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**NASA COMMERCIAL AVIATION SERVICES (CAS) STANDARD**

# NASA-STD-7919.1

## DOCUMENT HISTORY LOG

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## FOREWORD

This NASA technical standard provides uniform engineering and technical requirements for processes, procedures, practices, and methods that have been endorsed as standard for NASA facilities, programs, and projects, including requirements for selection, application, and design criteria of an item.

NASA acquires commercial aircraft services (CAS) for the purpose of supporting NASA public and civil use aircraft operations supporting NASA programs and projects using aircraft. This Standard outlines the standards for aircraft airworthiness, operations, maintenance, aviation management, and aviation safety requirements for protecting the public, the NASA workforce, and property during these commercial aircraft flight activities. This Standard serves as a companion to NPR 7900.3 and provides each NASA program, project, and aircraft operation with specific technical requirements and assessment methods to assure compliance.

Requests for information, corrections, or additions to this standard should be submitted to the NASA Office of Safety and Mission Assurance (OSMA) by email to [Agency-SMA-Policy-Feedback@mail.nasa.gov](mailto:Agency-SMA-Policy-Feedback@mail.nasa.gov) or via the “Email Feedback” link at <https://standards.nasa.gov>.

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## NASA COMMERCIAL AVIATION SERVICES (CAS) STANDARD

### 1. SCOPE

#### 1.1 Purpose

The purpose of this standard is to provide the technical standards and requirements to implement NPR 7900.3, Aircraft Operations Management, in regard to the protection of the public, the NASA workforce, and property as it pertains to management and oversight of Commercial Aviation Services (CAS) and federally-funded aviation activities used to accomplish agency official business flight operations in support of NASA missions.

#### 1.2 Applicability

1.2.1 This standard is applicable to all Commercial Aviation Services flight operations in support of NASA activities. The body of this standard contains the minimum requirements with which CAS missions must comply. Appendices A through Q provide additional and alternate requirements and limitations that allow increasing the operational capabilities of the CAS mission.

1.2.2 This standard is approved for use by NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers, and may be incorporated by reference in contracts and in program and other Agency documents as a technical requirement. This language applies to the Jet Propulsion Laboratory (a Federally Funded Research and Development Center), other contractors, recipients of grants, cooperative agreements, or other agreements to the extent specified or referenced in the applicable contracts, grants, or agreements.

1.2.3 In this standard, all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms “may” denotes a discretionary privilege or permission, “can” denotes statements of possibility or capability, “should” denotes a good practice and is recommended, but not required, “will” denotes expected outcome, and “are/is” denotes descriptive material.

#### 1.3 How to Use This Standard and Appendices to Meet Mission Requirements

1.3.1 The Standard, without any appendices selected, serves as the basic requirements applicable to vendors and is limited in the scope of operations as defined by operational capabilities and limitations defined in paragraph 1.3.4.2 of the Standard. In order to increase the operational capabilities and limitations to meet current or future mission needs, appendices can be selected that increase requirements to be met by the vendor. Appendices are structured the same as the Standard. The expanded operational capabilities and limitations for each appendix are listed in paragraph X.1.3.4 of that appendix, along with any other appendices that must be met to be in compliance with that appendix. The additional requirements for a vendor will be listed under the same paragraph number that topic is covered in the Standard (i.e., Paragraph 7.4

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covers Flight Crew Currency; if Appendix A has additional Flight Crew Currency requirements, those will be listed under paragraph A.7.4 of Appendix A). If an appendix has no additional requirements for a section, it will simply state “No additional requirement or information” next to or under the topic. Appendices are additional in nature and cannot take away from the requirements in the standard.

1.3.2 The requesting Program Office, Project Manager, or Center Flight Operations will ensure all necessary appendices are selected for the vendor to conduct the desired mission or possible future missions. Referring to paragraph 1.3.4 of the standard or of an Appendix will provide the operational capabilities and applicable limitations.

1.3.3 Additional appendices can be selected to be evaluated that are not required for the upcoming project or mission in order to access the vendors’ capabilities for potential future projects or missions. However, during the Airworthiness Review or Flight Readiness Review Board, findings from the appendices not required for the accomplishment of the specific project or mission being reviewed can be disregarded for that review.

### 1.3.4 Operational Capabilities and Limitations

1.3.4.1 Non-passenger carriage CAS missions will operate under public use authority when in US airspace.

1.3.4.2 Passenger carriage CAS missions will operate under the governing civil authority.

1.3.4.3 All CAS missions will operate under the governing foreign civil authority when not in US airspace.

1.3.4.4 Flights under this standard with no appendices selected shall be conducted on missions that operate:

- a. Aircraft not requiring a type rating.
- b. Unpressurized aircraft below 12,000 ft mean sea level (MSL) and not above 10,000 ft MSL for more than 30 minutes. Pressurized aircraft operations can be conducted up to 18,000 ft MSL.
- c. On flights that will not be conducting overwater operations.
- d. During daylight hours under visual flight rules (VFR).
- e. With a Standard Airworthiness Certificate issued by the governing civil authority, with any modifications being approved by the same governing civil authority.
- f. Aircraft free of icing contamination with no flights allowed in known or forecast icing conditions.
- g. Without conducting passenger carriage operations under governing civil authority.

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- h. Within the aircraft Normal, Transport, Commuter, or Utility Category flight parameters with no aerobatic maneuvers being performed.
- i. Airplanes at or above 1,000 ft Above Ground Level (AGL) in non-mountainous terrain and at or above 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings; this limitation does not apply to rotorcraft.
- j. Airplanes from prepared runway surfaces.
- k. Rotorcraft without performing any Rotorcraft External Load operations.
- l. Rotorcraft not performing shipborne operations.
- m. Aircraft not performing Brokered Medical flight operations.

## 1.4 Request for Relief

1.4.1 The responsible Chief of Flight Operations is the approving authority for granting relief from requirements in this standard and selected appendices. The responsible Chief of Flight Operations may approve relief based on an evaluation by either an Airworthiness Review or Flight Readiness Review Board as defined in NPR 7900.3.

1.4.2 Requirements related to the health and medical conditions of the crew also require the approval of the Center's flight surgeon (Chief Medical Officer).

## 2. APPLICABLE AND REFERENCE DOCUMENTS

### 2.1 Applicable Documents

The documents listed in this section are incorporated by reference and contain provisions that constitute requirements of this standard as cited in the text. Use of more recent issues of cited documents may be authorized by the responsible Institutional Safety Authority or Chief of Flight Operations. The applicable documents are accessible via the NASA Technical Standards System at <https://standards.nasa.gov> or may be obtained directly from the Standards Developing Organizations or other document distributors.

#### 2.1.1 Government Documents

14 CFR pt. 5	Safety Management Systems
14 CFR pt. 121	Operating Requirements: Domestic, Flag, and Supplemental Operations
14 CFR pt. 123	Type Certification of an Airplane Originally Certificated to Joint Aviation Regulations
14 CFR pt. 133	Rotorcraft External-Load Operations

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14 CFR pt. 135	Operating Requirements: Commuter and On-Demand Operations and Rules Governing Persons On Board Such Aircraft
OMB Circular A-126	Improving the Management and Use of Government Aircraft
FAA Order 8000.369C	Safety Management System
International Civil Aviation Organization (ICAO) Annex 19	Safety Management
NASA-STD-8739.6	Implementation Requirements for NASA Approved Workmanship Standards

### 2.1.2 Non-Government Documents

IATA DGR	IATA Dangerous Goods Regulations
ICAO Annex 18	Safe Transport of Dangerous Goods by Air
AS9100D	Quality Management Systems – Requirements for Aviation, Space, and Defense Organizations

## 2.2 Reference Documents

The documents listed in this section are not incorporated by reference within this standard. These references are included to provide further clarification and guidance.

### 2.2.1 Government Documents

49 U.S.C., Chapter 401, Sections 40102(a)(37)	Transportation, General Provisions, Definitions
49 U.S.C., Chapter 401, Sections 40125	Transportation, General Provisions, Qualifications for public aircraft status
51 U.S.C. § 20113(a)	The National Aeronautics and Space Act
14 CFR pt. 91	General Operating and Flight Rules
14 CFR pt. 121.374	Continuous airworthiness maintenance program (CAMP) for two-engine ETOPS
14 CFR. § 1201.102	Functions (National Aeronautics and Space Administration)
41 CFR § 102-33	Management of Government Aircraft

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48 CFR, Chapter 1, pt. 47	Federal Acquisition Regulations System, Federal Acquisition Regulation
48 CFR, Chapter 18, pt. 1847	Federal Acquisition Regulations System, National Aeronautics and Space Administration
NPR 7120.5	NASA Space Flight Program and Project Management
NPR 7900.3	Aircraft Operations Management
NPR 8621.1	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
NPR 8715.1	NASA Safety and Health Programs
NPR 8735.2	Hardware Quality Assurance Program Requirements for Programs and Projects
NASA-HDBK-8709.22	Safety and Mission Assurance Acronyms, Abbreviations, and Definitions
OCHMO-STD-1880.1	NASA Aviation Medical Certification Standards

2.2.2 Non-Government Documents - Reserved

### 2.3 Order of Precedence

2.3.1 Where conflicts exist between this standard and applicable Federal and state regulations, the applicable regulations take precedence.

2.3.2 Where conflicts exist between this standard and applicable Agency directives, the applicable Agency directives take precedence.

2.3.3 Where conflicts exist between this standard and standards that contain provisions that constitute requirements of this standard as cited in the text, this standard takes precedence, except in the case where those standards are Federal or state regulations.

2.3.4 Where conflicts exist between a general requirement and specific requirement, the specific requirement applies.

2.3.5 Where conflicts exist between a requirement that is meant to be applied generally across all technical disciplines and a requirement that is applicable to a specific technical discipline, the requirement that is applicable to a specific technical discipline takes precedence.

2.3.6 Clarification and further resolution of conflicts is resolved by the responsible Institutional Safety Authority or Chief of Flight Operations.

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## 3. ACRONYMS AND DEFINITIONS

### 3.1 Acronyms and Abbreviations

AAIP	approved aircraft inspection program
AD	Airworthiness Directives
ADS-B	automatic dependent surveillance–broadcast
AFM	aircraft flight manual
AGL	above ground level
AMM	aircraft maintenance manual
APU	auxillary power unit
AS	aerospace standard
ASE	altimetry system error
ATC	air traffic control
ATP	airline transport pilot
CAD	cartridge-actuated device
CAMP	continuing airworthiness maintenance program
CAS	commercial aviation services
CASA	Civil Aviation Safety Authority
CASS	Continuing Analysis and Surveillance System
CDL	configuration defect list
CFR	Code of Federal Regulations
CG	center of gravity
CMP	configuration, maintenance, and procedures
DER	designated engineering representative
EMI	electromagnetic interference
EO	EngineeringEngineering change orders

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ERP	Emergency Response Plan
ESD	electrostatic discharge
ETOPS	Extended Operations Performance Standards
EWIS	Electrical Wiring Interconnection Systems
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FCF	functional check flights
FDP	flight duty period
FLAS	flight level allocation scheme
FOD	foreign object damage
GIDEP	Government-Industry Data Exchange Program
GSE	ground support equipment
HF	high frequency
IATA	International Air Transport Association
ICA	instructions for continued airworthiness
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Commission
IFR	instrument flight rules
IMC	instrument meteorological conditions
IP	instructor pilot
IPI	In-Progress Inspection
ISO	International Organization for Standardization
LTE	loss of tail-rotor effectiveness
MDA	minimum decent altitude
MEA	minimum enroute IFR altitude

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MEL	minimum equipment list
MMSB	Manufacturer's Mandatory Service Bulletins
MOC	Management of Change
MOSA	Mission-Oriented Safety Assessment
MSL	mean sea level
MTOW	maximum takeoff weight
NASA	National Aeronautics and Space Administration
NGS	nitrogen-generation system
NM	nautical mile
NOTAM	notices to airmen
NPR	NASA Procedural Requirements
NVG	night vision goggle
OAS	Office of Aviation Services of the Department of Interior
OCHMO	Office of the Chief Health and Medical Officer
OEM	original equipment manufacturers
OMB	Office of Management and Budget
OSMA	Office of Safety and Mission Assurance
PAD	propellant-actuated device
PAO	public aircraft operations
PDSC	Pre Departure Service Check
PIC	pilot in command
POH	pilots operating handbook
QA	quality assurance
QMS	quality management system
QNC	qualified non-crewmembers



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RID	Review Item Discrepancy
RII	Required Inspection Items
RLC	rotorcraft-load combination
RVSM	Reduced Vertical Separation Minimum
SB	Service Bulletins
SDR	Service Difficulty Reports
SIC	second in command
SL	Service Letter
SMA	safety and mission assurance
SMS	Safety Management System
SOP	standard operating procedures
SSEC	static source error correction
STC	supplemental type certificate
STD	standard
SUP	suspected unapproved parts
TAWS	Terrain Awareness and Warning System
TC	type certificate
TCAS	Traffic Alert and Collision Avoidance System
US	United States
VFR	visual flight rules
VMC	visual meteorological conditions
W&B	weight and balance

### 3.2 Definitions

**adequate airport.** An airport that an airplane operator may list with approval from the FAA because that airport meets the landing limitations or is a military airport that is active and operational. (Source: 14 CFR § 121.7)

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**aerobatic flight maneuver.** An intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration; not necessary for normal flight and exceeds 60 degrees of bank or 30 degrees of pitch relative to the horizon. This does not apply to flight tests for pilot certification or rating. (Source: 14 CFR § 91.303 and 14 CFR § 91.307)

**aircraft inventory.** Aircraft inventory includes active, flyable storage, parts, and display aircraft. (Source: NPR 7900.3)

**aircraft.** A device that is used or intended to be used for flight in the air; this includes airplanes and rotorcraft. (Source: 14 CFR § 1.1)

**airplane.** A fixed or variable-geometry winged aircraft. (Source: 14 CFR § 1.1)

**airworthiness.** The capability of an aircraft to be operated within a prescribed flight envelope in a safe manner. (Source: NPR 7900.3)

**approving authority.** The person or organization responsible for oversight of the requirement and authorized to grant relief from the requirement. (Source: NPR 8715.1)

**Center's Chief of Flight Operations.** The Center's Chief of Flight Operations is a generic term to indicate that individual who is responsible for overall supervision of all flight operations conducted by that Center, regardless of the specific center title. (Source: NPR 7900.3)

**civil aircraft.** Aircraft that are other than "public," which include military aircraft. This includes aircraft engaged in carrying persons or property for commercial purposes, such as an air carrier, commuter, charter, and leased aircraft, and government aircraft carrying passengers. (Source: 49 U.S.C. § 40102 (16), (37))

**Class A rotorcraft-load combination (RLC).** The external load cannot move freely, cannot be jettisoned, and does not extend below the landing gear. An example of a Class A load is the carriage of items in an approved cargo rack, bin, or fixture attached to the exterior of the aircraft. A cargo rack certification may or may not include a cargo envelope. (Source: 14 CFR pt. 133)

**Class B RLC.** The external load is jettisonable, carried above or below the skids, and lifted free of land or water during the rotorcraft operation. An air conditioner unit being lifted onto the roof of a tall building is an example of a Class B load. (Source: 14 CFR pt. 133)

**Class C RLC.** The external load is jettisonable and remains in contact with land or water during the rotorcraft operation. Wire stringing, dragging a long pole, and boat towing are some examples of Class C loads. (Source: 14 CFR pt. 133)

**Class D RLC.** The external load is other than Class A, B, or C and approved on an individual basis through the issuance of a Letter of Authorization by the governing civil authority, Class D Operations Involving Carriage of Persons. Only approved Class D

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operations allow carriage of a person other than a crewmember or person who is essential and directly connected with the external-load operation in governing civil authority-approved lifting device with a transport Category A multiengine helicopter. A harbor pilot being transported externally to or from a ship utilizing a personnel lifting device or a person being rescued utilizing a personnel lifting device are examples of Class D loads. (Source: 14 CFR pt. 133)

**Commercial Aviation Services (CAS).** CAS includes:

- a. Leased aircraft for exclusive use for an agreed upon period of time (The acquiring executive agency operates and maintains the aircraft);
- b. Capital lease aircraft for which the leasing agency holds an option to take title;
- c. Charter aircraft for hire under a contractual agreement for one-time exclusive use that specifies performance (The commercial source operates and maintains a charter aircraft);
- d. Rental aircraft obtained commercially under an agreement in which the executive agency has exclusive use for an agreed upon period of time (The executive agency operates, but does not maintain, a rental aircraft);
- e. Contracting for full services (i.e., aircraft and related aviation services for exclusive use); or
- f. Obtaining related aviation services (i.e., services but not aircraft) by commercial contract, except those services acquired to support a Federal aircraft.

**configuration control.** Conformity to type design is considered attained when the aircraft configuration and the components installed are consistent with drawings, specifications, and other data that are part of the type certificate and would include any supplemental type certificates and field-approved alterations incorporated into the aircraft. (Source: NPR 7900.3)

**contracted aircraft.** An aircraft procured for an agency's exclusive use for a specified period of time by means of a formal contract under which the contractor is responsible for the operation, safety, and maintenance of the aircraft. (Source: NPR 7900.3)

**crew rest.** The total time primary aircrew members are assigned no official duties to provide for adequate rest. (Source: 14 CFR pt. 135)

**deviation.** A documented authorization releasing a program or project from meeting a requirement before the requirement is put under configuration control at the level the requirement will be implemented. (Source: NPR 7120.5)

**Director of Operations.** The Director of Operations for a CAS vendor oversees the elements of and ensures compliance with regulatory requirements established by the vendor's Governing Civil Authority.

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**domestic operations.** For the purpose of this standard, domestic operations means an operation conducted in an area defined by the operator's governing civil authority as domestic and does not require operations under other countries governing civil authorities' area of responsibility or airspace.

**duty day.** The total time primary aircrew members are assigned any official duties on behalf of the operator. (Source: 14 CFR pt. 135)

**effective.** For the purpose of this standard, effective means that the policy, process, or procedure has proven or has been evaluated to ensure compliance with the stated requirement and provides an adequate barrier against non-compliance. The type of policy, process, or procedure necessary to accomplish this will vary between vendors based on the company's size and the kind of operations they perform.

**ETOPS alternate airport.** An adequate airport that is designated in a dispatch or flight release for use in the event of a diversion during ETOPS. This definition applies to flight planning and does not in any way limit the authority of the pilot in command during flight. (Source: 14 CFR § 121.7)

**ETOPS entry point.** The first point on the route of an ETOPS flight determined using a one-engine inoperative cruise speed under standard conditions in still air, that is more than 180 minutes from an adequate airport. (Source: 14 CFR § 121.7)

**ETOPS Pre Departure Service Check (PDSC) Signatory Person.** A person is an ETOPS PDSC Signatory Person when that person is ETOPS Qualified and that person is designated by the operator in writing as a ETOPS PDSC Signatory Person. (Source: 14 CFR § 121.374)

**ETOPS Qualified Person.** A person performing maintenance for the operator who has satisfactorily completed the operator's ETOPS training program that has been approved by the governing civil authority. (Source: 14 CFR § 121.374)

**extended overwater operations:** An airplane operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline; and with respect to rotorcraft, an operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline and more than 50 nautical miles from an offshore heliport structure. (Source: 14 CFR § 1.1)

**external load.** A load that is carried, or extends, outside of the aircraft fuselage. (Source: 14 CFR § 1.1)

**flight duty period (FDP).** A period that begins when a Primary Aircrew member is required to report for duty with the intention of conducting a flight, a series of flights, or positioning or ferrying flights, and ends when the aircraft is parked after the last flight, and there is no intention for further aircraft movement by the same Primary Aircrew member. A flight duty period includes the duties performed by the Primary Aircrew member on behalf of the operator or vendor that occur before a flight segment or between flight segments without a required intervening rest period. Examples of

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tasks that are part of the FDP include deadhead transportation, training conducted in an aircraft or flight simulator, and airport/standby reserve if the above tasks occur before a flight segment or between flight segments without an intervening required rest period. (Source: 14 CFR § 117.3)

**flight envelope.** Aircraft performance limits or limitations approved by the aircraft manufacturer, the governing civil authority, or established by a formal NASA airworthiness review. (Source: NPR 7900.3)

**governing civil authority.** The civil authority in the operator's country of registration, certification, or licensure that grants and governs privileges to be utilized while operating aircraft. i.e., For a US-based operator, the Federal Aviation Administration (FAA) would be the governing civil authority; for an Australian-based operator, it would be the Civil Aviation Safety Authority (CASA).

