code required for ROA operations.
- 5 Communications between ROA operator and air traffic facility will be through normal ATC procedures unless advance coordination has been accomplished.
- 6 Loss of communications will terminate mission:
  - a ROA operator to ROA.
  - b ROA operator to ATC.
- 7 Detailed procedures will be developed to cover real-time emergencies/loss of communications link.
- 8 Military facilities (ATC) are expected to coordinate with appropriate FAA facility.
- 9 FAA response (Certificate of Authorization) may contain special provisions (exceptions) for operations.

## **SUMMARY**

The information in Attachment 4 supersedes all previous guidance and places determination of airworthiness requirements with the manufacturer/operator of the ROA in accordance with the requirements in Attachment 4 or under the provisions of 14 CFR 21.17(b). Until FAA guidance in the form of Advisory Circulars and/or regulations is published concerning the certification and operation of ROAs, use of the DOE ROA policy and standards, as detailed in DOE O 440.2B section 4 paragraph j. and Attachment 4, represents a rational means to obtain a level of safety for ROAs conducting operations in the National Airspace System.

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
<b>Subpart A-General</b>				
23.3 Airplane categories	YES			Informational, defines category differences  Normal category definition is useful reference throughout Part 23
<b>Subpart B-Flight General</b>				
23.21 Proof of Compliance	YES			Establishes weight & balance requirements / tolerances for all of subpart B  Entire paragraph applicable to ROAs
23.23 Load distribution limits	YES			Establishes requirement for load distribution limits  Applies to ROAs
23.25 Weight Limits	YES			Requirement to establish maximum & minimum weights  Entire paragraph applicable to ROAs
23.29 Empty weight and corresponding center of gravity	YES			Requirement to establish empty weight and corresponding C.G.  Applies to ROAs
23.31 Removable ballast	YES			Allows use of removable ballast during testing  Applies to ROAs
23.33 Propeller speed and pitch limits	YES			Requirement to establish propeller speed and pitch limits  Appropriate to the type propeller being considered
<b>Performance</b>				
23.45 General	YES			Details atmospheric parameters and engine power requirement to be used when determining aircraft performance  Applies to ROAs
23.49 Stalling Speed	YES			Defines VS0 and VS1: Stalling speeds  Entire paragraph applicable to ROAs
23.51 Takeoff	YES			Establishes requirement to determine the distance to takeoff and climb to 50'  Applicable to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.75 Landing	YES			Establishes requirements to determine landing distances from 50 ft.  Applicable to ROAs
23.77 Balked Landing	YES			Establishes balked landing climb requirement.  Applicable to ROAs, (Required performance standard)
<b>Flight Characteristics</b>				
23.141 General	YES			Informational, addresses normal operating conditions and pilot capabilities
<b>Subpart C-Structure General</b>				
23.301 Loads	YES			General structural design criteria  Applies to ROAs
23.302 Canard or tandem wing configurations	YES			Canard structural requirement  Possible ROA application
23.303 Factor of safety	YES			Design requirement  Applies to ROAs
23.305 Strength and deformation	YES			Structural requirements  Applies to ROAs
23.307 Proof of structure	YES			Structural test requirements  Applies to ROAs
<b>Flight Loads</b>				
23.321 General	YES			General compliance requirements  Applies to ROAs
23.331 Symmetrical flight conditions	YES			Horizontal tail and wing load requirements  Applies to ROAs
23.333 Flight envelope	YES			Requirement for design envelope  Applies to ROAs
23.335 Design airspeeds	YES			Requirements for VA, VB, VC and VD  Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.337 Limit maneuvering load factors	YES			Requirements for + / - n Applies to ROAs
23.341 Gust load factors	YES			Canard Requirements Applies to ROAs
23.345 High lift devices	YES			Flaps design requirements Applies to ROAs
23.347 Unsymmetrical flight conditions	YES			Unbalanced moments requirement Applies to ROAs
23.349 Rolling conditions	YES			Wing loading conditions Applies to ROAs
23.351 Yawing conditions	YES			Vertical surface load requirement Applies to ROAs
23.361 Engine torque	YES			Engine mount design requirements Applies to ROAs
23.363 Side load on engine mount	YES			Engine mount design requirement Applies to ROAs
23.365 Pressurized cabin loads	YES			Pressure vessel design requirement Applies to ROAs
23.367 Unsymmetrical loads due to engine failure	YES			Multi-engine design requirement Applies to ROAs
23.369 Rear lift truss	YES			Special design requirement Applies to ROAs
23.371 Gyroscopic and aerodynamic loads	YES			Turbine engine mount requirements Applies to ROAs
23.373 Speed control devices	YES			Spoiler design requirement Applies to ROAs
<b>Control Surface and System Loads</b>				
23.391 Control surface loads	YES			General requirements Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.395 Control system loads	YES			Design requirements Applies to ROAs
23.397 Limit control forces and torques	YES			Control forces limitations ROA application using actuator forces
23.399 Dual control system	NO			Two pilot force limitations Not applicable to ROAs
23.405 Secondary control system	YES			General design requirements ROA application using actuator forces
23.407 Trim tab effects	YES			General design requirements ROA application using actuator forces
23.409 Tabs	YES			Design requirements Applies to ROAs
23.415 Ground gust conditions	YES			Control system requirement Applies to ROAs
<b>Horizontal Tail Surfaces</b>				
23.421 Balancing loads	YES			General design requirement Applies to ROAs
23.423 Maneuvering loads	YES			Design requirements Applies to ROAs
23.425 Gust Loads	YES			Design requirements Applies to ROAs
23.427 Unsymmetrical loads	YES			Design requirements Applies to ROAs
<b>Vertical Tail Surfaces</b>				
23.441 Maneuvering loads	YES			Design requirements Applies to ROAs
23.443 Gust loads	YES			Design requirements Applies to ROAs
23.445 Outboard fins	YES			Design requirements Applies to ROAs