**government aircraft.** Any manned or unmanned aircraft operated for the exclusive use of an executive agency. Government aircraft include:

- a. Federal aircraft and
- b. Aircraft hired as CAS. CAS include:
  - (1) Leased aircraft for exclusive use for an agreed upon period of time (The acquiring executive agency operates and maintains the aircraft).
  - (2) Capital lease aircraft for which the leasing agency holds an option to take title.
  - (3) Charter aircraft for hire under a contractual agreement for one-time exclusive use that specifies performance (The commercial source operates and maintains a charter aircraft).
  - (4) Rental aircraft obtained commercially under an agreement in which the executive agency has exclusive use for an agreed upon period of time (The executive agency operates, but does not maintain, a rental aircraft).
  - (5) Contracting for full services (i.e., aircraft and related aviation services for exclusive use).
  - (6) Obtaining related aviation services (i.e., services but not aircraft) by commercial contract, except those services acquired to support a Federal aircraft.

**governmental function.** A Federally funded activity that an executive agency performs in compliance with its statutory authorities.

**hazard analysis.** The technique used to systematically identify, evaluate, resolve, and assess hazards. (Source: NPR 7900.3)

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**instructor pilot (IP).** A qualified pilot in command (PIC) who is designated by the Governing Civil Authority to perform the functions of an instructor in the aircraft. An IP is qualified to instruct and evaluate other pilots. (Source: 14 CFR § 1.1)

**instrument flight rules (IFR).** Rules governing the procedures for conducting instrument flight. (Source: 14 CFR § 1.1)

**instrument meteorological conditions (IMC).** Weather conditions expressed in terms of visibility, distance from clouds, and ceiling less than the minimum specified for visual meteorological conditions. (Source: 14 CFR § 1.1)

**international operations.** For the purpose of this standard, international operations means an operation conducted outside the area defined by the Operators Governing Civil Authority as domestic or one that requires operations be performed in other countries Governing Civil Authorities' area of responsibility or airspace.

**loss of tail-rotor effectiveness (LTE).** When the tail rotor of a helicopter is exposed to wind forces that prevent it from carrying out its function—that of canceling the torque of the engine and transmission. Any low-airspeed high-power environment provides an opportunity for it to occur. (Source: 14 CFR § 1.1)

**maintenance.** Scheduled or unscheduled work on an aircraft that is required to attain or sustain a state of airworthiness and meets all required standards, practices, and guidelines for airworthiness. (Source: NPR 7900.3)

**modification.** Any alteration, addition, or removal of aircraft structure, components, equipment, computer software, or primary instrumentation. (Source: NPR 7900.3)

**mountainous terrain.** Mountainous terrain areas include those areas having a terrain differential exceeding 3,000 feet within 10 nautical miles within those one arc-second quadrangles overlying terrain or United States territorial waters or as designated and defined by the applicable governing civil authority. (Source: 14 CFR pt. 95)

**observer.** An individual who is a primary crew member for UAS flight operations. The observer serves as the flight safety monitor to ensure noninterference between the unmanned aircraft and nonparticipating aircraft by means of seeing and avoiding. The observer may perform these duties either on the ground or in a chase aircraft while in direct communication with the controlling pilot. Daisy chain observer operations are limited to 5 NM between the pilot in command and the unmanned airborne aircraft. (Source: NPR 7900.3)

**operator.** The company/vendor providing Commercial Aviation Services to NASA.

**overwater operations:** An airplane operation over water beyond the gliding distance to the nearest shoreline but within a horizontal distance of 50 nautical miles of it. For rotorcraft, it is an operation over water beyond autorotation distance to the nearest shoreline but within a horizontal distance of 50 nautical miles of it or within 50 nautical miles of an offshore heliport structure. Distances in excess of 50 miles of the nearest

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shoreline (or heliport structure for rotorcraft) are classified as Extended Overwater Operations for the purpose of this standard. (Source: NPR 7900.3)

**passenger carriage.** Any aircraft operation carrying any person who is not a qualified non-crewmember, required maintenance personnel, or observer required for completion of that flight or mission. (Source: NPR 7900.3)

**PIC Authority.** The pilot in command of an aircraft is directly responsible for and is the final authority as to the operation of the aircraft. In an in-flight emergency requiring immediate action, the PIC may deviate from any previously stated requirement to the extent required to meet that emergency. (Source: 14 CFR § 91.3)

**pilot flying.** The pilot physically controlling the aircraft by hand-flying it or manipulating the controls through the autopilot. (Source: 14 CFR § 1.1)

**pilot in command (PIC).** A pilot who holds the appropriate category, class, and, if appropriate, type rating or military qualification for the aircraft and is qualified in its operation by appropriate governing civil authority. (Source: 14 CFR § 1.1)

**pilot monitoring.** The pilot not currently flying the aircraft but who is monitoring the other pilot(s) and the aircraft's performance and position. (Source: 14 CFR § 1.1)

**policy.** Describes the philosophies, fundamental values, and general direction of the Agency or Center and are used to determine present and future decisions. Because established policies are general in nature, they may need more specific requirements established in procedural requirements for full implementation. (Source: NPR 1400.1)

**primary aircrew.** The required pilot(s), flight engineers, navigators, loadmasters, flight attendants, and any other aircrew member required by the governing civil authority, company policy, or the aircraft certification to be present to operate the aircraft under the configuration to be utilized. (Source: 14 CFR § 1.1)

**procedure.** An established or official way of accomplishing a task by all relevant company personnel in order to accomplish a specific requirement.

**process.** A uniform series of actions or steps taken by all relevant company personnel in order to accomplish a specific requirement.

**program support aircraft.** Aircraft used to support programs and operations other than the direct production and acquisition of data. (Source: NPR 7900.3)

**public aircraft operations (PAO).** Operations conducted to perform a governmental function inside US Airspace with aircraft meeting the requirements set forth in Title 49 U.S.C. § 40102(a)(41) provides the definition of "public aircraft" and § 40125.

**public aircraft.** Aircraft used only inside of US airspace in the service of a government or a political subdivision as defined in Title 49 U.S.C. § 40102(a)(41) provides the definition of "public aircraft" and § 40125 provides the qualifications for public aircraft

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status. Being derived from United States Code and with no international equivalent, the term “public aircraft” exists **only** in US airspace. (Source: 49 U.S.C. § 40102 (16), (37))

**public use authority.** Authority of governmental agencies to conduct operations inside US Airspace with aircraft meeting the requirements set forth in Title 49 U.S.C. § 40102(a)(41) provides the definition of “public aircraft” and § 40125.

**public use.** Operations conducted to perform a governmental function inside US Airspace with aircraft meeting the requirements set forth in Title 49 U.S.C. § 40102(a)(41) provides the definition of “public aircraft” and § 40125.

**qualified non-crewmember (QNC).** An individual other than a member of the crew whose presence is required to perform or is associated with the performance of a governmental function. (Source: NPR 7900.3)

**quality assurance (QA).** Processes, activities, and functions that evaluate successful realization of product conformance and realization of the quality controls planned for maximizing and determining process or product conformance. (Source: NPR 8735.2) The act of attaining certainty that maintenance performed on aircraft meets all required airworthiness standards, regulations, practices, and guidelines. (Source: NPR 7900.3)

**research and development aircraft.** All aircraft directly related to the production or acquisition of data. (Source: NPR 7900.3)

**rotorcraft.** An aircraft that achieves lift through the use of rotors, such as a Helicopter. (Source: 14 CFR § 1.1)

**second in command (SIC).** A Pilot who is qualified to act as a pilot at the controls of an aircraft but is not performing the duties of the pilot in command of an aircraft by the governing civil authority. (Source: 14 CFR § 1.1)

**shipborne operations.** Flights operations conducted to and from a floating vessel or floating structure. (Source: 14 CFR § 1.1)

**type rating.** Specialized training and certification required for a particular make and model or family of aircraft. A type rating is required to act as pilot in command (PIC) of any aircraft that exceeds 12,500 pounds maximum takeoff weight (MTOW). In addition, all turbojet-powered aircraft require a type rating, regardless of MTOW. A turboprop aircraft does not require a type rating if it does not exceed 12,500 pounds MTOW. (Source: 14 CFR § 1.1)

**visual flight rules (VFR).** A set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going. Specifically, the weather must be better than the VFR weather minima as delineated in table 6.9.3 or by the governing civil authority’s VFR weather minima if more restrictive. (Source: 14 CFR § 1.1)



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**visual meteorological conditions (VMC).** Weather conditions expressed in terms of visibility, distance from clouds, and ceiling that meets or exceeds VFR weather minima as delineated in table 7.14 or by the governing civil authorities VFR weather minima if more restrictive. (Source: 14 CFR § 1.1)

**vortex ring state (formerly referenced as settling-with- power).** Describes an aerodynamic condition in which a helicopter may be in a vertical descent with 20 percent up to maximum power applied and little or no climb performance. (Source: FAA-H-8083B-21B)

**waiver.** A documented authorization releasing a program or project from meeting a requirement after the requirement is put under configuration control at the level the requirement will be implemented. (Source: NPR 7120.5)

### 4. CAS INSPECTIONS

#### 4.1 Oversight Responsibilities

NASA's oversight responsibilities include initial contractor review prior to contract award, surveillance during the contract period of performance, and appropriate close-out responsibilities.

#### 4.2 Center Surveillance of Contractor Aircraft Operations

The NASA Chief of Flight Operations oversees the Center's surveillance of contractor aircraft operations. Chiefs shall determine applicable requirements to the contract and ensure the contractor meets those requirements for Airworthiness Review Approvals and Flight Readiness Review Approvals.

#### 4.3 CAS Inspection Access

4.3.1 Federal Acquisition Clauses require NASA to have inspection access to contractors or sub-contractors for Services-Fixed-Price or Services-Cost-Reimbursement under 52.246-4 and 52.246-5, respectively.

4.3.2 Federal Acquisition Clause 46.405 allows NASA to contract quality assurance when required in the government's interest, and 46.402 allows the government to contract quality assurance at source when in its interest.

#### 4.4 Constructive Change

4.4.1 Only contracting officers acting within the scope of their authority are empowered to execute contract modifications on behalf of the government. NASA Inspection Teams are prohibited from:

- a. Executing contract modifications.

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- b. Acting in such a manner as to cause the contractor to believe that they have authority to bind the government.
- c. Directing or encouraging the contractor to perform work that should be the subject of a contract modification.

4.4.2 Any changes to a contract will be formally provided to the contractor by the contracting officer by means of a written contract modification.

### 4.5 CAS Inspection Process

4.5.1 The CAS inspection process consists of five phases: Pre-inspection Activities, Assessment of Readiness, Onsite inspection, CAS inspection after action report, and CAS surveillance.

#### 4.5.2 Prior to CAS Inspection

4.5.2.1 The requesting Project or Program Manager will coordinate with the CAS inspection team to ensure the operator has a copy of the Standard and Appendices which the vendor will be required to meet. The requesting Project or Program Manager will also coordinate with the CAS operator to provide relevant documentation to the CAS inspection team prior to the inspection. The operator may also provide documents for aircraft and capabilities they would like to have inspected not pertinent to the current mission but to have their capabilities inspected for possible future missions. Relevant documentation will include:

- a. Any company manuals, policies, procedures, or documents the CAS operator utilizes to meet the requirements contained in the Standard or applicable Appendices.
- b. Tail numbers of aircraft representative of the types to be evaluated for use on NASA missions.
- c. Copies of flight certificates, a listing of flight hours, and a copy of current flight crew medical certificates for all pilots evaluated to fly NASA missions.

#### 4.5.3 Assessment of Readiness

If the Inspection team, Project Manager, or operator believes that the operations may not be at the level of maturity necessary for a successful inspection, they will notify the reviewing NASA center. The Center Chief of Flight Operations will assess the information provided and make a determination on altering the timing of an inspection.

#### 4.5.4 Onsite Inspection

4.5.4.1 A CAS Inspection has an Inspection Team generally consisting of an Operations Inspector, Maintenance Inspector, and a Quality/Engineering Inspector. Additional NASA observers may also accompany the Inspection team. The onsite inspection generally lasts one day. The team will review any relevant company documents not previously provided, along

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with aircraft maintenance records and training records. The team will perform a visual review of aircraft, support equipment, hangars, preflight planning areas, and other associated facilities.

4.5.4.2 The Operations Inspector will conduct interviews as applicable with personnel such as the Chief Pilot or the Director of operations as applicable, inspect training records and practices, examine scheduling systems and other applicable primary aircrew departments, and conduct an interview with a line pilot with an aircraft available.

4.5.4.3 The Maintenance Inspector will conduct interviews with personnel such as the Chief of Maintenance and/or the Director of Maintenance as applicable, Maintenance Quality Assurance Personnel, inspect training records and practices, scheduling systems, and maintenance practices, and conduct visual inspections of aircraft representative of those to be utilized for NASA.

4.5.4.4 The Quality/Engineering Inspector will conduct interviews with Quality and Engineering Representatives (as applicable) and review historical data and relevant company policies, processes, or procedures.

### 4.5.5 CAS Inspection After Action Report

4.5.5.1 The CAS Inspection team will provide NASA with:

- a. An executive summary of the Inspection.
- b. An inspection grade sheet that shows whether or not the vendor was compliant with each requirement of the Standard and Applicable appendices (i.e., 6.5 Primary Aircrew Medical). If an area is graded less than fully compliant, it will have comments on the grade sheet explaining the deficiency.
- c. Aircraft inspections sheets for each aircraft that was inspected.
- d. A flight crew qualification sheet that will list the pilots whose records were reviewed and verified to operate NASA missions. The Flight crew qualifications sheet shows if each pilot was qualified to act as pilot in command (PIC) or second in command (SIC), if applicable, to the requirements in the standard and to qualification to each applicable appendix.

### 4.5.6 CAS Surveillance

NASA may perform surveillance inspections on operators during the performance of NASA missions while under contract.

#### 4.5.6.1 Mission-Oriented Safety Assessment (MOSA)

4.5.6.1.1 NASA may request a MOSA be performed on operators. A MOSA consists of an inspector or inspectors, which may include NASA representatives, conducting an observation of a flight mission or maintenance work in progress for a NASA contract to observe for compliance with the requirements of this standard and applicable appendices.

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## 4.5.6.2 CAS operator update requirements

4.5.6.2.1 If a CAS operator, after the inspection, uses pilots other than those listed on the flight crew qualification sheet from the onsite inspection, the operator will provide copies of flight certificates, a listing of flight hours, training records, and a copy of current medical certificates for pilots who will then be evaluated against the standard and applicable appendices to fly NASA missions.

4.5.6.2.2 If a CAS operator, after the inspection, requires to utilize an aircraft type not covered during the inspection, the operator will notify NASA, and the Center Chief of Flight Operations overseeing the CAS operator will determine the actions needed to be performed.

## 5. GENERAL REQUIREMENTS

The following sections define the aircraft operations, maintenance and safety management procedures that make up the requirements for CAS operations in support of NASA mission requirements as required by NPR 7900.3. All CAS Operators shall operate in compliance with the regulations set forth in 14 CFR pt. 135 and the requirements set forth in NPR 7900.3 as delineated in this standard. The operator will develop and operate in accordance with a company manual, flight operations manual, aircraft flight manual(s), and maintenance manual(s) or approved equivalent manuals. These must be available for review. The operators will maintain and have available for review aircraft logbooks and personnel training records.

## 6. SAFETY

### 6.1 Safety Management System (SMS)

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that an effective SMS is implemented to manage significant safety risks.

#### 6.1.1 Policies and Procedures of SMS

6.1.1.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that policies and objectives that demonstrate a commitment to safety with clear responsibilities for safety management are provided. Policies and procedures will address:

- a. Management commitment and safety objectives
- b. Safety roles, responsibilities, and accountability

#### 6.1.2 Management of SMS

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they identify the accountable executive who has ultimate responsibility for the implementation of the SMS and a Safety Manager is appointed to establish and maintain governance over the implementation of the SMS.

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### 6.1.3 Safety Risk Management

The operator shall establish a Hazard Identification program to provide for initial and continuing identification of hazards and the analysis and assessment of safety risk. The operator's safety risk management functions will ensure that appropriate safety risk controls are developed and employed operationally. This function must include: system analysis, identify hazards, analyze safety risks, assess safety risks, control safety risks, and track and monitor hazards.

### 6.1.4 Safety Assurance

The operator shall have a safety assurance process to ensure that safety risk controls achieve their intended safety performance targets and are used to assess operations to identify hazards. The safety assurance validation processes are a primary function of operator to provide oversight of product/service providers. Safety assurance includes monitoring systems of interest and assessing the need for new risk controls, modification of ineffective risk controls, or elimination of those no longer needed due to changes in the operational environment. These monitoring activities apply whether the operations are accomplished internally or outsourced (e.g., contracted activities or designees). The operator's safety assurance processes will include: Data/information acquisition, Data/information analysis, System assessment, corrective action, periodic management reviews.

### 6.1.5 Promoting and Communicating the SMS

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they maintain a range and hierarchy of safety promotion and communication processes to enable an effective, two-way flow of information throughout the company and establish formal safety meetings for all relevant staff.

### 6.1.6 International Operations

Under the basic standard, an SMS certificate for international operations is not required unless the operator is performing duties under appendix H.

## 6.2 Safety Performance Indicators

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they establish Safety Performance Indicators to monitor and measure the safety performance of the organization and the effectiveness of the Safety Management System.

## 6.3 Emergency Response Plan (ERP)

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they establish and maintain country, regional, or global ERP to meet the company's needs and response objectives covering all aviation emergency scenarios. Employees will be trained to a competence level to match their roles and responsibilities as outlined in the ERP and conduct emergency response process reviews and exercises on a scheduled basis.

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## **6.4 Safety Reporting Procedures**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they establish safety reporting procedures covering all regulatory and non-regulatory reports, including the reporting of lower-level incidents or occurrences, including near-miss events (non-flight related, workplace risk analysis, i.e., slips, trips, falls).

## **6.5 Procedures for Safety Critical Activities**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they provide documented procedures for safety critical activities related to aircraft operations, including flight operations, aircraft maintenance, and ground operations.

## **6.6 Monitoring the Safety Management System (SMS)**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they develop, document, and implement an assurance system covering the SMS and safety risk management processes, all flight operations, maintenance activities, and ground operations. The assurance system will detail a program of internal and external audits, using trained personnel, that monitors compliance with all the aircraft operator's published manuals and activities.

## **6.7 Management of Change Process (MOC)**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they manage the risk associated with significant changes related to aircraft operations, including key personnel changes, through a documented MOC process that identifies external and internal changes affecting established operations, systems, and processes.

# **7. FLIGHT OPERATIONS REQUIREMENTS**

## **7.1 Organization and Personnel**

7.1.1 The operator shall document and implement standard policies, procedures, and practices throughout the organization appropriate to the size of the operation.

7.1.1.1 The operator shall define an organizational structure with clearly identified reporting lines through to the accountable manager. The operator will have an organization structure that clearly defines qualifications, duties, responsibilities, and authorities of management and operations personnel. Where the organization has more than one operating base, the management structure must address the above responsibilities at all locations.

7.1.2 The operator will have all necessary certificates to perform the type of operation under Public Use or Governing Civil Authority, as applicable. All operations conducting commercial passenger carriage or occurring outside of the United States Airspace System have to be done under the privileges awarded by the appropriate governing civil authority.