<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
<b>Ailerons, Wing Flaps, and Special Devices</b>				
23.455 Ailerons	YES			Design requirements Applies to ROAs
23.457 Wing flaps	YES			Design requirements Applies to ROAs
23.459 Special Devices	YES			Spoiler test requirements Applies to ROAs
<b>Ground Loads</b>				
23.471 General	YES			General design requirements Applies to ROAs
23.473 Ground load conditions and assumptions	YES			Design Specifications Applies to ROAs
23.477 Landing gear arrangement	YES			General definitions Applies to ROAs
23.479 Level landing conditions	YES			Design requirements Applies to ROAs
23.481 Tail down landing conditions	YES			Design requirements Applies to ROAs
23.483 One-wheel landing conditions	YES			Design requirements Applies to ROAs
23.485 Side load conditions	YES			Design requirements Applies to ROAs
23.493 Braked roll conditions	YES			Design requirements Applies to ROAs
23.497 Supplementary conditions for tail wheels	YES			Design requirements Possible ROA application
23.499 Supplementary conditions for nose wheels	YES			Design requirements Applies to ROAs
23.505 Supplementary conditions for skiplanes	YES			Special design requirements Possible ROA application

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.507 Jacking loads	YES			Design requirements  Applies to ROAs
23.509 Towing loads	YES			Design requirements  Applies to ROAs
23.511 Ground load; unsymmetrical loads on multiple wheel units	YES			Design requirements  Applies to ROAs
<b>Water Loads</b>				
23.521 Water load conditions	YES			General seaplane / amphibian requirements  Possible ROA application
23.523 Design weight and C. G. positions	YES			Water load requirements  Possible ROA application
23.525 Application of loads	YES			Seaplane / Amphibian design requirements  Possible ROA application
23.527 Hull and main float load factors	YES			Design requirements  Possible ROA application
23.529 Hull and main float landing conditions	YES			Design requirements  Possible ROA application
23.531 Hull and main float takeoff condition	YES			Design requirements  Possible ROA application
23.533 Hull and main float bottom pressures	YES			Design specifications  Possible ROA application
23.535 Auxiliary float loads	YES			Design requirements  Possible ROA application
23.537 Seawing loads	YES			Design requirements  Possible ROA application
<b>Fatigue Evaluation</b>				
23.571 Pressurized Cabin	YES			Evaluation specifications  Possible ROA application

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.572 Wing, empennage, and associated structures	YES			Evaluation specifications Applies to ROAs
25.573 Damage tolerance and fatigue evaluation	YES			Evaluation specifications Applies to ROAs
<b>Subpart D-Design and Construction</b>				
23.601 General	YES			General requirements Applies to ROAs
23.603 Materials and workmanship	YES			Specific requirements Applies to ROAs
23.605 Fabrication methods	YES			Specific requirements Applies to ROAs
23.607 Self locking nuts	YES			Specific requirements Applies to ROAs
23.609 Protection of structure	YES			Specific requirements Applies to ROAs
23.611 Accessibility	YES			Specific requirements Applies to ROAs
23.613 Material strength properties and design values	YES			Specific requirements Applies to ROAs
23.619 Special factors	YES			Safety factor requirements Applies to ROAs
23.621 Casting factors	YES			Design requirements Applies to ROAs
23.623 Bearing factors	YES			Design requirements Applies to ROAs
23.625 Fitting factors	YES			Design requirements Applies to ROAs
23.627 Fatigue strength	YES			Design requirements Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.629 Flutter	YES			Analytical and test methods Entire paragraph as applies to ROAs
<b>Wings</b>				
23.641 Proof of strength	YES			General requirements Applies to ROAs
<b>Control Surfaces</b>				
23.651 Proof of strength	YES			Test requirements Applies to ROAs
23.655 Installation	YES			Design requirements Applies to ROAs
23.657 Hinges	YES			Design requirements Applies to ROAs
23.659 Mass balance	YES			Design requirements Applies to ROAs
<b>Control Systems</b>				
23.671 General	YES			General requirements Applies to ROAs
23.672 Stability augmentation and automatic systems	YES			Design requirements Applies to ROAs
23.673 Primary flight controls	YES			Design requirements Applies to ROAs
23.675 Stops	YES			Design requirements Applies to ROAs
23.677 Trim systems	YES			Design requirements Applies to ROAs
23.679 Control system locks	YES			Design requirements Applies to ROAs
23.681 Limit load static tests	YES			Design requirements Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.683 Operation tests	YES			Test requirements Include entire paragraph as applicable to ROAs
23.685 Control system details	YES			Design requirements Applies to ROAs
23.687 Spring devices	YES			Design requirements Applies to ROAs
23.689 Cable systems	YES			Design requirements Applies to ROAs
23.693 Joints	YES			Design requirements Applies to ROAs
23.697 Wing flap controls	YES			Design requirements Applies to ROAs
23.699 Wing flap position indicator	YES			Design requirements Applies to ROAs
23.701 Flap interconnection	YES			Design requirements Applies to ROAs
<b>Landing Gear</b>				
23.723 Shock absorption tests	YES			Test requirements Applies to ROAs
23.725 Limit drop tests	YES			Test requirements Applies to ROAs
23.726 Ground load dynamic tests	YES			Test requirements Applies to ROAs
23.727 Reserve energy absorption drop test	YES			Test requirements Applies to ROAs
23.729 Landing gear extension and retraction system	YES			Design requirements Applies to ROAs
23.731 Wheels	YES			Design requirements Concur - applicable to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.733 Tires	YES			Design requirements  Include entire paragraph as applicable to ROAs
23.735 Brakes	YES			Design requirements  Entire paragraph applies to ROAs
23.737 Skis	YES			Design requirements  Possible ROA application
<b>Floats and Hulls</b>				
23.751 Main float buoyancy	YES			Design requirements  Possible ROA application
23.753 Main float design	YES			Design requirements  Possible ROA application
23.755 Hulls	YES			Design requirements  Possible ROA application
23.757 Auxiliary floats	YES			Design requirements  Possible ROA application
<b>Personnel and Cargo Accommodations</b>				
23.777 Cockpit controls	YES			Design requirements  Applicable to ground station
23.779 Motion and effect of cockpit controls	YES			Design requirements  Applicable to ground station
23.781 Cockpit control knob shape	YES			Design requirements  Applicable to ground station
<b>Pressurization</b>				
23.841 Pressurized cabins	YES			Design requirements  Possible ROA application
23.843 Pressurization tests	YES			Test requirements  Possible ROA application
23.863 Flammable fluid fire protection	YES			Design requirements  Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.865 Fire protection of flight controls and other flight structure	YES			Design requirements  Applies to ROAs
<b>Lightning Protection</b>				
23.867 Lightning protection of structure	YES			Design requirements  Applies to ROAs
<b>Miscellaneous</b>				
23.871 Leveling means	YES			Design requirements  Applies to ROAs
<b>Subpart E-Powerplant General</b>				
23.901 Installation	YES			Defines powerplant installation and provides operating and maintenance requirements  Entire paragraph applies to ROAs
23.903 Engines	YES			Establishes engine / installation requirements  Include entire paragraph as applicable to ROAs
23.904 Automatic Power Reserve System	YES			APR system, if installed, must comply with appendix H of Part 23  Possible ROA application
23.905 Propellers	YES			Introduces propeller requirements  Include entire paragraph as applicable to ROAs
23.907 Propeller Vibration	YES			Requires measurement of vibration stresses  Include entire paragraph as applicable to ROAs
23.909 Turbocharger Systems	YES			Establishes turbocharger requirements  Include entire paragraph as applicable to ROAs
23.925 Propeller Clearance	YES			Establishes clearance requirements  Include entire paragraph as applicable to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.929 Engine installation ice protection	YES			Requires icing protection if icing approval is requested  Applies if, icing approval is requested for ROA
23.937 Turbopropeller-drag limiting systems	YES			Addresses system failure requirements  Applies, to turboprop ROA's
23.939 Powerplant operating characteristics	YES			Addresses adverse operating characteristics  Entire paragraph applies to ROAs
23.943 Negative acceleration	YES			Requires safe operation during negative 'G' flight  Applies to ROAs
<b>Fuel System</b>				
23.951 General	YES			Establishes general system requirements  Entire paragraph applies to ROAs
23.953 Fuel system independence	YES			Establishes multi-engine fuel system / tank requirements  Applies to ROAs
23.954 Fuel system lightning protection	YES			Requirement to prevent fuel vapor ignition by lightning  Applies to ROAs
23.955 Fuel flow	YES			Requirements for different types of fuel systems  Entire paragraph applies to ROAs
23.957 Flow between interconnected tanks	YES			Fuel flow requirements between tanks  Applies to ROAs
23.959 Unusable fuel supply	YES			Unusable fuel requirement for each tank  Applies to ROAs
23.961 Fuel system hot weather operation	YES			Requirement to test for vapor lock Applies to ROAs
23.963 Fuel tanks: general	YES			Includes multiple design requirements Applies to ROAs
23.965 Fuel tank tests	YES			Defines ground test requirements  Applies to ROAs