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## **7.2 Flight Operations Manuals, Publications, and Policies**

The operator shall maintain and operate aircraft in accordance with approved publications. These can be company-generated documents approved by the applicable governing civil authority or the documents provided by the original equipment manufacturer, such as the Pilot Operating Handbook (POH), Aircraft Flight Manual (AFM), and the Aircraft Maintenance Manual.

## **7.3 Primary Aircrew Qualifications and Experience**

The operator shall ensure the pilot or pilots meet the applicable minimum requirements in the tables below:

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**Table 7. 3 Airplanes Not Requiring a Type Rating Day VFR Only**

	Pilot-in-Command	SIC (if required by insurance/certification)
License	Commercial with IFR	Commercial with IFR
Total Hours	1,000	500
Total Hours in Class and Category	500	250
PIC hours in Class and Category	250	50
Turbine Hours (If Turbine Powered)	150	100
Total Hours in Make and Model	100	50
Total PIC Hours	300	50
Total PIC Hours in Make and Model	100	0
Tailwheel Time (if Tailwheel)	300	50

**Table 7.3. 1 Rotorcraft Not Requiring a Type Rating Day VFR Only**

	Pilot-in-Command	SIC (if required by aircraft insurance/certification)
License	Commercial	N/A
Total Hours	1,000	0
Total Hours in Class and Category	500	0
PIC hours in Class and Category	250	0
Turbine Hours (If Turbine Powered)	250	0
Total Hours in Make and Model	100	0
Total PIC Hours	500	0
Total PIC Hours in Make and Model	100	0

### 7.4 Primary Aircrew Currency

7.4.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures pilots have performed six takeoffs and six landings within the preceding 90 days. At least three takeoffs and landings have to be in the same category, class, and type (if a type rating is required) that will be utilized. To count, the pilot has to be the sole manipulator of the controls. These landings may be touch-and-go landings unless the aircraft has conventional landing gear (tailwheel). Conventional landing gear (tailwheel) landings have to be to a full stop to count toward this requirement.



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7.4.1.1 To regain currency to the requirements in 7.4.1, a pilot may act as a pilot of an aircraft under day VFR or day IFR (if Appendix A is met), provided no commercial cargo or passengers are carried and only required Primary Aircrew are on board the aircraft. The takeoffs and landings may be accomplished in a full flight simulator or flight training that is approved by the governing civil authority for landings and used in accordance with an approved course conducted by a training center certificated by the governing civil authority.

7.4.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the primary aircrew have completed all currency requirements necessary in accordance with the governing civil authority and company policy to be able to execute the privileges granted by the governing civil authority for the make and model of aircraft to be used.

### **7.5 Primary Aircrew Medical**

7.5.1 The operator shall ensure all Primary Aircrew members meet the NASA aviation medical certification requirements set forth in OCHMO-STD-1880.1, NASA Aviation Medical Certification Standards.

*Note: Pilots, Flight Engineers, Navigators, Other Aircrew, and QNC conducting High-Risk Aircraft activities (e.g., ejection seat aircraft, sub-orbital spacecraft, and aircraft designated as high-risk by the Center Chief of Flight Operations) in addition to meeting the requirements described above, shall also undergo additional tests and evaluations as defined by OCHMO-STD-1880.1.*

7.5.2 When Flight Attendants are required due to aircraft certification or configuration (seating for more than 19 Passengers), the operator shall have an effective policy, process, or procedure for the size and type of operation to ensure the flight attendants are capable of performing their duties.

### **7.6 Primary Aircrew Training**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the primary aircrew have completed training and evaluation requirements necessary in accordance with the governing civil authority and company policy to be able to execute the privileges granted by the governing civil authority for the make and model of aircraft to be used.

### **7.7 Primary Aircrew Responsibilities**

7.7.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures they provide the number of qualified primary aircrew as specified in the Aircraft Flight Manual or equivalent and as required by NASA.

7.7.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all primary aircrew members perform their duties in accordance with standardized procedures. Examples of these can be governing civil authority approved company

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developed Standard Operating Procedures, the aircraft's pilot operating handbook or flight operating manuals, etc.

### **7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flights are staffed with all required crew members. This process, policy, or procedure will also ensure all crewmembers are current, qualified, and meet crew rest requirements for the duties to be performed as spelled out in paragraphs 7.3, 7.4, 7.5, 7.6, 7.9.1, and 7.9.2.

### **7.9 Crew Rest and Duty Day**

7.9.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crewmembers:

- a. Are free from all duties for at least 10 hours prior to beginning a flight duty period.
- b. Do not exceed 8 flight hours (single pilot) or 10 hours (dual pilot) in a 24-hour period.
- c. Have at least 13 rest periods of at least 24 consecutive hours each in every calendar quarter.
- d. Do not fly more than 300 hours per quarter and no more than 1,000 hours in a calendar year.
- e. Do not violate any duty day or crew rest limitations established by the governing civil authority for the type of operation or more restrictive NASA or company policies (i.e., FAR 117 for 121 operations).

7.9.2 If the operator allows any deviations from the company flight and/or duty time limitations, the operator shall have a clearly defined process, policy, or procedure that designates the approval authority, demonstrates how the risk is mitigated, how the deviation is to be recorded and ensures that all crewmembers agreed individually to the deviation.

### **7.10 Fatigue Management**

The operator shall have an effective policy, process, or procedure for the size and type of operation that allows crewmembers to remove themselves non-punitively from a flight operation due to individual levels of self-assessed fatigue. The operator can have a reasonable review process to evaluate whether fatigue was operationally or non-operationally induced, although neither can result in punitive action.

### **7.11 Flight Preparation**

The operator shall have an effective policy, process, or procedure for the size and type of operation to complete flight preparation and pre-flight planning prior to the commencement of each flight period to cover the requirements in 7.12, 7.14, 7.15., 7.16., and 7.18.

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## 7.12 Operational Risk Management

7.12.1 The operator shall have an effective Operational Risk Management process, policy, or procedure for the size and type of operation prior to each flight duty period. Examples of items this should cover, if applicable, are listed below:

- a. Measures each crew member's personal fitness for duty.
- b. Measures equipment risk due to aircraft/rotorcraft limitations or discrepancies.
- c. Measures the environmental risk of the mission from elements such as:
  - (1) Weather.
  - (2) Terrain.
  - (3) Airport.
  - (4) Airspace.
  - (5) Time of Day.
  - (6) Visual illusions present in the operating environment.
- d. Measures Mission Specific Risks such as:
  - (1) External pressures for mission completion.
  - (2) Additional equipment installed on board.
  - (3) Additional crew members and crew coordination required for the mission.

7.12.2 The risk management policy, process, or procedure should have ways to mitigate risk and elevate the approval authority required for increased unmitigated risk.

## 7.13 Inflight Publications

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all flight crewmembers have current versions of required operational documentation onboard and accessible during flight. This documentation will include items such as:

- a. Pertinent aeronautical charts.
- b. Pertinent en route, terminal area, and instrument approach procedure charts.
- c. Aircraft performance data.
- d. Aircraft checklists (if applicable).

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- e. Approved Operations Manuals or Pilots Operating Handbook, as applicable.
- f. Standard Operating Procedures (SOP), when SOPs are established for the aircraft.
- g. Applicable Aircraft Flight Manual.
- h. If utilized, an Aircraft Minimum Equipment List (MEL).
- i. If utilized, an Aircraft Configuration Defect List (CDL).
- j. Pertinent flight authorization documents (i.e., flight release if applicable).
- k. If Dangerous Goods are to be carried, the appropriate documentation, forms, and guidance material for the Safe Transport of Dangerous Goods by Air.
- l. Applicable Notice to Air Missions (NOTAM) for the area of operation.

### **7.14 Operating Weather Minima**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all flight crewmembers have weather data available to comply with required weather minima for the class of airspace when operating under Visual Flight Rules (VFR) in accordance with the table 7.14. If company policy or the governing civil authority has more restrictive requirements, the more restrictive requirements will be used.

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## Table 7.1 4 VFR Weather Minimums

Airspace		Flight visibility	Distance from clouds
Class A		Not Applicable	Not Applicable.
Class B		3 statute miles	Clear of Clouds.
Class C		3 statute miles	500 feet below.
			1,000 feet above.
			2,000 feet horizontal.
Class D		3 statute miles	500 feet below.
			1,000 feet above.
			2,000 feet horizontal.
Class E	Less than 10,000 feet MSL	3 statute miles	500 feet below.
			1,000 feet above.
			2,000 feet horizontal.
	At or above 10,000 feet MSL	5 statute miles	1,000 feet below.
			1,000 feet above.
			1 statute mile horizontal.
Class G	For Airplanes		
	1,200 feet or less above the surface (regardless of MSL altitude)		
	For aircraft other than helicopters:		
	Day	1 statute mile	Clear of clouds.
	Night	3 statute miles	500 feet below.
			1,000 feet above.
			2,000 feet horizontal.
	For rotorcraft:		
	Day	1/2 statute mile	Clear of clouds.
	Night	1 statute mile	Clear of clouds.
	More than 1,200 feet above the surface but less than 10,000 feet MSL		
	Day	1 statute mile	500 feet below.
			1,000 feet above.
			2,000 feet horizontal.
Night	3 statute miles	500 feet below.	
		1,000 feet above.	
		2,000 feet horizontal.	
More than 1,200 feet above the surface and at or above 10,000 feet MSL	5 statute miles	1,000 feet below.	
		1,000 feet above.	
		1 statute mile horizontal.	

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### 7.15 Weight and Balance

7.15.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures weight and balance requirements are correctly calculated, and all aircraft remain safely within the specified limits during flight operations.

7.15.2 The operator shall ensure multiengine aircraft have current empty weight and center of gravity calculated from values established by actual weighing of the aircraft within the preceding 36 calendar months. Unless the original airworthiness certificate was issued in the previous 36 months, or the aircraft is operated under a weight and balance program approved by the operators governing civil authority.

### 7.16 Fuel Requirements

7.16.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures every aircraft carries sufficient fuel for all flights. The operator will ensure that when operating airplanes under Day VFR, the minimum amount of useable fuel required at takeoff will be sufficient to complete the flight to the destination airport and then fly from that airport to the alternate airport if required, and then fly for 30 minutes at normal cruising speed.

7.16.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures every aircraft carries sufficient fuel for all flights. The operator will ensure that when operating under Night VFR, the minimum amount of useable fuel required at takeoff will be sufficient to complete the flight to the destination airport and then fly from that airport to the alternate airport if required, and then fly for 45 minutes at normal cruising speed.

7.16.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures every aircraft carries sufficient fuel for all flights. The operator will ensure that when operating rotorcraft under Day or Night VFR, the minimum amount of useable fuel required at takeoff will be sufficient to complete the flight to the destination airport and then fly from that airport to the alternate airport if required, and then fly for 20 minutes at normal cruising speed.

7.16.4 The requirements listed in 7.16.1, 7.16.2, and 7.16.3 apply unless company policy or the Governing Civil Authority has more restrictive requirements. The most restrictive requirements will apply.

### 7.17 Passenger and Qualified Non-Crewmember Briefings

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that all Passengers/Qualified Non-Crewmembers (QNC) are briefed on emergency procedures and other safety matters prior to flight. The operator will ensure all passengers/QNC are aware of the actions they are expected to perform in the event of an emergency and how to perform them proficiently.

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## 7.18 Aircraft Performance

7.18.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews operate aircraft in accordance with Original Equipment Manufacturer (OEM) performance criteria using Aircraft Flight Manual (AFM) profiles, data, charts and ensures governing civil authority requirements for specified phases of flight are being met.

7.18.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews have the takeoff and landing data to operate from the runways of intended use, including any alternate runways required, and meet all governing civil requirements in regards to distances, required climb gradients and other performance characteristics. Required calculations can be performed by conducting performance calculations utilizing performance charts or approved software, utilizing tabular data, or by establishing minimum runway distances to be utilized by the operator under a specified set of atmospheric parameters that ensure the aforementioned requirements are met.

## 7.19 Aircraft Acceptance

7.19.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that defines flight crew responsibilities to ensure all equipment required for the flight is operational. If the operator has an approved Minimum Equipment List (MEL) or Configuration Defect List (CDL), it will prohibit all departures with defects not processed in accordance with the MEL/CDL. If conducting passenger carriage without an approved MEL, all equipment must be operational prior to flight with no open discrepancies. If conducting operations, not including passenger carriage under civil authority without a MEL/CDL, any inoperative equipment not required for the type of flight operations must be placarded or removed in accordance with the governing civil authorities' regulations.

7.19.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all known or suspected defects affecting the aircraft after every flight will be reported and recorded in the aircraft logbook.

7.19.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures primary aircrew perform an exterior aircraft pre-flight inspection and an interior aircraft emergency equipment inspection prior to each flight.

## 7.20 Aircraft Documentation

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the aircraft has the following documents on board:

- a. Airworthiness Certificate
- b. Registration Certificate
- c. Radio Station License (international operations only)

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- d. Operating Handbook
- e. Weight and Balance

## **7.21 Inflight Operations**

7.21.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures Primary Aircrew operate the aircraft at all times in accordance with the requirements listed in paragraph 7.2 and 7.7.

7.21.2 The Pilot in Command (PIC) of an aircraft is directly responsible for and is the final authority as to the operation of the aircraft. In an in-flight emergency requiring immediate action, the PIC may use PIC authority to deviate from any previously stated requirement to the extent required to meet that emergency.

## **7.22 Stabilized Approach**

7.22.1 The operator shall have an effective policy, process, or procedure that establishes applicable stabilized-approach criteria for airplanes suited to their particular flight operation.

7.22.2 In the absence of flight manual or airplane directive guidance, for a straight-in approach, an airplane's stabilized approach shall be established by 1,000 feet above airport elevation in Instrument Meteorological Conditions (IMC) and by 500 feet above airport elevation in Visual Meteorological Conditions (VMC).

7.22.3 In the event that a stabilized approach is not established by the altitudes required in paragraph 7.22.1 or in its absence 7.22.2, a missed approach shall be executed.

## **7.23 Adverse Weather Operations**

7.23.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the safe operation of aircraft in adverse weather and for flight crews to monitor weather information whilst en route, including destination, destination alternate (when applicable), and en route alternate (when applicable).

7.23.2 Under this Standard, with no appendices selected, the operator shall have an effective policy, process, or procedure for the size and type of operation crews to maintain the VFR requirements listed in table 7.14.

7.23.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained, proficient, and able to safely escape an inadvertent entry into IMC conditions.

## **7.24 Icing Requirements**

7.24.1 Under this Standard, with no appendices selected, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews operate aircraft free of any icing contamination and avoid flying into areas of forecast or known icing conditions.



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7.24.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained, proficient, and able to safely escape an inadvertent entry into icing conditions.

### **7.25 Flight Following Requirements**

The operator shall have an effective policy, process, system, or procedure for the size and type of operation that records aircraft position when the aircraft is outside an effective Air Traffic Control (ATC) surveillance service (Radar, Voice, or Automatic Dependent Surveillance–Broadcast (ADS-B)), and maintain a record of flight following position reports.

### **7.26 Emergency Procedures**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained and proficient in managing emergencies in accordance with any applicable inflight publications (paragraph 7.13) or governing civil authority requirements.

### **7.27 Windshear**

7.27.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures airplane crews avoid flying into areas of forecast or known areas of moderate or severe wind shear. More restrictive governing civil authority, company requirements, or aircraft limitations will be utilized.

7.27.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained, proficient, and able to safely escape an inadvertent entry into moderate or severe wind shear.

### **7.28 Terrain Avoidance**

7.28.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews have an awareness of any terrain which poses a hazard to the flight.

7.28.2 The operator shall ensure Terrain Awareness and Warning System (TAWS) is installed on a turbine-powered airplane that is configured with six to nine passenger seats, excluding any pilot seat. When a turbine-powered airplane is configured with ten or more passenger seats, excluding any pilot seat, an approved terrain situational awareness display is additionally required.

7.28.3 If TAWS is installed on the aircraft, the operator shall have an effective policy, process, or procedure for the size and type of operation to ensure all pilots are trained in its usage, operation, and any necessary actions to be performed in the event of a TAWS warning.

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7.28.4 If TAWS is not installed on the aircraft, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures pilots have been trained and are proficient in:

- a. Terrain avoidance procedures and actions.
- b. Procedures and actions to perform when terrain awareness is lost and to place the aircraft in a position where the terrain is no longer a threat.

### 7.29 Traffic Avoidance

7.29.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are aware of traffic threats in the area of operation and maintain a vigilant lookout to see and avoid other traffic.

7.29.2 All turbine-powered airplanes that have a passenger seat configuration, excluding any pilot seat, of 10 or more seats are required to be equipped with an approved Traffic Alert and Collision Avoidance System (TCAS).

7.29.3 If TCAS is installed on the aircraft, the operator shall have an effective policy, process, or procedure for the size and type of operation ensures all pilots are trained in its usage, operation, and any necessary actions to be performed in the event of a TCAS advisory.

### 7.30 Oxygen Use Requirements

Under this Standard, with no appendices selected, no supplemental oxygen is to be utilized without meeting the requirements listed in Appendix D of this Standard.

### 7.31 Life Support and Emergency Equipment

7.31.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all aircraft are equipped with the necessary emergency equipment. All equipment will be readily accessible to the crew with clear instructions on its method of operation, have been inspected in accordance with governing civil authority requirements, and is in serviceable condition. When carried in a compartment or container, it needs to be marked as to contents and date of last inspection. The equipment required is described below:

- a. Hand fire extinguishers must be provided for use in the crew, passenger, and cargo compartments in accordance with the following:
  - (1) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used.
  - (2) At least one hand fire extinguisher must be provided and located on or near the flight deck in a place that is readily accessible to the flight crew.
  - (3) At least one hand fire extinguisher must be conveniently located in the passenger compartment of each aircraft accommodating more than six but less than 31 passengers,

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and at least two hand fire extinguishers must be conveniently located in the passenger compartment of each aircraft accommodating more than 30 passengers.

(4) Hand fire extinguishers must be installed and secured in such a manner that they will not interfere with the safe operation of the aircraft or adversely affect the safety of the crew and passengers. They must be readily accessible, and unless the locations of the fire extinguishers are obvious, their stowage provisions must be properly identified.

b. First aid kits for treatment of injuries likely to occur in flight or in minor accidents must be provided.

(1) For aircraft capable of carrying 19 passengers or more (excluding pilot seats) the first aid kit must at least contain the contents and quantities in the table below.

**Table 7.31. 1 First Aid Kit Contents (19+ Passengers)**

Contents	Quantity
Adhesive bandage compresses, 1-inch	16
Antiseptic swabs	20
Ammonia inhalants	10
Bandage compresses, 4-inch	8
Triangular bandage compresses, 40-inch	5
Arm splint, noninflatable	1
Leg splint, noninflatable	1
Roller bandage, 4-inch	4
Adhesive tape, 1-inch standard roll	2
Bandage scissors	1
Protective nonpermeable gloves or equivalent	1 pair

c. Each aircraft accommodating more than 19 passengers must be equipped with a crash axe.

d. Each aircraft accommodating more than 19 passengers must be equipped with a functioning Public Address System compliant with the governing civil authority's requirements.

e. Each passenger-carrying aircraft meeting the seating requirements below must have a portable battery-powered megaphone or megaphones installed as follows:

(1) Aircraft with a seating capacity of more than 60 but less than 100 passengers at the most rearward location in the passenger cabin, where it would be readily accessible to a normal flight attendant seat. However, the governing civil authority may authorize a deviation to the location.

(2) On each aircraft with a seating capacity of 100 or more passengers, one megaphone is installed at the forward end and one installed at the most rearward location where it would be readily accessible to a normal flight attendant seat.

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7.31.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircraft have any additional equipment required by the governing civil authority for specific geographic areas.

### **7.32 Maintenance Discrepancy Reporting**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all discrepancies encountered during aircraft operation are reported to the appropriate maintenance personnel and documented in the aircraft logbook.

### **7.33 Flight Hazard and Incident Reporting**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all hazards or incidents encountered during aircraft operation are reported in accordance with the company, governing civil authority, and contractual requirements.