<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.967 Fuel tank installation	YES			Defines installation requirements  Entire paragraph applies to ROAs
23.969 Fuel tank expansion space	YES			Establishes requirement  Applies to ROAs
23.971 Fuel tank sump	YES			Details sump requirements  Applies to ROAs
23.973 Fuel tank filler connection	YES			Details filler requirements  Entire paragraph applies to ROAs
23.975 Fuel tank vents and carburetor vapor vents	YES			Details vent requirements  Applies to ROAs
23.977 Fuel tank outlet	YES			Details fuel strainer requirements  Entire paragraph applies to ROAs
23.979 Pressure fueling systems	YES			Details system requirements  Possible ROA application
<b>Fuel System Components</b>				
23.991 Fuel Pumps	YES			Establishes pump requirements  Entire paragraph applies to ROAs
23.993 Fuel system lines and fittings	YES			Establishes requirements  Applies to ROAs
23.995 Fuel valves and controls	YES			Establishes requirements  Entire paragraph applies to ROAs
23.997 Fuel strainer or filter	YES			Establishes filter requirements  Entire paragraph for consistent format
23.999 Fuel system drains	YES			Establishes requirement for drain(s) Applies to ROAs
<b>Oil System</b>				
23.1011 General	YES			Establishes general system requirements  Entire paragraph for consistent format
23.1013 Oil tanks	YES			Establishes design and installation requirements  Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.1015 Oil tank tests	YES			Details testing requirements  Applies to ROAs
23.1017 Oil lines and fittings	YES			System requirements for lines and breather lines  Applies to ROAs
23.1019 Oil strainer or filter	YES			Requirements for both turbine & reciprocating engines Applies to ROAs
23.1021 Oil system drains	YES			Establishes drain requirement  Applies to ROAs
23.1023 Oil radiators	YES			Establishes radiator requirements  Possible application to ROAs
23.1027 Propeller feathering system	YES			Addresses systems that use engine oil  Possible application to ROAs
<b>Cooling</b>				
23.1041 General	YES			General system requirements  Applies to ROAs
23.1043 Cooling tests	YES			Introduces ground & flight test conditions  Applies to ROAs
23.1045 Cooling test procedures for turbine engine powered airplanes	YES			Details test conditions  Applies to ROAs
23.1047 Cooling test procedures for reciprocating engine powered airplanes	YES			Details test conditions  Applies to ROAs
<b>Liquid Cooling</b>				
23.1061 Installation	YES			Details installation requirements  Applies to ROAs
23.1063 Coolant tank tests	YES			Details test requirements  Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
<b>Induction System</b>				
23.1091 Air induction system	YES			Establishes general system requirements  Include entire paragraph as applicable to ROAs
23.1093 Induction system icing protection	YES			Requirement to prevent & eliminate icing  Applies to ROAs
23.1101 Induction air preheater design	YES			Specifies design requirements  Applies to ROAs
23.1103 Induction system ducts	YES			Details system requirements  Applies to ROAs
23.1105 Induction system screens	YES			Lists screen requirements  Applies to ROAs
23.1107 Induction system filters	YES			Lists filter requirements  Applies to ROAs
23.1111 Turbine engine bleed air system	YES			Bleed air system requirements  Possible ROA application
<b>Exhaust System</b>				
23.1121 General	YES			Establishes general system requirements  Entire paragraph applies to ROAs
23.1123 Exhaust system	YES			Details system requirements  Applies to ROAs
23.1125 Exhaust heat exchangers	YES			Details system requirements  Entire paragraph Applies to ROAs
<b>Powerplant Controls and Accessories</b>				
23.1141 Powerplant controls: general	YES			Details general requirements  Entire paragraph applies to ROAs
23.1143 Engine controls	YES			Details control requirements  Entire paragraph applies to ROAs