### **7.34 Drugs and Alcohol**

7.34.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that no crewmember performs flight duties while under the influence of alcohol or drugs or performs flight duties:

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

7.34.2 If company policy or the governing civil authority has more restrictive requirements, the most restrictive requirements will be utilized.

### **7.35 Cargo and Baggage**

7.35.1 The Operator shall weigh and manifest all cargo and document each item separately. The Operator will verify the contents of each piece of cargo by inspection of the manifest or cargo.

7.35.2 If the operator transports dangerous goods they shall be transported in accordance with ICAO Annex 18 "Safe Transport of Dangerous Goods by Air" or IATA Dangerous Goods Regulations.

### **7.36 Aircraft Refueling**

7.36.1 The operator shall document and implement a policy or procedure which either forbids refueling with passengers and QNCs onboard or ensures passenger and QNC safety and egress

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after a spillage or fire when refueling aircraft with passengers and QNC embarking, on board or disembarking.

7.36.2 If aircraft are equipped with HF communication systems, the operator shall prohibit any HF transmission (including HF transmissions via an HF data link) during refueling and defueling operations.

### **8. MAINTENANCE OPERATIONS REQUIREMENTS**

#### **8.1 Operations Manuals, Publications, and Policies**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures they have a company manual, flight operations manual, aircraft flight manual(s), and maintenance manual(s) or approve equivalent manuals.

#### **8.2 Personnel Training Records and Qualifications**

8.2.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that maintains personal training records. The personnel training records will be available for review and should ensure all maintenance personnel meets the requirements and currency set forth by the governing civil authority for the duties they perform.

8.2.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure maintenance personnel has completed the required training program or qualified per their aviation governing authority to perform servicing, inspections, and functional tests for specific aircraft, which will ensure their individual qualification.

#### **8.3 Approved Maintenance Personnel**

8.3.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircraft have an airworthiness certificate per their aviation governing authority.

8.3.1.1 The aircraft should be maintained by a certificated personnel or repair station.

8.3.1.2 The maintenance and/or inspection must be documented.

#### **8.4 Airworthiness Certificate**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure the aircraft has a valid airworthiness certificate commensurate to the type of operations to be performed.

#### **8.5 Aircraft Logbooks**

8.5.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure they maintain aircraft logbooks and:

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- a. Ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating that aircraft have been approved for return to service.
- b. The aircraft logbooks and records be available for review.

### **8.6 Tool Control**

8.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure tool control.

8.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the accuracy of tool inventories at specific intervals, especially after critical maintenance activities or prior to closing critical areas.

8.6.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that will ensure a lost tool process and prohibits aircraft from flying until all tools used on an aircraft have been accounted for during and after maintenance is performed.

### **8.7 Tool Calibration Standards**

8.7.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that only currently calibrated and tested tools/special equipment operating within established tolerance limits are used to perform maintenance on an aircraft (alternative calibration standards can be met using industry-standard processes approved by governing civil authority requirements).

8.7.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures when a calibrated tool is discovered to be outside of calibration limits, the operator can identify and rectify all maintenance that was performed with the tool since it was last known to be inside calibration limits.

### **8.8 Aviation Material Management**

8.8.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure an effective aircraft component inspection program to determine the serviceability, authenticity, traceability, and airworthiness of parts, components, accessories, and assemblies by subjecting them to inspections, tests, or operational checks.

8.8.1.1 This program will ensure that aviation parts are properly tagged, documented, and segregated from non-aircraft parts.

8.8.1.2 Organizations providing maintenance support shall have a procurement program to prevent the purchase of unapproved parts and materials in type- certificated products.

8.8.1.3 The approved parts program shall include, at a minimum, methods to establish qualified suppliers who are authorized to manufacture or distribute parts they supply and criteria to identify and screen potential unapproved parts suppliers.

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## **8.9 Shelf-Life Program**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that an inspection is conducted on all equipment parts and materials received for use, returned for repair, or held awaiting repair to verify satisfactory material condition, identification, packaging, preservation, and configuration and, when applicable, that shelf-life limits are not exceeded.

## **8.10 General Housekeeping Procedures**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure general housekeeping procedures for aviation facilities to ensure all electrical equipment connections are at least 18 in. above the hangar floor when aircraft are in a hangar with fuel onboard.

## **8.11 Fall Arrest**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure general safety requirements for workplace fall arrest systems while working off the ground or from an aircraft surface. This standard applies to industrial and workplace situations and is not intended to apply to construction, residential, or commercial occupancies except where necessary maintenance or workstation access may be required.

## **8.12 Fatigue Management System for Maintenance Personnel**

8.12.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure all maintenance personnel has at least four periods of at least 24 hours each within every calendar month free from all duties.

8.12.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that maintenance personnel do not carry out maintenance work or can remove themselves from duty when they are fatigued. This includes procedures to manage the risks associated with maintenance personnel working alone.

8.12.3 The requirements listed in 8.12.1 and 8.12.2 apply unless company policy or the Governing Civil Authority has more restrictive requirements. The most restrictive requirements will apply.

## **8.13 Aircraft Maintained per Manufacturer's Specifications**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the aircraft and all required equipment are operated and maintained in accordance with the manufacturer's specifications.

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### **8.14 Subscriptions with Original Equipment Manufacturer (OEM)**

The operator shall maintain subscriptions with OEM or an equivalent replacement approved by the governing civil authority to receive revisions to all technical data and information related to the maintenance of the aircraft or its components.

### **8.15 Forecasting and Recording of Aircraft Maintenance and Component Maintenance**

8.15.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure persons signing entries on serviceable parts tags and all documentation for work performed on aircraft, systems, and components will be authorized to do so by the governing civil authority.

8.15.2 The operator shall satisfactorily completed maintenance training or possesses the equivalent current experience on the applicable type of aircraft, engine, or propeller. The equivalent experience will be documented on the individual's training record, which is filed in the maintenance organization.

8.15.3 The operator shall understand and have knowledge of the governing civil authority's regulations and the applicable types of maintenance or overhaul manuals and follow the applicable procedures set forth in this manual.

### **8.16 Airworthiness Directives (AD) and Manufacturer's Mandatory Service Bulletin (MMSB)**

8.16.1 The operator shall have a policy, process, or procedure for the size and type of operation to ensure to review and manage all airworthiness data and instructions, including AD from applicable Service Bulletins (SB) from the OEM or equivalent for the aircraft they operate.

8.16.1.1 The operator shall comply with all ADs and appropriate Service Bulletins (SBs) or equivalent, or recommended by the OEM.

8.16.1.2 The operator shall maintain a technical review process for all incoming directives and bulletins and incorporate any additional SBs that are requested by NASA.

8.16.1.3 The operator shall comply with MMSBs and ADs before and during agreement performance.

8.16.1.4 The operator shall provide and make available a list of all completed MMSBs and ADs applicable to the contracted aircraft.

### **8.17 Service Difficulty Reports (SDR)**

8.17.1 The operator shall have a policy, process, or procedure for the size and type of operation to effectively report the occurrence or detection of each failure, malfunction, or defect in an aircraft concerning:

- a. Fires during flight and whether the related fire-warning system functioned properly.



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- b. Fires during flight not protected by the related fire-warning system.
- c. False fire warning during flight.
- d. An exhaust system that causes damage during flight to the engine, adjacent structure, equipment, or components.
- e. An aircraft component that causes accumulation or circulation of smoke, vapor, or toxic or noxious fumes in the crew compartment or passenger cabin during flight.
- f. Engine shut down during flight because of flameout.
- g. Engine shutdown during flight when external damage to the engine or aircraft structure occurs.
- h. Engine shutdown during flight due to foreign object ingestion or icing.
- i. Shutdown of more than one engine during flight.
- j. A propeller feathering system or ability of the system to control overspeed during flight.
- k. A fuel or fuel-dumping system that affects fuel flow or causes hazardous leakage during flight.
- l. An unwanted landing gear extension or retraction or opening or closing of landing gear doors during flight.
- m. Brake system components that result in loss of brake actuating force when the aircraft is in motion on the ground.
- n. Aircraft structure that requires major repair.
- o. Cracks, permanent deformation, or corrosion of aircraft structures, if more than the maximum acceptable to the manufacturer or the governing civil authority; and
- p. Aircraft components or systems that result in taking emergency actions during flight (except action to shut down an engine).

8.17.2 For the purpose of this section, during flight means the period from the moment an aircraft moves under its own power for the purpose of flight and ends when the aircraft comes to rest after landing.

8.17.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures they report any other failure, malfunction, or defect in an aircraft that occurs or is detected at any time if, in its opinion, the failure, malfunction, or defect has endangered or may endanger the safe operation of the aircraft.

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### 8.18 Submitting SDR Reports to Aviation Governing Body

8.18.1 The operator shall transmit the reports required by this section on a form and in a manner prescribed by the governing civil authority and will include as much detail as needed and will include the following information as available:

- a. The type and identification number of the aircraft.
- b. The name of the operator.
- c. The date.
- d. The nature of the failure, malfunction, or defect.
- e. Identification of the part and system involved, including available information pertaining to type designation of the major component and time since the last overhaul, if known.
- f. Apparent cause of the failure, malfunction, or defect (e.g., wear, crack, design deficiency, or personnel error).
- g. Other pertinent information necessary for more complete identification, determination of seriousness, or corrective action.

### 8.19 Aircraft Storage Program

8.19.1 The operator shall have a policy, process, or procedure for the size and type of operation that ensures preservation and prevents the deterioration of the airplane, engines, structure, finish, and system components.

8.19.2 If aircraft are to be stored in excess of time limits specified by the Original Equipment Manufacturer (OEM), the operator shall have a policy, process, or procedure for the size and type of operation to preserve aircraft while in storage that includes:

- a. Procedures that preserve the aircraft in a known state through methods, techniques, and procedures designed to mitigate or eliminate the adverse effects of the storage environment and non-operation of the aircraft.
- b. A program that allows the operator to readily return the stored aircraft to an operational status.

8.19.3 The operator shall have a policy, process, or procedure for the size and type of operation that has procedures to return an aircraft to Airworthy condition once taken out of storage. These procedures must include record checks and compliance audits of the maintenance program. All time-limited (flight hours, cycles, or calendar) items that went overdue during the storage period must be brought back into compliance.

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## 8.20 Aging Aircraft Program

If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation to ensure a continuing structural integrity program, an aging aircraft program, a condition monitoring program, and reliability program descriptions for aircraft systems, components, and power plants.

## 8.21 Inspection Programs

8.21.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircraft inspection programs detail inspection of the aircraft, engines, propellers, appliances, emergency equipment, and survival equipment.

- a. Operators may have the aircraft inspected per a manufacturer's inspection program that ensures the continuity of the aircraft inspection program.
- b. Operators may establish an aircraft inspection program based on service history and similar programs developed by owners/operators, especially for aircraft no longer supported by an aircraft manufacturer.

8.21.2 The requirements listed in 8.21.1 apply unless company policy or the Governing Civil Authority has more restrictive requirements. The most restrictive requirements will apply.

### 8.21.3 Inspection Program Types Based on Aircraft/Rotorcraft

8.21.3.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that small airplanes (12,500 pounds or less) (rotorcraft 6,000 pounds or less) must be inspected annually. In lieu of this, the owner/operator may elect to utilize a progressive inspection; all inspection items are spread out to cover the inspection of the entire aircraft within a 12-month period. Progressive inspections, when performed over the period of 1 year, would equal an annual inspection.

8.21.3.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures large aircraft (airplanes over 12,500 lbs. or rotorcraft over 6,000 pounds max takeoff weights and turbine-powered rotorcraft) are inspected in accordance with a different inspection programs than small aircraft. The following are options for large aircraft inspection:

- a. Continuing Airworthiness Maintenance Program (CAMP) that includes:
  - (1) The performance of the inspections.
  - (2) Procedures on how the inspections are scheduled.
  - (3) Who may perform the inspection.
  - (4) Return to service procedures.

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(5) Procedures on how to handle unscheduled maintenance.

b. An Approved Aircraft Inspection Program (AAIP). This program consists of a list of inspection tasks and associated intervals. The tasks are derived from a manufacturer's recommendations and are comprehensive enough to ensure the airworthiness of the aircraft.

c. An inspection program is devised by the operator based on the manufacturer's recommendations or inspection programs in use by operators of similar aircraft. Operators may also use elements of the manufacturer's recommended program, along with any inspection tasks to incorporate.

8.21.3.3 The requirements listed in 8.21.3.1. and 8.21.3.2. apply unless company policy or the Governing Civil Authority has more restrictive requirements. The most restrictive requirements will apply.

### 8.21.4 Inspection Program Requirements

8.21.4.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the inspection program requirements contain:

- a. The instructions and procedures to conduct the inspection.
- b. Inspection items and areas of the airframe, engines, propellers, appliances, and emergency equipment.
- c. A schedule for the inspections in terms of time in service of aircraft, engines, parts (life-limited parts), calendar time, number of airplane and engine cycles, or any combination of these.
- d. Special inspections for hard or overweight landings, turbulent air, extended out of service inspection, etc.
- e. System for controlling life-limited parts.
- f. AD compliance control.
- g. System for recordkeeping.
- h. Creation, approval, and recording of program revisions.

### 8.22 Current Inspection Status of the Aircraft

The operator shall have an effective policy, process, or procedure for the size and type of operation establishing a current inspection status of the aircraft record that contains time in service since the last inspection required by the inspection program under which the aircraft is maintained and the time in service remaining until the next required inspection under which the aircraft is maintained.

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## **8.23 Responsibility for Airworthiness**

The operator shall have an effective policy, process, or procedure for the size and type of operation for maintaining that aircraft in an airworthy condition, including compliance with ADs. This includes maintenance planning, obtaining replacement parts, and scheduling the aircraft for maintenance at repair facilities.

## **8.24 Aircraft Maintenance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircraft maintenance applies to general maintenance, preventive maintenance, and alterations, including inspections associated with specific products (i.e., airframes, engines, propellers, and appliances).

## **8.25 Aircraft Inspection or Continuing Airworthiness Maintenance Program (CAMP)**

8.25.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure the operator has an aircraft inspection process or continuous CAMP and provide procedures and instructions for its use.

8.25.1.1 Aircraft that are type certificated for a passenger seating configuration, excluding any pilot seat of nine seats or less, shall be maintained with an approved aircraft inspection program may be used. Approved programs include annual inspections, 100-hour inspections, and Approved Aircraft Inspection Programs (AAIP).

8.25.1.2 Aircraft that are type certificated for a passenger seating configuration, excluding any pilot seat of ten seats or more, shall be maintained under a maintenance program in accordance with governing civil authority requirements that include a continuous CAMP.

## **8.26 Scheduled Maintenance**

8.26.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures scheduled maintenance consists of maintenance tasks performed according to a maintenance schedule, including procedural instructions for the maintenance task and method of recording the results of inspection checks, tests, and other maintenance.

8.26.2 Operators may use the aircraft manufacturer's job/task cards or develop their own. These should include procedural instructions for accomplishing maintenance and inspection tasks.

8.26.3 Operators may also develop and use non-routine item job cards to document discrepancies found when performing maintenance and inspection tasks.

## **8.27 Unscheduled Maintenance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures unscheduled maintenance is performed, including procedures, instructions,

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and standards for maintenance performed because of unscheduled or unforeseen circumstances. A need for unscheduled maintenance may result from scheduled maintenance tasks, pilot reports, or unforeseen events such as hard or overweight landings or ground damage.

### **8.28 Post-Maintenance Functional Check Flights**

8.28.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to:

- a. Brief check pilots and aircrew before post-maintenance Functional Check Flights (FCF) so that the purpose and objectives of the flight are clearly understood.
- b. Debrief with the check pilots, aircrew, maintenance control representative, and applicable work center representatives after completion of the FCF to determine compliance with objectives outlined on the FCF checklist and clarify noted discrepancies.

### **8.29 List Contracted (and sub-contracted) Organizations and Suppliers**

8.29.1 The operator shall have a policy, process, or procedure for the size and type of operation to ensure an accountable person is assigned to manage all maintenance activities performed by the maintenance organization, whether these are performed in-house or by a contracted organization.

8.29.2 The operator shall ensure all aircraft maintenance is performed by an approved maintenance organization that has the facilities, capability, and scope to maintain the aircraft types operated.

### **8.30 Major Repairs and Alterations Approved Data**

8.30.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures major repairs and major alterations performed on civil aircraft require the use of approved data. Sources of approved data include:

- a. Type Certificate (TC) data, Supplemental Type Certificate (STC) data, AD, and most airframe structural repair manuals.
- b. Data approved by a Designated Engineering Representative (DER) and data approved by an airworthiness inspector on documentation approved by the governing civil authority, Major Repair, and Alteration (Airframe, Powerplant, Propeller, or Appliance).

### **8.31 Determining Level of Repairs or Alterations**

The operator shall have an effective policy, process, or procedure for the size and type of operation that determines if a repair or alteration is major or minor, including maintenance performed on components. Operators shall use approved or accepted data to repair their aircraft.

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## 8.32 Aircraft Records

8.32.1 The operator shall have an effective policy, process, or procedure for the size and type of operation establishing a recordkeeping system.

8.32.1.1 Maintenance records may be kept in any format that provides record continuity, includes required content, lends itself to the addition of new entries, and provides for signature entry.

8.32.1.2 Aircraft records shall contain maintenance records for each aircraft, engine, propeller, rotor, and appliance of an aircraft. These records can be separate or combined.

8.32.1.2.1 The maintenance record entry shall include a description of the work performed. The description will be in sufficient detail to permit a person unfamiliar with the work to understand what was done and the methods and procedures used in doing it. A reference to the technical data used, such as manufacturer's manuals, service letters, service bulletins, work orders, and other data, which accurately describe what was done or how it was done, must be referenced.

8.32.1.2.2 The maintenance record entry shall contain the date the work was completed. This is normally the date upon which the work is approved for return to service.

8.32.1.2.3 The maintenance record entry shall include the signature and certificate number of the person approving the work for return to service.

## 8.33 Total Time in Service

The operator shall have an effective policy, process, or procedure for the size and type of operation establishing maintenance record entry that contains the total time in service for each airframe, engine, propeller, and appliance (as applicable). Time in service, with respect to maintenance records, is the time from the moment an aircraft leaves the surface of the earth until it touches down at the next point of landing and is expressed in hours, cycles, or both.

## 8.34 Status of Life-Limited Parts

8.34.1 The operator shall have an effective policy, process, or procedure for the size and type of operation establishing a status of each life-limited part of each airframe, engine, propeller, and appliance that contain at least the following:

- a. Time in service since new, expressed in the appropriate parameter (hours, cycles, and/or calendar time).
- b. Time in service remaining to the specified life limit expressed in the appropriate parameter (hours, cycles, and/or calendar time).
- c. The specified life limit is expressed in the appropriate parameter (hours, cycles, and/or calendar time).

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- d. A record of any action that alters the part's life limit or changes the parameter of the life limit.

### **8.35 Time Since Last Overhaul**

8.35.1 The operator shall have an effective policy, process, or procedure for the size and type of operation, establishing a status of time since the last overhaul.

8.35.2 All items installed on the aircraft that are required to be overhauled on a specified time basis include at least the following information:

- a. An identification of the item that requires overhaul and its associated scheduled overhaul interval.
- b. The time in service since the last overhaul was accomplished.
- c. The time in service remaining until the next scheduled overhaul.
- d. The time in service when the next scheduled overhaul is due.

### **8.36 Time Constraints Specified Maintenance**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure a procedure to track any maintenance tasks required by the maintenance schedule/program, an airworthiness directive, or any task required for the rectification of a defect is completed within the time constraints specified in maintenance procedures.

### **8.37 Major Alterations and Major Repair Records**

8.37.1 The operator shall have an effective policy, process, or procedure for the size and type of operation for establishing a current record of major alterations and repairs and be recorded in the aircraft maintenance records.