23.1145 Ignition switches	YES			Details switch requirements  Entire paragraph applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.1147 Mixture controls	YES			Details control requirements  Applies to ROAs
23.1149 Propeller speed and pitch controls	YES			Details control requirements  Entire paragraph applies to ROAs
23.1153 Propeller feathering controls	YES			Details control requirements  Applies to ROAs
23.1157 Carburetor air temperature controls	YES			Requirement for each engine  Applies to ROAs
23.1163 Powerplant accessories	YES			Lists accessories requirements  Entire paragraph applies to ROAs
23.1165 Engine ignition systems	YES			Details systems requirements  Entire paragraph applies to ROAs
<b>Powerplant Fire Protection</b>				
23.1181 Designated fire zones; regions included	YES			Defines fire zones  Applies to ROAs
23.1182 Nacelle areas behind firewalls	YES			Defines environmental temperature requirement  Applies to ROAs
23.1183 Lines, fittings, and components	YES			Fire resistant requirements  Applies to ROAs
23.1189 Shutoff means	YES			Multi-engine shutoff requirement  Possible ROA application
23.1191 Firewalls	YES			Details firewall requirement  Applies to ROAs
23.1193 Cowling and nacelle	YES			Lists design requirements  Include entire paragraph as applicable to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.1203 Fire detector system	YES			Lists system requirements Applies to ROAs
<b>Subpart F-Equipment General</b>				
23.1301 Function and installation	YES			General requirements Entire paragraph applies to ROAs
23.1303 Flight and navigation instruments	YES			Cockpit instrument requirements Entire paragraph applies to ROAs
23.1305 Powerplant instruments	YES			Cockpit instrument requirements Entire paragraph applies to ROAs
23.1307 Miscellaneous equipment	YES			Other equipment requirements Entire paragraph applies to ROA
23.1309 Equipment, systems, and installations	YES			System requirements Applies to ROAs
<b>Instruments: Installation</b>				
23.1311 Electronic display instrument systems	YES			Electronic instrument requirements Applies to ROAs
23.1321 Arrangement and visibility	YES			Instrument requirements Applies to ROAs
23.1322 Warning, caution, and advisory lights	YES			Light requirements Applies to ROAs
23.1323 Airspeed indicating system	YES			System calibration requirements Applies to ROAs
23.1325 Static pressure system	YES			System requirements Applies to ROAs
23.1329 Automatic pilot system	YES			System requirements Applies to ROAs
23.1331 Instruments using a power source	YES			Power failure requirements Applies to ROAs
23.1335 Flight director systems	YES			System requirements Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.1337 Powerplant instruments	YES			System requirements Applies to ROAs
<b>Electrical Systems and Equipment</b>				
23.1351 General	YES			General systems requirements Applies to ROAs
23.1353 Storage battery design and installation	YES			System requirements Applies to ROAs
23.1357 Circuit protective devices	YES			Fuse/circuit breaker requirements Applies to ROAs
23.1361 Master switch arrangement	YES			Electrical system requirements Applies to ROAs
23.1365 Electric cables and equipment	YES			Cable requirements Applies to ROAs
23.1367 Switches	YES			Switch requirements Applies to ROAs
<b>Lights</b>				
23.1381 Instrument lights	YES			Illumination requirements Applies to ROAs
23.1383 Landing lights	YES			Visibility requirements Applies to ROAs
23.1385 Position light system installation	YES			Color requirements Applies to ROAs
23.1387 Position light system dihedral angles	YES			System lighting requirements Applies to ROAs
23.1389 Position light distribution and intensities	YES			Lighting requirements Applies to ROAs
23.1391 Minimum intensities in the horizontal plane of position lights	YES			Intensity specifications Applies to ROAs