8.37.1.1 The record shall contain documentation approved by the governing civil authority that contains details of a repair or alteration, if applicable.

8.37.1.2 If operator is using a continuous airworthiness maintenance program to maintain the airplane, the operator's internal documentation, such as Engineering Orders, Repair Orders, and Repair Authorizations may be used to record the major repair or alteration.

### **8.38 Return to Service**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures any maintenance, preventive maintenance, or alterations performed is documented in the aircraft log before an aircraft is returned to service.



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### **8.39 Documented Aircraft Release Procedure**

8.39.1 The operator shall have a policy, process, or procedure for the size and type of operation to ensure an effective aircraft release process is utilized and aircraft are released from maintenance by authorized personnel.

8.39.2 There shall be an effective aircraft release process for aircraft that are deployed and away from home base operations. If required, the operator will designate the maintenance release authority in writing for aircraft deployed.

8.39.3 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that persons with maintenance release authority have at least six months of experience during the preceding 24 months of the inspection, servicing, or maintenance of an aircraft or system or maintenance control duty in accordance with maintenance procedures.

### **8.40 Foreign Object Damage**

8.40.1 The operator shall have a policy, process, or procedure for the size and type of operation to ensure an effective Foreign Object Debris/Damage (FOD) control program that effectively reduces the risk of FOD both during maintenance and flight operations.

8.40.1.1 Maintenance personnel shall be assigned to perform a general inspection of hangar and ramp areas for FOD on a weekly basis at a minimum.

### **8.41 Ground Handling Procedures**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure ground handling procedures are only performed by qualified ground handling personnel for duties such as fire guard, application of external electrical power, towing, engine run, and taxi operations.

### **8.42 Ground Support Equipment (GSE)**

The operator shall have a policy, process, or procedure for the size and type of operation to ensure that all GSE used on aircraft are safe and operable.

### **8.43 Aviation Survival Equipment**

8.43.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure maintenance procedures and technical standards for Aviation Survival Equipment (including life support and ejection seats) being flown are an integrated function of aircraft maintenance.

8.43.2 If applicable, all tools shall be accounted for after the repack and inspection of each item. For example, parachutes and floatation equipment, since these items cannot be functionally checked prior to use.

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## **8.44 Confined Space Program**

If the operator has aircraft that has compartments that are large enough for an employee to enter and perform work but has limited or restricted means of entry or exit and is not designed for continuous human occupancy, the operator shall have an effective policy, process, or procedure for the size and type of operation to ensure an Aircraft Confined Space Program that ensures a safe environment when working in these spaces and personnel recovery procedures.

## **8.45 Fuel Surveillance Program**

The operator shall have a policy, process, or procedure for the size and type of operation that ensures the operator fuel is approved for aircraft use from a vendor approved by the governing civil authority or has a method to ensure fuel utilized meets grade requirements and is free of contaminants prior to fuel entering the aircraft.

## **8.46 Operator's Hazardous Material Program**

8.46.1 The operator shall have a policy, process, or procedure for the size and type of operation to ensure all hazardous materials utilized in maintenance activities are handled, stored, and disposed of in accordance with the governing civil authority's requirements.

8.46.2 If the operator maintains explosive devices, Propellant-Actuated Devices (PADs)/Cartridge-Actuated Devices (CADs), the maintenance manual shall document the program for personnel training and qualifications in accordance with NASA-STD-8719.12. The program will also include procedures for explosives handling, storage, and aircraft parking that affords appropriate quantity distance criteria.

## **8.47 Oil Analysis Program**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure implementation of an oil analysis program, per OEM and/or maintenance instructions, to identify mechanical breakdown precursors that exist prior to failure.

## **8.48 Weight and Balance Program Post-Maintenance**

8.48.1 The operator shall have a policy, process, or procedure for the size and type of operation to ensure an effective program for determining Weight and Balance (W&B) for each aircraft, including the procedures used to ensure that the weight and balance of an aircraft are maintained, documented, current, and updated when required.

8.48.2 For multiengine aircraft, the operator shall have an effective policy, process, or procedure for the size and type of operation for determining the current empty weight and Center of Gravity (CG). These values are established by actual weighing of the aircraft within the preceding 36 calendar months.

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### **8.49 Altimeter System**

Under this Standard, with no appendices selected, no instrument flights are authorized without meeting the requirements listed in Appendix A of this Standard.

### **8.50 ATC Transponder Tests and Inspections**

The operator shall have an effective policy, process, or procedure for the size and type of operation established to ensure that within the preceding 24 calendar months the ATC transponder has been tested and inspected by a person approved by the governing civil authority. The operator must also ensure following any installation or maintenance on an ATC transponder where data correspondence error could be introduced; the integrated system has been tested and inspected.

### **8.51 Electrical Wiring Interconnection Systems (EWIS)**

Under this Standard, with no appendices selected, an EWIS system is not required unless performing operations under Appendix B of this Standard.

### **8.52 Fuel Tank Flammability Program**

Under this Standard, with no appendices selected, a Fuel Tank Flammability system is not required unless performing operations under Appendix B of this Standard.

### **8.53 Electromagnetic Interference (EMI)/Electrostatic Discharge (ESD) Program**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that aircraft maintenance complies with EMI and ESD requirements in accordance with NASA-STD-8739.6 "Implementation Requirements for NASA Approved Workmanship Standards". The operator will ensure proper transportation, storage, and maintenance of ESD-sensitive devices/components.

### **8.54 ETOPS (Extended-range Twin-engine Operations Performance Standards)**

Under this Standard, with no appendices selected, ETOPS operations are not allowed without meeting the requirements listed in Appendix F of this Standard.

### **8.55 RVSM (Reduced Vertical Separation Minimum)**

Under this Standard, with no appendices selected, RVSM operations are not allowed without meeting the requirements listed in Appendix G of this Standard.

## **9. QUALITY SYSTEM REQUIREMENTS**

### **9.1 Quality Management System (QMS)**

Under the basic standard, a QMS is not required unless the operator is performing duties under Appendix O or P.

### **9.2 Quality Policies, Procedures, and Practices**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the quality program requirements are planned, implemented, maintained, and integrated into every aspect of aircraft maintenance and that only fully qualified personnel are assigned quality program responsibilities.

### **9.3 Auditing and Surveillance**

Under the basic standard, auditing and surveillance are not required unless the operator is performing duties under Appendix O or P.

### **9.4 Required Inspection Items (RII) or In-progress Inspection (IPI)**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure the adequacy and effectiveness of the maintenance program and that it includes RII or IPI where appropriate.

### **9.5 Validation of Work Orders**

Under the basic standard, validation of work orders is not required unless the operator is performing duties under Appendix O or P.

### **9.6 QA Monitoring of Maintenance via Trend Analysis**

Under the basic standard, a QA Monitoring of Maintenance via Trend Analysis is not required unless the operator is performing duties under Appendix O or P.

### **9.7 Aircraft Configuration and Components**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure aircraft configuration and components have been properly maintained and are correct, all essential modifications have been incorporated, and requirements have been properly documented.

### **9.8 Quality Inspection Personnel Qualifications**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure trained and qualified Quality Inspectors are utilized when needed for applicable tasks.

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## **9.9 Government-Industry Data Exchange Program (GIDEP)**

Under the basic standard, a GIDEP is not required unless the operator is performing duties under Appendix P.

## **9.10 Suspected Unapproved Parts (SUP)**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure they are compliant with the governing civil authority's SUP Program and requisite actions.

## **9.11 Design and Development Planning**

Under the basic standard, design, and development planning is not required unless the operator is performing duties under Appendix P.

## **9.12 Configuration Management**

Under the basic standard, configuration management is not required unless the operator is performing duties under Appendix P.

## **9.13 Product Safety**

Under the basic standard, product safety planning, implementation, and control are not required unless the operator is performing duties under Appendix P.

## **9.14 Design and Development Controls**

Under the basic standard, design, and development controls are not required unless the operator is performing duties under Appendix P.

## **9.15 Identification and Traceability**

Under the basic standard, identification, and traceability of products and services are not required unless the operator is performing duties under Appendix P.

## **9.16 Supplier Approval**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator has a documented subcontract management process detailing the scope of the contracted activity and the interfaces between the operator and the contracted party. The organization will ensure the use of parts that meet the requirements of the local governing civil authority.

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## 9.17 Flow Down of Requirements

Under the basic standard, Flow Down of Requirements is not required unless the operator is performing duties under Appendix P.

## 9.18 Verification of Supplier Quality Management System (QMS)

Under the basic standard, verification of a supplier's QMS is not required unless the operator is performing duties under Appendix P.

## 9.19 Quality Management System Compliance for Supplied Critical Parts and Processes

Under the basic standard, verification of a supplier's QMS compliance for supplied critical parts and processes are not required unless the operator is performing duties under Appendix P.

# 10. AIRWORTHINESS MANAGEMENT REQUIREMENTS

## 10.1 Records Management

Under the basic standard, records management is not required unless the operator is performing duties under Appendix O or P.

## 10.2 Major Alterations and Repair

10.2.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that an effective system is in place to ensure all major repairs or alterations are compliant with applicable requirements and the operator is able to provide evidence of compliance through applicable approved forms, reports, and maintenance records.

10.2.2 The operator shall have one of the following for all Major Repairs and Major Alterations:

- a. Documentation of the Major Repairs and Major Alterations approved by the governing civil authority (i.e. FAA Form 337).
- b. For major repairs made in accordance with a manual or specifications acceptable to the governing civil authority, a certificated repair station may, in place of the requirements of paragraph (a), provide a signed copy of the work order and a maintenance release signed by an authorized representative of the repair station incorporating the following information:
  - (1) Identity of the aircraft, airframe, aircraft engine, propeller, or appliance.
  - (2) If an aircraft, the make, model, serial number, nationality and registration marks, and location of the repaired area.

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(3) If an airframe, aircraft engine, propeller, or appliance, give the manufacturer's name, name of the part, model, and serial numbers (if any).

### **10.3 Aircraft Configuration**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that aircraft and associated documentation accurately reflect current and approved configuration.

### **10.4 Design Hazard Analysis**

Under the basic standard, design hazard analysis is not required unless the operator is performing duties under Appendix O or P.

### **10.5 Work Card System**

Under the basic standard, a Work Card System is not required unless the operator is performing duties under Appendix O or P.

## **11. FACILITIES**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the operator utilizes facilities equipped and maintained to satisfactorily meet the requirements of this standard and applicable appendices.

## **12. AIRCRAFT SECURITY**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the operator meets the governing civil authority's security requirements. When NASA equipment is installed on an aircraft, the operator will restrict and secure access to required personnel only.

**APPENDIX A. INSTRUMENT FLIGHT RULES (IFR) AND NIGHT VISUAL FLIGHT RULES (VFR) OPERATIONS**

**A.1 SCOPE**

A.1.1 through A.1.3.3 (No additional requirement or information)

A.1.3.4 Operational Capabilities and Limitations

A.1.3.4.1 Flights under this Appendix are allowed to operate aircraft under Night Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). If flights are to be operated:

- a. With aircraft requiring a type rating, Appendix B also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. Conducting passenger carriage operations under governing civil authority, Appendix C also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix K also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- j. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. With rotorcraft performing shipborne operations, Appendix M also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. Performing NVG operations, Appendix I also applies.
- o. On brokered medical flight operations, Appendix Q also applies.
- p. Under ETOPs, Appendix F also applies.



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A.1.4 through A.7.2 (No additional requirement or information)

### A.7.3 Primary Aircrew Qualifications and Experience

The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the tables below:

**Table A.7. 3 Airplanes Not Requiring a Type Rating IFR and Night VFR**

	Pilot-in-Command	SIC (if required)
License	Commercial with IFR	Commercial with IFR
Total Hours	1,500	500
Total Hours in Class and Category	500	250
PIC hours in Class and Category	250	50
Turbine Hours (If Turbine Powered)	250	100
Total Hours in Make and Model	250	50
NVG (If Required)	250	50
Total PIC Hours	500	50
Total PIC Hours in Make and Model	150	0
Tailwheel Time (if Tailwheel)	300	50

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**Table A.7.3. 1 Rotorcraft Not Requiring a Type Rating IFR and Night VFR**

	Pilot-in-Command	SIC (if required by aircraft certification)
License	Commercial with IFR	Commercial with IFR (If required by certification for IFR flight)
Total Hours	1,500	250
Total Hours in Class and Category	500	100
PIC hours in Class and Category	250	0
Turbine Hours (If Turbine Powered)	250	100
Total Hours in Make and Model	100	75
NVG (If Required)	200	50
Total PIC Hours	500	100
Total PIC Hours in Make and Model	100	0

### A.7.4 Primary Aircrew Currency

A.7.4.1 Operators conducting Night VFR flights shall have an effective policy, process, or procedure for the size and type of operation that ensures pilots maintain night takeoff and landing experience by ensuring no pilot may act as PIC of an aircraft carrying passengers during the period beginning 1 hour after sunset and ending 1 hour before sunrise unless within the preceding 90 days that pilot has made at least three takeoffs and three landings to a full stop during the period beginning 1 hour after sunset and ending 1 hour before sunrise, and acted as the sole manipulator of the flight controls; and the required takeoffs and landings were performed in an aircraft of the same category, class, and type (if a type rating is required).

A.7.4.1.1 The takeoffs and landings required may be accomplished in a full flight simulator that is approved by the governing civil authority for takeoffs and landings as long as the visual system is adjusted to represent the period beginning 1 hour after sunset and ending 1 hour before sunrise and is used in accordance with an approved course conducted by a training center certified by the governing civil authority.

A.7.4.1.2 Operators conducting flights under IFR shall have an effective policy, process, or procedure for the size and type of operation of this section that ensures before a pilot operates under IFR or flights with weather minima below those listed in Table 7.9.14 has in the previous six calendar months conducted holding procedures, intercepted and tracked a course using electronic navigational equipment and six instrument approaches. These requirements must have been met in actual IMC weather conditions or

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under simulated IMC conditions using a view-limiting device in the actual aircraft or a full flight simulator, flight training device, or aviation training device that is the same category and is flown in IMC conditions. A combination of these devices can be used to maintain currency.

A.7.4.1.3 If company policy or the governing civil authority has more restrictive requirements, the most restrictive requirements will be used.

### **A.7.5 Primary Aircrew Medical** (No additional requirement or information)

### **A.7.6 Primary Aircrew Training**

A.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all crew operating under IFR or Night VFR who have not met the requirements of paragraph A.7.4.1.2 for more than six months must complete an Instrument Proficiency Check. The instrument proficiency check must consist of at least the following areas of operation:

- a. ATC clearances and procedures
- b. Flight by reference to instruments
- c. Navigation systems
- d. Instrument approach procedures
- e. Emergency operations
- f. Postflight procedures

A.7.6.1.1 The instrument proficiency check must be accomplished in the same category aircraft or in a full flight simulator or flight training device that is representative of the aircraft category.

A.7.6.1.2 The instrument proficiency check must be given by a person approved to do so by the governing civil authority.

### **A.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

### **A.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs A.7.3, A.7.4, A.7.5, and A.7.6.

A.7.9 through A.7.10 (No additional requirement or information)

### **A.7.11 Flight Preparation**

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A.7.11.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures while operating IFR, an IFR flight plan is filed and that a suitable alternate is filed unless the first airport of intended landing for at least one hour before and after the estimated time of arrival, the appropriate weather reports or forecasts, or any combination of them, indicate that either:

- a. The ceiling will be at least 1,500 feet above the lowest circling approach Minimum Decision Altitude (MDA).
- b. If a circling instrument approach is not authorized for the airport, the ceiling will be at least 1,500 feet above the lowest published minimum or 2,000 feet above the airport elevation, whichever is higher; and visibility for that airport is forecast to be at least three miles, or two miles more than the lowest applicable visibility minimums, whichever is the greater, for the instrument approach procedure to be used at the destination airport.

A.7.11.2 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures if an alternate is required:

- a. For airplanes the weather reports or forecasts, or any combination of them, indicate that the weather conditions will be at or above authorized alternate airport landing minimums for that airport at the estimated time of arrival.
- b. For rotorcraft the weather reports or weather forecasts, or a combination of them, indicate that, at the estimated time of arrival at the alternate airport, the ceiling and visibility at that airport will be at or above the following weather minimums:
  - (1) If, for the alternate airport, an instrument approach procedure has been published or a special instrument approach procedure has been issued by the governing civil authority, the ceiling is 200 feet above the minimum for the approach to be flown, and visibility is at least 1 statute mile but never less than the minimum visibility for the approach to be flown.
  - (2) If, for the alternate airport, no instrument approach procedure has been published and no special instrument approach procedure has been issued by the governing civil authority, the ceiling and visibility minimums are those allowing descent from the minimum enroute altitude (MEA), approach, and landing under basic VFR.

A.7.11.3 If company policy or the governing civil authority has more restrictive requirements, the most restrictive requirements will be used.

**A.7.12 Operational Risk Management** (No additional requirement or information)

**A.7.13 Inflight Publications** (No additional requirement or information)

**A.7.14 Operating Weather Minima**

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A.7.14.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all flight crewmembers have approved weather data available to comply with required weather minima for takeoff, approach, and landing minimums.

A.7.14.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures no flight crewmembers begin an approach if the weather is not at or above the published minimums for the equipment and approach being flown. However, if the aircraft is inside the final approach fix when notified the weather is below minimums, they may continue the approach to the minimum altitude and then land or perform a missed approach as appropriate.

A.7.14.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures no flight crewmembers takeoff under IMC when the weather is reported below the lowest compatible approach minimums without having a departure alternate filed. One-mile visibility is required for all takeoffs unless the operator has been approved for less by the governing civil authority.

**A.7.15 Weight and Balance** (No additional requirement or information)

**A.7.16 Fuel Requirements**

The operator shall have an effective policy, process, or procedure for the size and type of operation that will ensure that when operating aircraft under IFR conditions:

- a. Airplanes carry enough fuel to fly to the intended airport, then to the alternate (if required), and then fly after that for 45 minutes at normal cruising speed.
- b. Rotorcraft carry enough fuel to fly to the intended airport, then to the alternate (if required), and then fly after that for 30 minutes at normal cruising speed.

A.7.17 through A.7.22 (No additional requirement or information)

**A.7.23 Adverse Weather Operations**

A.7.23.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews do not operate the aircraft into known or forecast weather that exceeds the equipment certification limitations.

A.7.23.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained, proficient, and able to safely escape weather conditions approaching equipment certification limits.

**A.7.24 Icing Requirements**

A.7.24.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures no aircraft takes off with frost, ice, or snow adhering to any aircraft surface. However, hoar frost below fuel tanks may be permitted if approved by the governing civil authority.

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A.7.24.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that no airplane takeoff into areas icing is expected to occur shortly after takeoff unless he/she has a de-icing/anti-icing program approved by the governing civil authority and aircrews are trained and proficient.

A.7.24.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that no aircraft fly into an area of known or forecast light or moderate icing that exceeds the equipment limitations and all required de/anti-icing equipment is functional.

A.7.24.4 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that no aircraft fly into an area of known or forecast severe icing and that crewmembers are trained and proficient in maneuvers to escape inadvertent severe icing. However, flight test operations for icing may exceed this limitation when operating under the limitations of the specific flight test protocol.

A.7.24.5 If company policy or the governing civil authority has more restrictive requirements, the most restrictive requirements will be used.

A.7.25 Flight following requirements (No additional requirement or information)

### **A.7.26 Emergency Procedures**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crewmembers promptly notify ATC of degraded instrument capabilities when required.

A.7.27 through A.8.48 (No additional requirement or information)

### **A.8.49 Altimeter System**

The operator shall have an effective policy, process, or procedure for the size and type of operation established within the preceding 24 calendar months; each static pressure system, each altimeter instrument, and each automatic pressure altitude reporting system has been tested and inspected by a person approved by the governing civil authority. The operator will also ensure that the pitot-static system is tested and inspected following any opening or closing of the pitot-static pressure system except for the use of system drain and alternate static pressure valves.