<b>FAR 23 CHECKLIST</b>					
<b>ROA GENERAL TABLE 1</b>					
FAR Section and Title		Recommend Compliance	Yes/No	Alternate Data	Comments
23.1393	Minimum intensities in any vertical plane of position lights	YES			Intensity specifications  Applies to ROAs
23.1395	Maximum intensities in overlapping beams of position lights	YES			Intensity specifications  Applies to ROAs
23.1397	Color specifications	YES			Illumination specifications  Applies to ROAs
23.1399	Riding light	YES			Seaplane requirements  Possible ROA application
23.1401	Anticollision light system	YES			Required for night operations  Applies to ROAs
<b>Miscellaneous Equipment</b>					
23.1431	Electronic Equipment	YES			EMI/EMF requirements  Applies to ROAs
23.1435	Hydraulic systems	YES			Design specifications  Applies to ROAs
23.1437	Accessories for multiengine airplanes	YES			Multi-engine requirements  Applies to ROAs
23.1438	Pressurization and pneumatic systems	YES			System requirements  Possible ROA application
23.1459	Flight recorders	YES			On board recorder requirements  Possible ROA application
23.1461	Equipment containing high energy rotors	YES			Rotor failure requirements  Possible ROA application
<b>Subpart G-Operating Limitations and Information</b>					
23.1501	General	YES			Requirement to establish limits and provide information  Applies to ROAs
23.1505	Airspeed limitations	YES			Requirement to establish limits  Applies to ROAs