A.8.50 through A.12 (No additional requirement or information)

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## APPENDIX B. OPERATIONS WITH AIRCRAFT REQUIRING A TYPE RATING

### B.1 SCOPE

B.1.1 through B.1.3.3 (No additional requirement or information)

#### B.1.3.4 Operational Capabilities and/or Limitations

B.1.3.4.1 Flights under this Appendix are allowed to operate aircraft requiring a Type Rating. If flights are to be operated:

- a. Under IFR or Night VFR, Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. Conducting passenger carriage operations under governing civil authority, Appendix C also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix K also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- j. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. With rotorcraft performing shipborne operations, Appendix M also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. Performing NVG operations, Appendix I also applies.
- o. On brokered medical flight operations, Appendix Q also applies.
- p. Under ETOPs, Appendix F also applies.

B.1.4 through B.7.3 (No additional requirement or information)

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### B.7.3 Primary Aircrew Qualifications and Experience

The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the tables below:

**Table B.7. 3 Airplanes Requiring a Type Rating**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial with IFR
Type Rating	Yes	Yes
Total Hours	1,500	500
Total Hours in Class and Category	750	400
PIC hours in Class and Category	500	250
Turbine Hours (If Turbine Powered)	250	100
Hours in Type	250	100
NVG (If Required)	250	50
Total PIC Hours	1,000	250
PIC in Type	250	0
Tailwheel, Ski, and Float equipped	300	100



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**Table B.7.3. 1 Airplanes Requiring a Type Rating**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial with IFR
Type Rating	Yes	No (Required for International)
Total Hours	1,500	500
Total Hours in Class and Category	750	250
PIC hours in Class and Category	500	0
Turbine Hours (If Turbine Powered)	500	100
Hours in Type	100	75
NVG (If Required)	250	50
Total PIC Hours	500	250
PIC in Type	100	0

## **B.7.4 Primary Aircrew Currency**

B.7.4.1 The operator shall ensure that for operations with aircraft requiring a type rating only appropriately qualified crewmembers are used.

B.7.4.2 Any aircraft that exceeds 12,500 pounds Maximum Take Off Weight (MTOW) and all turbojet-powered aircraft require a type rating or an equivalent qualification by the governing civil authority.

B.7.4.3 To act as Pilot In Command (PIC) of any aircraft requiring a type rating requires specialized training and certification for the make and model or family of aircraft.

## **B.7.5 Primary Aircrew Medical** (No additional requirement or information)

## **B.7.6 Primary Aircrew Training**

B.7.6.1 The operator shall ensure newly hired crewmembers receive basic indoctrination in at least: Duties and responsibilities of crewmembers as applicable; if applicable, contents of the operator's operating certificate and operations specifications (not required for flight attendants); and appropriate portions of the operator's operating manual, as applicable.

B.7.6.2 The operator shall ensure that all required crewmembers receive a type rating and initial, transition, or upgrade training as applicable on the aircraft to be flown through a program that meets all the requirements of the governing civil authority with devices or aircraft approved by the governing civil authority to be utilized for the training.

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B.7.6.3 The operator shall ensure all crew members receive either initial, transition, recurrent, or upgrade training or receive a check ride in accordance with the governing civil authorities' requirements on the equipment to be flown at least every 12 calendar months. Initial, recurrent, transition, or upgrade ground training for crewmembers must include at least the following:

- a. A quiz or other review to determine the crewmember's knowledge of the aircraft and crewmember position involved.
- b. Instruction on low-altitude wind shear training, training on operating during ground icing conditions (if required), crew resource management training, and emergency training.

B.7.6.4 The operator shall ensure all crewmembers of aircraft requiring a second in command that Crew Resource Management training received during initial, transition, recurrent, or upgrade training activities, as applicable, covers at least the following topics:

- a. Authority of the pilot in command.
- b. Communication processes, decisions, and coordination, including communication with Air Traffic Control, personnel performing flight locating and other operational functions, and passengers.
- c. Building and maintenance of a flight team.
- d. Workload and time management.
- e. Situational awareness.
- f. Effects of fatigue on performance, avoidance strategies, and countermeasures.
- g. Effects of stress and stress reduction strategies.
- h. Aeronautical decision-making and judgment training tailored to the operator's flight operations and aviation environment.

B.7.6.5 The operator shall ensure all crew members of aircraft requiring a type rating are provided emergency training for each aircraft type, model, and configuration, each crewmember, and each kind of operation conducted, as appropriate for each crewmember and the operator. Emergency training received during initial, transition, recurrent, or upgrade training activities, as applicable, covers at least instruction in emergency assignments and procedures, including coordination among crewmembers. Crew members shall receive instructions on the location, function, and operation of emergency equipment onboard. Each crewmember must perform at least the following emergency drills, using the proper emergency equipment and procedures unless approved by the governing civil authority to be trained by demonstration:

- a. Emergency Evacuation.
- b. Fire Extinguishing and smoke control.

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c. Operation and use of emergency exits, including deployment and use of evacuation chutes, if applicable.

B.7.6.6 In addition to initial, transition, upgrade, and recurrent training, each training program must provide ground and flight training, instruction, and practice necessary to ensure that each crewmember receives training in new equipment, facilities, procedures, and techniques, including modifications to aircraft.

**B.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

**B.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed listed in paragraphs B.7.3, B.7.4, and B.7.6.

B.7.9 through B.8.50 (No additional requirement or information)

**B.8.51 Electrical Wiring Interconnection Systems (EWIS)**

If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation establishing an EWIS maintenance program for any aircraft with a type certificate issued after January 1, 1958, that, as a result of the original certification or later increase in capacity, have a maximum type-certificated passenger capacity of 30 or more. The EWIS program utilized will ensure the wiring is inspected for chaffing and wire integrity in accordance with the governing civil authority's requirements.

**B.8.52 Fuel Tank Flammability Program**

If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation establishing a Fuel Tank Flammability Program for aircraft with a type certificate issued after January 1, 1958, that, as a result of the original certification, or later increase in capacity have a passenger capacity of 30 or more. The Fuel Tank Flammability program will ensure any fuel tank located within the fuselage has a properly maintained and approved fuel tank flammability reduction system approved by the governing civil authority, such as Nitrogen Generating System (NGS), an Oxygen Reduction System, or an alternate approved system.

B.8.53 through B.12 (No additional requirement or information)

**APPENDIX C. PASSENGER CARRIAGE OPERATIONS UNDER  
GOVERNING CIVIL AUTHORITY**

**C.1 SCOPE**

C.1.1 through C.1.3.1 (No additional requirement or information)

C.1.3.4 Operational Capabilities and/or Limitations

C.1.3.4.1 Flights under this Appendix are allowed to operate aircraft conducting passenger carriage operations under the operator's governing civil authority. If flights are to be operated:

- a. Under IFR or Night VFR, Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating; Appendix B also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix K also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- j. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. With rotorcraft performing shipborne operations, Appendix M also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. Performing NVG operations, Appendix I also applies.
- o. On brokered medical flight operations, Appendix Q also applies.
- p. Under ETOPs, Appendix F also applies.

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C.1.4 through C.7 (No additional requirement or information)

## **C.7 FLIGHT OPERATIONS REQUIREMENTS**

### **C.7.1 Organization and Personnel**

C.7.1.1 The operator is required to be certified and granted privileges by the governing civil authority to conduct commercial passenger carriage operations.

C.7.1.2 If applicable, the operator assigned a Director of Operation that holds a Commercial Pilot Certificate and an instrument rating (If any PIC is required to have an instrument rating), that has 3 years of managerial experience within the last 6 years, or had previously held experience as a Director of Operations for a company approved by the governing civil authority to conduct commercial passenger carriage operations for at least 3 years, or has been otherwise approved by the governing civil authority perform duties as a Director of Operations based upon other experience.

C.7.1.3 If applicable, the Chief Pilot of the organization is:

- a. Someone with previous experience as a Chief Pilot and has at least 3 years experience as a PIC for a company approved by the governing civil authority to conduct commercial passenger carriage operations.
- b. Someone without experience as a Chief Pilot has at least 3 years experience within the past 6 years as a PIC for a company approved by the governing civil authority to conduct commercial passenger carriage operations.

**C.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

### **C.7.3 Primary Aircrew Qualifications and Experience**

The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the tables below:

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**Table C.7. 3 Airplanes Conducting Passenger Carriage Under Civil Authority**

	Pilot-in-Command	Second-in-Command (SIC)
License	ATP	Commercial with IFR
Type Rating	Yes	Yes
Total Hours	2500	1,000
Total Hours in Class and Category	750	500
PIC hours in Class and Category	500	250
Turbine Hours (If Turbine Powered)	250	100
Hours in Type	250	100
NVG (If Required)	250	50
Total PIC Hours	1,000	250
PIC in Type	250	0
Tailwheel, Ski, and Float Equipped	300	100

**Table C.7.3. 1 Rotorcraft Conducting Passenger Carriage Under Civil Authority**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial
Type Rating	Yes	No (Required for International)
Total Hours	2500	750
Total Hours in Class and Category	750	250
PIC hours in Class and Category	250	0
Turbine Hours (If Turbine Powered)	500	100
Hours in Type	100	75
NVG (If Required)	250	50
Total PIC Hours	500	250
PIC in Type	100	0

C.7.4 through C.7.7 (No additional requirement or information)

### **C.7.8 Flight Crew Scheduling**

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If applicable, an operator that will be conducting passenger carriage operations under civil authority with airplanes with more than 19 seats shall have a process that ensures they have at least the minimum number of current and qualified flight attendants on the flight as listed below:

- a. For airplanes having more than 19 but less than 51 passengers on board, one flight attendant.
- b. For airplanes having more than 50 but less than 101 passengers on board, two flight attendants.
- c. For airplanes having more than 100 passengers on board, two flight attendants plus one additional flight attendant for each unit (or part of a unit) of 50 passengers above 100.
- d. No person may serve as a flight attendant on an airplane unless that person has demonstrated to the pilot in command familiarity with the necessary functions to be performed in an emergency or a situation requiring emergency evacuation and is capable of using the emergency equipment installed on that airplane and has met the applicable training requirements under Appendix B.7.6 of this standard and any additional requirements from other appendices applicable to the operation.

### **C.7.9 Crew Rest and Duty Day**

C.7.9.1 If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures flight attendants' duty periods will be scheduled not to exceed 14 hours in duration except:

- a. An operator conducting domestic, flag, or supplemental operations may assign a flight attendant to a scheduled duty period of more than 14 hours, but no more than 16 hours, if the operator has been assigned to the flight or flights in that duty period at least one flight attendant in addition to the minimum flight attendant complement required under C.7.8 of this appendix.
- b. An operator conducting domestic, flag, or supplemental operations may assign a flight attendant to a scheduled duty period of more than 16 hours, but no more than 18 hours, if the operator has been assigned to the flight or flights in that duty period at least two flight attendants in addition to the minimum flight attendant complement required under C.7.8 of this appendix.
- c. An operator conducting domestic, flag, or supplemental operations may assign a flight attendant to a scheduled duty period of more than 18 hours, but no more than 20 hours, if the scheduled duty period includes one or more flights operating internationally and if the operator has assigned to the flight or flights in that duty period at least three flight attendants in addition to the minimum flights required under C.7.8 of this appendix.

C.7.9.2 A flight attendant is not considered to be scheduled for duty in excess of duty period limitations if the flights to which the flight attendant is assigned are scheduled and normally terminate within the limitations but due to circumstances beyond the control of the operator

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conducting domestic, flag, or supplemental operations (such as adverse weather conditions) are not at the time of departure expected to reach their destination within the scheduled time.

C.7.9.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures flight attendants have an uninterrupted rest period of at least 10 hours in duration, except a flight attendant scheduled to a duty period of more than 14 hours but no more than 20 hours must be given a scheduled rest period of at least 12 consecutive hours. This rest period may be reduced to 10 hours as long as the flight attendant's subsequent rest period following the next duty period is at least 14 consecutive hours and begins no later than 24 hours after beginning the initial reduced rest period. Time spent during transportation to and from the aircraft away from the flight attendants' home base is not considered part of the rest period.

C.7.9.4 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures flight attendants have at least 24 consecutive hours off during any seven consecutive calendar days.

C.7.9.5 The requirements listed in C.7.9.1., C.7.9.2., C.7.9.3., and C.7.9.4. apply unless company policy or the governing civil authority has more restrictive requirements. The most restrictive requirements will apply.

C.7.10 through C.7.14 (No additional requirement or information)

### **C.7.15 Weight and Balance**

C.7.15.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the preparation and accuracy of a load manifest in duplicate containing information concerning the loading of the airplane. The manifest must be prepared before each takeoff and must include:

- a. The number of passengers.
- b. The total weight of the loaded.
- c. The maximum allowable takeoff and landing weights for that flight.
- d. The center of gravity limits.
- e. The center of gravity of the loaded airplane, except that the actual center of gravity need not be computed if the airplane is loaded according to a loading schedule or other approved method that ensures that the center of gravity of the loaded airplane is within approved limits. In those cases, an entry shall be made on the manifest indicating that the center of gravity is within limits according to a loading schedule or other approved method.
- f. The registration number of the airplane.
- g. The origin and destination.
- h. Names of passengers.



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C.7.15.2 The pilot in command of an airplane for which a load manifest must be prepared shall carry a copy of the completed load manifest in the airplane to its destination. The operator will keep copies of completed load manifests for at least 30 days at its principal operations base or at another location used by it and approved by the governing civil authority.

**C.7.16 Fuel Requirements** (No additional requirement or information)

**C.7.17 Passenger & Qualified Non-Crewmember Briefings**

The operator shall ensure all passenger briefings required by governing civil authority are completed in accordance with the governing civil regulations when conducting passenger carriage missions under their civil authority.

C.7.18 through C.12 (No additional requirement or information)

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## APPENDIX D. OPERATIONS REQUIRING THE USE OF OXYGEN

### D.1 SCOPE

D.1.1 through D.1.3.3 (No additional requirement or information)

D.1.3.4 Operational Capabilities and/or Limitations

D.1.3.4.1 Flights under this Appendix are allowed to operate above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace; Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix F also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating, and Appendix B also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix K also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- j. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. With rotorcraft performing shipborne operations, Appendix M also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. Performing NVG operations, Appendix I also applies.
- o. On brokered medical flight operations, Appendix Q also applies.
- p. Under ETOPs, Appendix F also applies.

D.1.4 through D.7.5 (No additional requirement or information)

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## **D.7.6 Primary Aircrew Training**

D.7.6.1 If applicable, the operator, if operating pressurized aircraft, shall have an effective policy, process, or procedure for the size and type of operation that ensures that all crewmembers are trained and proficient in the emergency handling of a rapid decompression and emergency descent procedures. If applicable, an operator conducting flights in environments with a Minimum Obstacle Clearance Altitude (MOCA) above 10,000 ft MSL will be trained on how to calculate and have ready an initial safe descent altitude for the area of operations and how to calculate a safe route to continue the descent to 10,000 ft MSL.

D.7.6.2 If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crewmembers who serve in operations above 25,000 feet must receive instruction in the following:

- a. Respiration.
- b. Hypoxia.
- c. Duration of consciousness without supplemental oxygen at altitude.
- d. Gas expansion.
- e. Gas bubble formation.
- f. Physical phenomena and incidents of decompression.

## **D.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

## **D.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed listed in paragraph D.7.6 of this section.

D.7.8.1 through D.7.29 (No additional requirement or information)

## **D.7.30 Oxygen Use Requirements**

D.7.30.1 If operating unpressurized aircraft, the operator will have an effective policy, process, or procedure for the size and type of operation that ensures it is equipped with enough oxygen dispensers and oxygen to supply the pilots who shall be required to use oxygen continuously at altitudes above 10,000 feet through 12,000 feet MSL for that part of the flight at those altitudes that is of more than 30 minutes duration, or anytime above 12,000 ft MSL.

D.7.30.2 If operating pressurized aircraft, the operator will have an effective policy, process, or procedure for the size and type of operation that ensures it is equipped with enough oxygen dispensers and oxygen to supply the pilots that comply with D.7.30.1 of this appendix with the cabin pressure altitude more than 10,000 feet MSL:

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a. Unless each pilot has an approved quick-donning type oxygen mask approved by the governing civil authority, whenever a pressurized aircraft is operated at altitudes above 25,000 feet through 35,000 feet MSL, the operator shall ensure:

(1) At least one pilot at the controls shall wear, secured and sealed, an oxygen mask that either supplies oxygen at all times or automatically supplies oxygen whenever the cabin pressure altitude exceeds 12,000 feet MSL.

(2) During that flight, each other pilot on flight deck duty shall have an oxygen mask connected to an oxygen supply, located so as to allow the immediate placing of the mask on the pilot's face sealed and secured for use.

b. The equipment required by any part of D.7.30 must have the means to enable the pilots to readily determine, in flight, the amount of oxygen available in each source of supply and whether the oxygen is being delivered to the dispensing units; or in the case of individual dispensing units, to enable each user to make those determinations with respect to that person's oxygen supply and delivery; and to allow the pilots to use undiluted oxygen at their discretion at altitudes above 25,000 feet MSL.

D.7.30.3 If operating unpressurized aircraft, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures it is equipped with enough oxygen dispensers and oxygen to supply occupants other than the pilots:

a. At altitudes above 10,000 feet through 15,000 feet MSL, oxygen to at least 10 percent of the occupants of the aircraft for the parts of the flight at those altitudes more than 30 minutes duration.

b. Above 15,000 feet MSL, each occupant of the aircraft is supplied supplemental oxygen for the duration of time above 15,000 ft MSL.

D.7.30.4 If operating pressurized aircraft, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures it is equipped with enough oxygen dispensers and oxygen to supply occupants with:

a. At altitudes above 25,000 feet MSL, at least a 10-minute supply of supplemental oxygen is available for each occupant of the aircraft, other than the pilots, for use when descent is necessary due to loss of cabin pressurization.

b. Unless it is equipped with enough oxygen dispensers and oxygen to comply with D.7.30.1 and D.7.30.3 whenever the cabin pressure altitude exceeds 10,000 feet MSL and, if the cabin pressurization fails, comply with D.7.30.1 or provide a 2-hour supply for each pilot, whichever is greater, and to supply when flying:

(1) At altitudes above 10,000 feet through 15,000 feet MSL, oxygen to at least 10 percent of the occupants of the aircraft, other than the pilots, for that part of the flight at those altitudes that is of more than 30 minutes duration.

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(2) Above 15,000 feet MSL, oxygen to each occupant of the aircraft, other than the pilots, for one hour unless, at all times during flight above that altitude, the aircraft can safely descend to 15,000 feet MSL within four minutes, in which case only a 30-minute supply is required.

D.7.31 through D.12 (No additional requirement or information)

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## APPENDIX E. OVERWATER OPERATIONS

### E.1 SCOPE

E.1 through E.1.3.3 (No additional requirement or information)

#### E.1.3.4 Operational Capabilities and/or Limitations

Flights under this Appendix are allowed to operate on overwater operations. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace, Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL, Appendix G also applies.
- d. On brokered medical flight operations, Appendix Q also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating; Appendix B also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix K also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- j. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. With rotorcraft performing shipborne operations, Appendix M also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. Performing NVG operations, Appendix I also applies.
- o. On ETOPS operations, Appendix F also applies.

E.1.4 through E.7.5 (No additional requirement or information)

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### **E.7.6 Primary Aircrew Training**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all crewmembers receive training on any applicable ditching procedures or other overwater emergency procedures along with training on any applicable overwater emergency or life support equipment at least every 12 calendar months.

**E.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

### **E.7.8 Flight Crew Scheduling**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all crewmembers are current with the requirements set forth in E.7.6.

E.7.9 through E.7.18 (No additional requirement or information)

### **E.7.19 Aircraft Acceptance**

E.7.19.1 If operating rotorcraft, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that rotorcraft operating over water beyond the shoreline must be equipped with fixed floats or an inflatable flotation system adequate to accomplish a safe emergency ditching if it is a single-engine rotorcraft; or it is a multi-engine rotorcraft that cannot be operated with the critical engine inoperative at a weight that will allow it to climb, at least 50 feet a minute, at an altitude of 1,000 feet above the surface, as provided in the applicable flight manual.