<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.1507 Operating Maneuvering speed	YES			Requirement to establish limits Applies to ROAs
23.1511 Flap extended speed	YES			Requirement to establish speed Applies to ROAs
23.1513 Minimum control speed	YES			Requirement for multi engine airplanes Applies to ROAs
23.1519 Weight and center of gravity	YES			Requirement to establish limits Applies to ROAs
23.1521 Powerplant limitations	YES			Requirement to establish limits and provide information Applies to ROAs
23.1523 Minimum flight crew	YES			Requirement based on crew workload Applies to ROAs
23.1525 Kinds of operation	YES			Requirement to establish operational environment Applies to ROAs
23.1527 Maximum operating altitude	YES			Requirement to establish limits Applies to ROAs
23.1529 Instructions for Continued Air worthiness	YES			Requirement to prepare instructions Applies to ROAs
<b>Markings and Placards</b>				
23.1541 General	YES			General requirements Applies to ROAs
23.1543 Instrument markings: general	YES			General requirements Applies to ROAs
23.1545 Airspeed indicator	YES			Specific requirements Applies to ROAs
23.1549 Powerplant and APU instruments	YES			Specific requirements Applies to ROAs
23.1551 Oil quantity indicator	YES			Specific requirements Applies to ROAs



<b>FAR 23 CHECKLIST</b>				
<b>ROA GENERAL TABLE 1</b>				
FAR Section and Title	Recommend Compliance	Yes/No	Alternate Data	Comments
23.1553 Fuel quantity indicator	YES			Specific requirements  Applies to ROAs
23.1553 Fuel quantity indicator	YES			Specific requirements  Applies to ROAs
23.1555 Control markings	YES			Specific requirements  Applies to ROAs
23.1557 Miscellaneous markings and placards	YES			Marking requirements  Applies to ROAs
23.1559 Operating limitations placard	YES			Placard requirements  Applies to ROAs
23.1563 Airspeed placards	YES			Placard requirements  Applies to ROAs
<b>Airplane Flight Manual and Approved Manual Material</b>				
23.1581 General	YES			General manual requirements  Applies to ROAs
23.1583 Operating limitations	YES			Specific requirements  Applies to ROAs
23.1585 Operating procedures	YES			Procedures requirements  Applies to ROAs
23.1587 Performance information	YES			Data requirements  Applies to ROAs
23.1589 Loading information	YES			Loading instructions  Applies to ROAs

**ROA GENERAL Table 2. Operations**

Title 14 CFR Chapter 1 References	Compliance Required	FRRB Controls
Part 91 General Operating and Flight Rules		
Sec. 91.1, Applicability		
Sec. 91.3, Responsibility of PIC		
Sec. 91.11, Interfering with crew		
Sec. 91.13, Careless or reckless operations		
Sec. 91.101, Aircraft within 12 miles of coastline		
Sec. 91.103, Preflight actions		
Sec. 91.105, Flight crew at station		
Sec. 91.111, Operating near other aircraft		
Sec. 91.113, Right of way		
Sec. 91.115, Right of way		
Sec. 91.117, Aircraft speed		
Sec. 91.119, Minimum altitudes		
Sec. 91.121, Altimeter settings		
Sec. 91.123, Compliance with ATC		
Sec. 91.125, Light signals		
Sec. 91.126, Operating in airspace G		
Sec. 91.127, Operating in airspace E		
Sec. 91.129, Operating in airspace D		
Sec. 91.130, Operating in airspace C		
Sec. 91.131, Operating in airspace B		
Sec. 91.135, Operating in airspace A		
Sec. 91.137, Temporary flight restrictions		
Sec. 91.138, Temporary flight restrictions		
Sec. 91.139, Emergency ATC rules		
Sec. 91.141, Flight restrictions near President		
Sec. 91.144, Temp. flight restrictions/high barometer		

**ROA GENERAL Table 2. Operations**

Title 14 CFR Chapter 1 References	Compliance Required	FRRB Controls
<b>Part 91 General Operating and Flight Rules, continued</b>		
Sec. 91.151, Fuel-VFR		
Sec. 91.153, VFR flight plan		
Sec. 91.155, VFR weather		
Sec. 91.159, VFR cruise altitudes		
Sec. 91.169, IFR flight plan		
Sec. 91.173, ATC clearance/flight plan required		
Sec. 91.175, Take and landing IFR		
Sec. 91.177, Minimum altitude IFR		
Sec. 91.179, IFR cruise altitude		
Sec. 91.181, Course to be flown/IFR		
Sec. 91.183, IFR commo		
Sec. 91.185, IFR commo failure		
Sec. 91.187, IFR malfunction reports		
Sec. 91.191, Cat II manual		
Part 91.193, Cat II authorization		
Part 91.205, Equipment required		
Part 91.209, Aircraft lights		
Part 91.213, Inop equipment		
Part 91.215, ATC use		
Part 91.217, Data correspondence		
Part 91.219, Altitude alert		
Part 91.221, Traffic alert		
Part 91.303, Aerobatic flight		
Part 91.305, Flight test areas		