E.7.19.2 Each rotorcraft that is required to be equipped with an inflatable flotation system must have the activation switch for the flotation system on one of the primary flight controls and the flotation system armed when the rotorcraft is over water and is flying at a speed that does not exceed the maximum speed prescribed in the applicable flight manual for flying with the flotation system armed.

E.7.19.3 The requirements of E.7.19.1 and E.7.19.2 do not apply and fixed floats or an inflatable flotation system is not required if the rotorcraft is over water only during the takeoff or landing portion of the flight or it is operated within power-off gliding distance to the shoreline for the duration of the flight and each occupant is wearing a life preserver from before takeoff until the aircraft is no longer over water.

E.7.20 through E.7.30 (No additional requirement or information)

### **E.7.31 Life Support and Emergency Equipment**

E.7.31.1 If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all airplanes that do not have an approved ditching procedure remain within 50 miles of the nearest shoreline and have a flotation device readily available for each occupant or comply with E.7.31.2.

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E.7.31.2 If applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all airplanes that do have an approved ditching procedure or any aircraft that operates further than 50 miles from the nearest shoreline (or more than 50 miles from the nearest heliport or shoreline) has an approved life preserver equipped with an approved survivor locator light for each occupant of the aircraft. The life preserver must be easily accessible to each seated occupant. Also, it must have enough approved life rafts of a rated capacity and buoyancy to accommodate the occupants of the aircraft.

E.7.31.3 Each life raft required by E.7.31.2 of this appendix must be equipped with or contain at least the following:

- a. One approved survivor locator light.
- b. One approved pyrotechnic signaling device.
- c. Either one survival kit, appropriately equipped for the route to be flown; or
  - (1) One canopy (for sail, sunshade, or rain catcher).
  - (2) One radar reflector.
  - (3) One life raft repair kit.
  - (4) One bailing bucket.
  - (5) One signaling mirror.
  - (6) One police whistle.
  - (7) One raft knife.
  - (8) One CO2 bottle for emergency inflation.
  - (9) One inflation pump.
  - (10) Two oars.
  - (11) One 75-foot retaining line.
  - (12) One magnetic compass.
  - (13) One dye marker.
  - (14) One flashlight having at least two sized "D" cells or equivalent.
  - (15) A 2-day supply of emergency food rations supplying at least 1,000 calories per day for each person.



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- (16) For every two persons, the raft is rated to carry two pints of water or one seawater desalting kit.
- (17) One fishing kit.
- (18) One book on survival appropriate for the area in which the aircraft is operated.

E.7.31.4 No operator may operate an aircraft in extended overwater operations unless there is attached to one of the life rafts a required and approved survival-type emergency locator transmitter. Batteries used in this transmitter must be replaced (or recharged, if the batteries are rechargeable) when the transmitter has been in use for more than one cumulative hour or when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge) has expired, as established by the transmitter manufacturer under its approval. The new expiration date for replacing (or recharging) the battery must be legibly marked on the outside of the transmitter. The useful battery life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

E.7.32 through E.12 (No additional requirement or information)

## APPENDIX F. EXTENDED OPERATIONS (ETOPS)

### F.1 SCOPE

F.1.1 through F.1.3.2 (No additional requirement or information)

F.1.3.4 Operational Capabilities and/or Limitations

F.1.3.4.1 Flights under this Appendix are allowed to operate extended operations and must also comply with Appendices A, B, C, D, E, and H. Additionally, if flights are to be operated:

- a. On brokered medical flight operations, Appendix Q also applies.
- b. With any specific modifications for NASA use, Appendix O also applies
- c. With aerobatic maneuvers being performed, Appendix K also applies.
- d. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- e. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- f. Requiring developmental and experimental test flights, Appendix P also applies.
- g. Performing NVG operations, Appendix I also applies.
- h. Between 29,000 ft MSL and 41,000 ft MSL, Appendix G also applies.

F.1.4 through F.6.7 (No additional requirement or information)

### F.7 FLIGHT OPERATIONS REQUIREMENTS

#### F.7.1 Organization and Personnel

All operators conducting flights with twin engine multi-engine transport category turbine-powered airplanes overwater more than 180 minutes flying time (at the one-engine-inoperative cruise speed under standard conditions in still air) from the nearest suitable airport, other than an all-cargo airplane with more than two engines, is required to have ETOPS approval from the governing civil authority. ETOPS operations cannot be planned for more than the maximum allowable minutes of flying time specified in the ETOPS approval.

**F.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

**F.7.3 Primary Aircrew Qualifications and Experience**

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The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the table below:

**Table F.7. 3 ETOPS Pilot Hours Requirements**

	Pilot-in-Command	Second-in-Command (SIC)
License	ATP	ATP
Type Rating	Yes	Yes
Total Hours	2,000	1,500
Total Hours in Class and Category	1,000	750
PIC hours in Class and Category	500	250
Turbine Hours	250	100
Hours in Type	250	100
Total PIC Hours	1,000	500

**F.7.4 Primary Aircrew Currency** (No additional requirement or information)

**F.7.5 Primary Aircrew Medical** (No additional requirement or information)

**F.7.6 Primary Aircrew Training**

The operator will ensure that pilots conducting ETOPS operations have completed the operator's ETOPS initial and necessary recurrent training approved by the governing civil authority as required before conducting ETOPS missions.

**F.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

**F.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed listed in paragraphs F.7.6 and F.7.3 of this section.

F.7.9 through F.7.15 (No additional requirement or information)

**F.7.16 Fuel Requirements**

F.7.16.1 The operator must ensure, considering wind and other weather conditions expected, it has the fuel otherwise required by this section and enough fuel to satisfy each of the following requirements for fuel to fly to ETOPS alternate airport.

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F.7.16.1.1 Fuel to account for rapid decompression and engine failure. The airplane must carry the greater of the following amounts of fuel:

- a. Fuel sufficient to fly to an ETOPS Alternate Airport assuming a rapid decompression at the most critical point followed by a descent to a safe altitude in compliance with the oxygen supply requirements of D.7.30 of this standard.
- b. Fuel sufficient to fly to an ETOPS Alternate Airport (at the one-engine-inoperative cruise speed under standard conditions in still air) assuming a rapid decompression and a simultaneous engine failure at the most critical point followed by a descent to a safe altitude in compliance with the oxygen requirements of D.7.30 of this standard.
- c. Fuel sufficient to fly to an ETOPS Alternate Airport (at the one-engine-inoperative cruise speed under standard conditions in still air), assuming an engine failure at the most critical point followed by a descent to the one-engine inoperative cruise altitude.

F.7.16.1.2 Fuel to account for errors in wind forecasting. In calculating the amount of fuel required by paragraph F.7.16.1.1 of this appendix, the operator must increase the actual forecast wind speed by 5% (resulting in an increase in a headwind or a decrease in tailwind) to account for any potential errors in wind forecasting. If an operator is not using the actual forecast wind based on a wind model accepted by the governing civil authority, the airplane must carry additional fuel equal to 5% of the fuel required by paragraph F.7.16.1.1 of this appendix, as reserve fuel, to allow for errors in wind data.

F.7.16.1.3 Fuel to account for icing. In calculating the amount of fuel required by paragraph F.7.16.1.1 of this appendix (after completing the wind calculation in F.7.16.1.2 of this appendix), the operator must ensure that the airplane carries the greater of the following amounts of fuel in anticipation of possible icing during the diversion:

- a. Fuel that would be burned as a result of airframe icing during 10 percent of the time icing is forecast (including the fuel used by engine and wing anti-ice during this period).
- b. Fuel that would be used for engine anti-ice and, if appropriate, wing anti-ice for the entire time during which icing is forecast.

F.7.16.1.4 Fuel to account for engine deterioration. In calculating the amount of fuel required by paragraph F.7.16.1.1 of this appendix (after completing the wind calculation in paragraph F.7.16.1.2 of this appendix), the operator must ensure the airplane also carries fuel equal to 5% of the fuel specified above to account for deterioration in cruise fuel burn performance unless the operator has a program to monitor airplane in-service deterioration to cruise fuel burn performance.

F.7.16.1.5 Fuel to account for holding, approach, and landing. In addition to the fuel required by paragraphs F.7.16.1.1, F.7.16.1.2, F.7.16.1.3, and F.7.16.1.4 of this appendix, the airplane must carry fuel sufficient to hold at 1,500 feet above field elevation for 15 minutes upon reaching the ETOPS Alternate Airport and then conduct an instrument approach and land.

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F.7.16.1.6 Fuel to account for APU use. If an APU is a required power source, the operator must account for its fuel consumption during the appropriate phases of flight.

F.7.16.1.7 The requirements listed in F.7.16.1.1, F.7.16.1.2, F.7.16.1.3, F.7.16.1.4, F.7.16.1.5, and F.7.16.1.6, apply unless company policy or the governing civil authority has more restrictive requirements. The most restrictive requirements will apply.

**F.7.17 Passenger & Qualified Non-Crewmember Briefings** (No additional requirement or information)

**F.7.18 Aircraft Performance** (No additional requirement or information)

**F.7.19 Aircraft Acceptance**

F.7.19.1 The operator will ensure all aircraft conducting an ETOPS flight have the following communications equipment, appropriate to the route to be flown, installed and operational:

- c. Two independent communication transmitters, at least one of which allows voice communication.
- d. Two independent communication receivers, at least one of which allows voice communication.
- e. Two headsets, or one headset and one speaker.

F.7.19.2 In areas where voice communication facilities are not available or are of such poor quality that voice communication is not possible, communication using an alternative system must be substituted.

**F.7.20 Aircraft Documentation** (No additional requirement or information)

**F.7.21 Inflight Operations**

F.7.21.1 The operator must ensure that flight crews have in-flight access to current weather and operational information needed to ensure all applicable airports for the route information, including runway conditions, NOTAMS, and weather conditions to ensure the airport's continued suitability. This includes information on all ETOPS Alternate Airports, all destination alternates, and the destination airport proposed for each ETOPS flight.

F.7.21.2 The operator shall ensure no flight continues beyond its ETOPS Entry Point unless the weather conditions at each ETOPS Alternate Airport are forecast to be at or above the operating minima approved for the operator by the governing civil authority for that airport when it might be used (from the earliest to the latest possible landing time), and all ETOPS Alternate Airports within the authorized ETOPS maximum diversion time are reviewed for any changes in conditions that have occurred since dispatch.

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F.7.21.3 In the event that an operator cannot comply with paragraph F.7.11.1 of this appendix for a specific airport, another ETOPS Alternate Airport must be substituted within the maximum ETOPS diversion time that could be authorized for that flight with weather conditions at or above operating minima.

F.7.21.4 Pilots must plan and conduct ETOPS under instrument flight rules.

F.7.21.5 The time required to fly the distance to each ETOPS Alternate Airport (at the all-engines-operating cruise speed, corrected for wind and temperature) may not exceed the time specified in the Airplane Flight Manual for the airplane's most limiting fire suppression system time required by regulation for any cargo or baggage compartments (if installed), minus 15 minutes.

F.7.21.6 The time required to fly the distance to each ETOPS Alternate Airport (at the approved one-engine-inoperative cruise speed, corrected for wind and temperature) may not exceed the time specified in the Airplane Flight Manual for the airplane's most time-limited system time (other than the airplane's most limiting fire suppression system time required by regulation for any cargo or baggage compartments), minus 15 minutes.

F.7.22 through F.8.53 (No additional requirement or information)

### **F.8.54 ETOPS** (Extended-range Twin-engine Operations Performance Standards)

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that aircraft maintenance complies with ETOPS operational certification and is granted per their aviation governing authority once it demonstrates that it has the necessary capabilities (engineering, procedures, etc.) to conduct ETOPS flights safely.

#### F.8.54.1 ETOPS Maintenance Program Requirements

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures they develop and comply with an ETOPS maintenance program approved by the governing civil authority for each two-engine airplane-engine combination used in ETOPS. The operator must develop this ETOPS maintenance program to supplement the maintenance program currently approved for the operator. This ETOPS maintenance program must include the following elements:

- a. List each ETOPS Significant System.
- b. Refer to or include all duties and responsibilities.
- c. Clearly state where referenced material is located in the operator's document system.
- d. ETOPS Pre-Departure Service Check (PDSC). The operator must develop a pre-departure check tailored to their specific operation that ensures they:

- (1) Verify the condition of all ETOPS Significant Systems.

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- (2) Verify the overall status of the airplane by reviewing applicable maintenance records.
- (3) Include an interior and exterior inspection to include a determination of engine and APU oil levels and consumption rates.
- e. An appropriately trained maintenance person who is ETOPS qualified must accomplish and certify by signature ETOPS-specific tasks.
- f. Except for maintenance performed by a ETOPS Pre Departure Service Check (PDSC) Signatory Person, the operator may not perform scheduled or unscheduled dual maintenance during the same maintenance visit on the same or a substantially similar ETOPS Significant System listed in the ETOPS maintenance document if the improper maintenance could result in the failure of an ETOPS System.
- g. The maintenance action on each affected ETOPS Significant System is performed by a different technician, or the maintenance action on each affected ETOPS Significant System is performed by the same technician under the direct supervision of a second qualified individual.
- h. A qualified individual conducts a ground verification test and any in-flight verification test required under the program developed pursuant to paragraph 8.54.1(i) of this appendix.
- i. The operator must develop a program for the resolution of discrepancies that will ensure the effectiveness of maintenance actions taken on ETOPS Significant Systems. The verification program must identify potential problems and verify satisfactory corrective action. The verification program must include ground verification and in-flight verification policy and procedures. The operator must establish procedures to clearly indicate who is going to initiate the verification action and what action is necessary. The verification action may be performed on an ETOPS revenue flight provided the verification action is documented as satisfactorily completed upon reaching the ETOPS entry point.
- j. The operator must identify all ETOPS specific tasks. An ETOPS qualified person must accomplish and certify by signature that the ETOPS specific task has been completed.
- k. The operators existing CASS must be enhanced to include all elements of the ETOPS maintenance program.
- l. Additional ETOPS Significant System:
  - (1) Engine condition remote monitoring.
  - (2) Oil consumption remote monitoring.
  - (3) APU in-flight start program.
  - (4) ETOPS Maintenance Training Certifications.
  - (5) Configuration, Maintenance, and Procedures (CMP).

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(6) Reporting.

F.8.55 through F.12 (No additional requirement or information)



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## APPENDIX G. REDUCED VERTICAL SEPARATION MINIMUM (RVSM)

### G.1 SCOPE

G.1.1 through G.1.3.1 (No additional requirement or information)

G.1.3.4 Operational Capabilities and/or Limitations

Flights under this Appendix are allowed to operate between 29,000 ft MSL and 41,000 ft MSL outside of special use airspace and must also comply with Appendix A and D of this standard. If flights are to be operated:

- a. On operations conducting passenger carriage under the governing civil authority, Appendix C also applies.
- b. On overwater operations; Appendix E also applies.
- c. With any specific modifications for NASA use, Appendix O also applies.
- d. With aircraft requiring a type rating; Appendix B also applies.
- e. On international flights, Appendix H also applies.
- f. With aerobatic maneuvers being performed, Appendix K also applies.
- g. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- h. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- i. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- j. With rotorcraft performing shipborne operations, Appendix M also applies.
- k. Requiring developmental and experimental test flights, Appendix P also applies.
- l. Performing NVG operations, Appendix I also applies.
- m. On brokered medical flight operations, Appendix Q also applies.
- n. Under ETOPs, Appendix F also applies.

G.1.4 through G.6.7 (No additional requirement or information)

### G.7 FLIGHT OPERATIONS REQUIREMENTS

#### G.7.1 Organization and Personnel

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The operator will ensure they have required approvals from the governing civil authority to operate in RVSM airspace, if applicable.

G.7.2 through G.7.5 (No additional requirement or information)

### **G.7.6 Primary Aircrew Training**

G.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all pilots conducting operations in RVSM airspace must be proficient with the procedures and operations associated with RVSM. The operators will have a training program addressing the operational practices, procedures, and training items related to RVSM (e.g., initial, upgrade, or recurrent training for pilots). The following subjects need to be addressed during the initial introduction of a pilot to RVSM operations:

- a. Description of RVSM airspace, including Flight Level Allocation Schemes (FLAS).
- b. Flight planning for RVSM aircraft.
- c. Preflight procedures.
- d. Procedures before RVSM airspace entry.
- e. In-flight procedures.
- f. RVSM pilot Air Traffic Control (ATC) phraseology.
- g. Contingency procedures after entering RVSM airspace.
- h. Postflight procedures.
- i. Non-RVSM aircraft.
- j. Altitude-keeping performance monitoring.
- k. Minimum Equipment List (MEL), if applicable.
- l. Traffic Alert and Collision Avoidance System (TCAS) considerations for RVSM (if TCAS-equipped).
- m. RVSM oceanic operations (if applicable).
- n. International operations.
- o. Mountain wave and convective turbulence.

G.7.6.2 Recurrent training is only required to inform pilots of changes to RVSM operations as applicable.

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**G.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

**G.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed listed in paragraphs G.7.6 of this section.

G.7.9 through G.7.18 (No additional requirement or information)

**G.7.19 Aircraft Acceptance**

Pilots shall ensure RVSM critical areas are free of undocumented defects on the preflight inspection prior to RVSM flights.

G.7.20 through G.7.25 (No additional requirement or information)

**G.7.26 Emergency Procedures**

Pilots must notify the controlling agency of degraded RVSM performance when operating in RVSM airspace if the altimeters fail to meet the RVSM tolerances or other RVSM required equipment is degraded as specified in the most restrictive of company policy, flight manual, or governing civil authority regulations.

G.7.27 through G.8.54 (No additional requirement or information)

**G.8.55 RVSM (Reduced Vertical Separation Minimum)**

G.8.55.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures the aircraft is RVSM compliant or brought into compliance through the application of appropriate Service Bulletins (SB), Service Letters (SL), Engineering Change Orders (EO), or Supplemental Type Certificates (STC) for airworthiness guidance with RVSM Airworthiness Certification.

G.8.55.2 The operator is responsible for the maintenance of the systems affecting RVSM performance on the aircraft. The operator must ensure that it complies with the appropriate Instructions for Continued Airworthiness (ICA).

G.8.55.3 The operator shall define compliance requirements and test procedures for each potential source of Altimetry System Error (ASE).

G.8.55.4 The operator shall provide guidance for corrective action in the event of equipment, test, and/or inspection failure. Typical RVSM specific maintenance procedures include the following:

- a. Verification of avionics component part numbers.

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- b. A direct assessment of altimetry system component errors and the correct application of the Static Source Error Correction (SSEC).
- c. Assessment/measurement of the skin surrounding the static sources (e.g., skin waviness, skin splices/joints, access panels, radome fit/fair, and damage).
- d. Inspection of the pitot-static probe or static port (e.g., erosion, corrosion, damage, static port orifice degradation, static port step height, excessive or non-homogenous paint).
- e. Smart Probe Inspection for corrosion, erosion, damage, and degradation.

G.9 through G.12 (No additional requirement or information)

**APPENDIX H. INTERNATIONAL OPERATIONS**

**H.1 SCOPE**

H.1.1 through H.1.3.3 (No additional requirement or information)

H.1.3.4 Operational Capabilities and/or Limitations

H.1.3.4.1 Flights under this Appendix are allowed to operate on international flights. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating, Appendix B also applies.
- g. With aerobatic maneuvers being performed, Appendix K also applies.
- h. With airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- i. With airplanes from other than prepared runway surfaces, Appendix L also applies.
- j. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- k. With rotorcraft performing shipborne operations, Appendix M also applies.
- l. Requiring developmental and experimental test flights, Appendix P also applies.
- m. Performing NVG operations, Appendix I also applies.
- n. On brokered medical flight operations, Appendix Q also applies.
- o. On ETOPS flights, Appendix F also applies.

H.1.4 through H.6.1.5 (No additional requirement or information)

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## H.6.1.6 International Operations

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that they possess the appropriate SMS certificate applicable for international operations.

## H.7. FLIGHT OPERATIONS REQUIREMENTS

### H.7.1 Organization and Personnel

The operator shall ensure they have all necessary approvals, authorizations, and certifications required to conduct civil operations by the governing civil authorities of the countries whose airspace or aerodromes will be utilized.

**H.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

### H.7.3 Primary Aircrew Qualifications and Experience

In addition to the most restrictive hours requirements listed in the applicable appendices for the type of operations to be conducted internationally, the operator shall ensure pilots also have a radio operator's license issued by their governing civil authority.

**H.7.4 Primary Aircrew Currency** (No additional requirement or information)

**H.7.5 Primary Aircrew Medical** (No additional requirement or information)

### H.7.6 Primary Aircrew Training

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all crewmember are trained on all the requirements and differences for international operations for the countries of intended use. The operator will also ensure crewmembers are trained and proficient on ICAO requirements, regulations, and differences.

**H.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

### H.7.8 Flight Crew Scheduling

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed listed in paragraphs H.7.6 of this section.

H.7.9 through H.7.19 (No additional requirement or information)

### H.7.20 Aircraft Documentation

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H.7.20.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure the aircraft has all documentation onboard required for the country visited, such as insurance certificates, registration, or other documentation requested by the host nations governing civil authority.

H.7.20.2 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures all occupants have the necessary passports, forms, and visas required for the country of intended landing.

H.7.21 through H.12 (No additional requirement or information)

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## APPENDIX I. NIGHT VISION GOGGLES (NVG) OPERATIONS

### I.1 SCOPE

I.1.1 through I.1.3.3 (No additional requirement or information)

I.1.3.4 Operational Capabilities and/or Limitations

I.1.3.4.1 Flights under this Appendix are allowed to operate aircraft while utilizing NVG. If flights are to be operated:

- a. Under IFR or Night VFR, Appendix A also applies.
- b. With aircraft requiring a type rating, Appendix B also applies.
- c. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- d. Between 29,000 ft MSL and 41,000 ft MSL, Appendix G also applies.
- e. On overwater operations, Appendix E also applies.
- f. On Extended Operations (ETOPS) Appendix F also applies.
- g. With any specific modifications for NASA use, Appendix O also applies.
- h. On international flights, Appendix H also applies.
- i. With aerobatic maneuvers being performed, Appendix K also applies.
- j. Conducting commercial passenger carriage operations under governing civil authority, Appendix C also applies.
- k. With rotorcraft performing shipborne operations, Appendix M also applies.
- l. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. On brokered medical flight operations, Appendix Q also applies.

I.1.4 through I.6.7 (No additional requirement or information)

### I.7 FLIGHT OPERATIONS REQUIREMENTS

#### I.7.1 Organization and Personnel



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I.7.1.1 Pilots are required to be certified and granted privileges by the governing civil authority to conduct NVG operations. Pilots must demonstrate compliance outlined within the associated requirements of certification and granted privileges set forth by the governing civil authority.

I.7.1.2 If the operator is conducting passenger carriage under their civil authority, they must be able to provide the NVG operator certificate and a list of approved aircraft for NVG operations.

**I.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

**I.7.3 Primary Aircrew Qualifications and Experience**

The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the tables below:

**Table I.7. 3 Airplane NVG Operations**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial with IFR
Total Hours	1,500	750
Total Hours in Class and Category	750	400
PIC hours in Class and Category	500	250
Turbine Hours (If Turbine Powered)	250	100
Hours in Type	250	100
NVG	250	50
Total PIC Hours	1,000	250
PIC in Type	250	0
Tailwheel, Ski, and Float equipped	300	100

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**Table I.7.3. 1 Rotorcraft NVG Operations**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial	Commercial
Total Hours	1,500	500
Total Hours in Class and Category	750	250
PIC hours in Class and Category	500	0
Turbine Hours (If Turbine Powered)	500	100
Hours in Type	100	75
NVG	250	50
Total PIC Hours	500	250
PIC in Type	100	0

## **I.7.4 Primary Aircrew Currency**

I.7.4.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures that pilots have performed NVG operations in an aircraft of the same category within the past 12 calendar months or have received the necessary recurrent training as specified by the governing civil authority, if applicable.

I.7.4.2 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures no pilot serves in operations conducted under this part unless that pilot:

- a. Has successfully demonstrated to the governing civil authority knowledge and skill with respect to NVG operations in accordance with the governing civil authority requirements.
- b. A pilot may act as pilot in command in a night vision goggle operation with passengers on board only if, within two calendar months preceding the month of the flight, that person performs and logs the following tasks as the sole manipulator of the controls on a flight during a night vision goggle operation.
  - (1) Three takeoffs and three landings, with each takeoff and landing including a climb out, cruise, descent, and approach phase of flight (only required if the pilot wants to use night vision goggles during the takeoff and landing phases of the flight).
  - (2) If operating rotorcraft, three hovering tasks (only required if the pilot wants to use night vision goggles when operating rotorcraft during the hovering phase of flight).
  - (3) Three area departure and area arrival tasks.

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(4) Three tasks of transitioning from aided night flight (aided night flight means that the pilot uses night vision goggles to maintain visual surface reference) to unaided night flight (unaided night flight means that the pilot does not use night vision goggles) and back to aided night flight.

(5) Three night vision goggle operations for airplanes or six night vision goggle operations for rotorcraft.

c. A pilot may act as pilot in command using night vision goggles only if, within the four calendar months preceding the month of the flight, that person performs and logs the associated tasks listed in this section as the sole manipulator of the controls during a night vision goggle operation.

d. Night vision goggle proficiency check. A person must either meet the night vision goggle experience requirements of this section or pass a night vision goggle proficiency check to act as the pilot in command using night vision goggles. The proficiency check must be performed in the category of aircraft that is appropriate to the night vision goggle operation for which the person is seeking the night vision goggle privilege or in a full flight simulator or flight training device that is representative of that category of aircraft. The check must consist of the associated tasks, and the check must be performed by a pilot authorized by the governing civil authority.

e. Has in their personal possession a letter of competency or an appropriate logbook entry indicating compliance with the governing civil authority regulations and requirements.

f. If company policy or the governing civil authority has more restrictive requirements, the most restrictive requirements will be used.

### **I.7.5 Primary Aircrew Medical** (No additional requirement or information)

### **I.7.6 Primary Aircrew Training**

I.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that every pilot is trained and evaluated for proficiency in NVG operations. Additionally, the pilot must have received ground training and passed a written or oral test on the following subjects:

- a. Night vision goggle limitations and flight operations.
- b. Aeromedical factors related to the use of night vision goggles, including how to protect night vision, how the eyes adapt to night, self-imposed stresses that affect night vision, effects of lighting on night vision, cues used to estimate distance and depth perception at night, and visual illusions.
- c. Normal, abnormal, and emergency operations of night vision goggle equipment.
- d. Night vision goggle performance and scene interpretation.

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- e. Night vision goggle operation flight planning, including night terrain interpretation and factors affecting terrain interpretation.

I.7.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures every pilot successfully demonstrates the skills required for appropriate maneuvers for each category of aircraft being requested by NASA to include:

- a. Preflight and use of internal and external aircraft lighting systems for night vision goggle operations.
- b. Preflight preparation of night vision goggles for night vision goggle operations.
- c. Proper piloting techniques when using night vision goggles during the takeoff, climb, en route, descent, and landing phases of flight.
- d. Normal, abnormal, and emergency flight operations using night vision goggles.

I.7.6.2.1 The evaluation shall be conducted by a person approved to conduct the evaluation by the governing civil authority.

I.7.6.2.2 The appropriate maneuvers shall be demonstrated in the designated category of aircraft.

I.7.6.3 If company policy or the governing civil authority has more restrictive requirements, the most restrictive requirements will be used.

### **I.7.7 Primary Aircrew Responsibilities**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews perform due diligence and precautionary measures throughout NVG operations.

### **I.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs I.7.3, I.7.4, and I.7.6.

**I.7.9 Crew Rest and Duty Day** (No additional requirement or information)

**I.7.10 Fatigue Management** (No additional requirement or information)

### **I.7.11 Flight Preparation**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed, including safety/operational briefs, equipment inspections, route plan, and emergency action review.

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I.7.12 through I.7.13 (No additional requirement or information)

### **I.7.14 Operating Weather Minima**

Weather minima must meet the requirements set forth with the standard Table 7.14.

I.7.15 through I.7.18 (No additional requirement or information)

### **I.7.19 Aircraft Acceptance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all STC and manufacturer's requirements are met prior to NVG operations.

### **I.7.20 Aircraft Documentation**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all required and current documentation is posted within appropriate logs prior to any NVG operations as per the governing civil authority.

I.7.20 through I.7.25 (No additional requirement or information)

### **I.7.26 Emergency Procedures**

I.7.26.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that pilots are prepared and knowledgeable of NVG and associated system failure while performing NVG operations.

I.7.26.2 In the event of an NVG system failure that is not correctable in under 10 seconds, and a transfer of flight controls can't be made, crewmembers will immediately announce the failure while executing a climb to a safe VFR altitude, if able. The minimum safe altitude will be at least 1,000 ft above the highest obstruction to flight within 25 nautical miles in non-mountainous terrain and 2,000 ft above in mountainous.

I.7.27 through I.12 (No additional requirement or information)

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## APPENDIX J. AIRPLANE LOW-LEVEL FLIGHT OPERATIONS

### J.1 SCOPE

J.1.1 through J.1.3.3 (No additional requirement or information)

J.1.3.4 Operational Capabilities and/or Limitations

Flights under this Appendix are allowed to operate with Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace. Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating, Appendix B also applies.
- g. With aerobatic maneuvers being performed, Appendix K also applies.
- h. With airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- i. With airplanes from other than prepared runway surfaces, Appendix L also applies.
- j. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- k. With rotorcraft performing shipborne operations, Appendix M also applies.
- l. Requiring developmental and experimental test flights, Appendix P also applies.
- m. Performing NVG operations, Appendix I also applies.
- n. On brokered medical flight operations, Appendix Q also applies.
- o. On ETOPS flights, Appendix F also applies.

J.1.4 through J.5.6 (No additional requirement or information)

### J.7. FLIGHT OPERATIONS REQUIREMENTS

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### **J.7.1 Organization and Personnel**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures pilots demonstrate compliance with associated requirements of certification or privileges, if applicable for the governing civil authority. The governing civil authority may require a waiver process to allow for operations beyond the following limits, except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

- a. Anywhere at an altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
- b. Over any congested area of a city, town, or settlement, or over any open-air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.
- c. Over other than congested areas at an altitude of 500 feet above the surface except over open water or sparsely populated areas. In that case, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

### **J.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

### **J.7.3 Primary Aircrew Qualifications and Experience**

The operator shall ensure the pilot or pilots meet the minimum applicable requirements as applicable in the table below:

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**Table J.7. 3 Airplane Low-Level Flight Operations**

	Pilot-in-Command	Second-in-Command (SIC) (If required)
License	Commercial	Commercial
Total Hours	1,500	750
Total Hours in Class and Category	750	400
PIC hours in Class and Category	500	250
Turbine Hours (If Turbine Powered)	250	100
Hours in Type	250	100
NVG (if required)	250	50
Total PIC Hours	1,000	250
PIC in Type	250	0
Tailwheel, Ski, and Float equipped	300	100
Low-Level Airplane Flights	100	50

## **J.7.4 Primary Aircrew Currency**

J.7.4.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures that pilots have performed airplane low-level flight operations in an aircraft of the same category within the past 12 calendar months or have received the necessary recurrent training if required by the governing civil authority.

J.7.4.2 If company policy or the governing civil authority has more restrictive requirements, the more restrictive requirements will be used.

## **J.7.5 Primary Aircrew Medical** (No additional requirement or information)

## **J.7.6 Primary Aircrew Training**

J.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all pilots have been evaluated for the proficiency of the operator or the governing civil authority, company, or other government agency (i.e. Office of Aviation Services (OAS)) on conducting airplane low-level flight operations within 12 months.

J.7.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that every pilot successfully completes a test of knowledge (which may be oral or written) that covers the following subjects:

- a. Applicable subjects that relate to low level flight limitations and flight operations.



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- b. Normal, abnormal, and emergency considerations associated with low level flight.
- c. Hazards to include towers, guide wires, powerlines, natural vegetation, terrain, sun position, and wildlife.
- d. Low level flight operations flight planning, including flight operation area survey, hazards map, degraded communication plan, time of day, and operational boundaries.

### **J.7.7 Primary Aircrew Responsibilities**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews perform due diligence and precautionary measures throughout low level flight operations. All efforts will be made to mitigate risk while conducting low level flight.

### **J.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs M.6.3, M.6.4, M.6.6.

**J.7.9 Crew Rest and Duty Day** (No additional requirement or information)

**J.7.10 Fatigue Management** (No additional requirement or information)

### **J.7.11 Flight Preparation**

J.7.11.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed, including safety/operational briefs, equipment inspections, route plan, and emergency action review.

J.7.11.2 The operator shall ensure crews have utilized sources approved by the governing civil authority to ensure the crew is aware of the location and height of all obstructions to flight in the area of operation.

**J.7.12 Operational Risk Management** (No additional requirement or information)

**J.7.13 Inflight Publications** (No additional requirement or information)

### **J.7.14 Operating Weather Minima**

Weather minimums must meet the requirements set forth with the standard Table 7.14.

J.7.15 through J.7.20 (No additional requirement or information)

### **J.7.21 Inflight Operations**

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If operating single-engine aircraft, the crews shall remain vigilant and continuously access options in the event of an engine failure based on the aircraft's energy state (airspeed and altitude) and identify and update the best suitable landing sites in case of the need of a power off landing along the route.

J.7.22 through J.7.25. (No additional requirement or information)

### **J.7.26 Emergency Procedures**

J.7.26.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that pilots are prepared and knowledgeable of low-level flight operations risks, hazards, and associated contingencies. Low level flight operations will only be planned so a climb to a safe altitude can be made at any time during low level flight.

J.7.26.2 When an emergency occurs during low level flight operations, crewmembers will immediately discontinue the operation, and announce the issue while executing a climb (if able) to a safe VFR altitude which will be at a minimum 1,000 ft above the highest obstruction to flight in non-mountainous terrain and 2,000 ft above in mountainous within 25 nautical miles of the aircraft position.

J.7.27 through J.12 (No additional requirement or information)

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## APPENDIX K. OPERATIONS REQUIRING AEROBATIC FLIGHT MANEUVERS

### K.1 SCOPE

K.1.1 through K.1.3.3 (No additional requirement or information)

#### K.1.3.4 Operational Capabilities and/or Limitations

Flights under this Appendix are allowed to operate with aerobatic maneuvers being performed. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating, and Appendix B also applies.
- g. On international flights, Appendix H also applies.
- h. On brokered medical flight operations, Appendix Q also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- j. On ETOPS flights, Appendix F also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. With rotorcraft performing shipborne operations, Appendix M also applies.
- m. Requiring developmental and experimental test flights, Appendix P also applies.
- n. Performing NVG operations, Appendix I also applies.
- o. Conducting commercial passenger carriage operations under governing civil authority, Appendix C also applies.

K.1.4 through K.6.7 (No additional requirement or information)

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## K.7 FLIGHT OPERATIONS REQUIREMENTS

### K.7.1 Organization and Personnel

Pilots, if required, are to be certified and granted privileges by the governing civil authority to conduct aerobatic operations. Pilots must demonstrate compliance outlined within the associated requirements of certification and granted privileges set forth by the governing civil authority.

**K.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

### K.7.3 Primary Aircrew Qualifications and Experience

The operator shall ensure the pilot or pilots meet the minimum applicable requirements as applicable in the table below:

**Table K.7. 3 Airplane Operations Requiring Aerobatic Flight Maneuvers**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial with IFR
Total Hours	1,500	750
Total Hours in Class and Category	750	400
PIC hours in Class and Category	500	250
Turbine Hours (If Turbine Powered)	250	100
Hours in Type	250	100
NVG	250	50
Total PIC Hours	1,000	250
PIC in Type	250	0
Tailwheel	300	100

### K.7.4 Primary Aircrew Currency

K.7.4.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures that pilots have performed aerobatic flight maneuvers, including stall and spin awareness training in an aircraft of the same category within the past 24 calendar months or have received the necessary recurrent training as specified by the governing civil authority.

K.7.4.2 If company policy or the governing civil authority has more restrictive requirements, the more restrictive requirements will be utilized.

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**K.7.5 Primary Aircrew Medical** (No additional requirement or information)

**K.7.6 Primary Aircrew Training**

K.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all operations requiring aerobatic flight maneuvers within the preceding 24 calendar months that the pilot has successfully completed either an approved initial, a recurrent training program, or provided aerobatic flight training to others.

K.7.6.1.1 A pilot designated for operations requiring aerobatics must have demonstrated satisfactory knowledge and skill regarding aerobatic flight operations, including stall and spin awareness training. If the governing civil authority has additional requirements, those must also be met.

K.7.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that every designated crewmember demonstrates proficient knowledge on the following subjects prior to conducting aerobatic flights:

- a. Applicable subjects that relate to aerobatic flight operations.
- b. Normal, abnormal, and emergency considerations associated with aerobatic flight.
- c. Aircraft allowed by the governing civil authority to perform aerobatic maneuvers.
- d. Parachute requirements for pilots and passengers, certification, inspection, and use when required for aerobatic maneuvers.
- e. Aerobatic flight operations flight planning, including flight operation area survey and operational boundaries as required by the governing civil authority.

**K.7.7 Primary Aircrew Responsibilities**

K.7.7.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews perform due diligence and precautionary measures throughout aerobatic maneuver operations.

K.7.7.2 No person may operate an aircraft in aerobatic flight:

- a. Over any congested area of a city, town, or settlement.
- b. Over an open-air assembly of persons.
- c. Within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport without permission from the governing civil authority.
- d. Within 4 nautical miles of the center line of any Federal airway.

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- e. Below an altitude of 1,500 feet above the surface; or
- f. When flight visibility is less than 3 statute miles.

K.7.7.3 If company policy or the governing civil authority has more restrictive requirements, the more restrictive requirements will be used.

### **K.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs K.7.3, K.7.4, K.7.6.

K.7.9 through K.7.10. (No additional requirement or information)

### **K.7.11 Flight Preparation**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed, including safety/ operational briefs, equipment inspections, route plan, and emergency action review. Crew and passengers will be instructed on parachute use and the aircraft egress plans, if applicable.

K.7.12 through K.7.13. (No additional requirement or information)

### **K.7.14 Operating Weather Minima**

Weather minimum must meet the requirements set forth with the standard Table 7.14.

K.7.15 through K.7.18 (No additional requirement or information)

### **K.7.19 Aircraft Acceptance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all STC and manufacturers requirements are met prior to any aerobatic maneuver operations. Aerobatic and spin flight operations will only be conducted in an appropriate category aircraft.

### **K.7.20 Aircraft Documentation**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all required and current documentation is posted within appropriate logs prior to any aerobatic maneuver operations as per the governing civil authority.

K.7.21 through K.7.25. (No additional requirement or information)

### **K.7.26 Emergency Procedures**

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The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures parachute and egress procedures are developed, and aircrew are trained for specific aircraft that perform aerobatic flight maneuvers.

K.7.27 through K.7.30. (No additional requirement or information)

### **K.7.31 Life Support and Emergency Equipment**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that parachutes (if needed) are packed, rigged, maintained, and inspected in accordance with both the manufacturers and governing civil authority requirements.

K.7.32 through K.12. (No additional requirement or information)

**APPENDIX L. AIRPLANE OPERATIONS TAKING OFF AND LANDING  
ON UNPREPARED SURFACES**

**L.1. SCOPE**

L.1.1 through L.1.3.3 (No additional requirement or information)

L.1.3.4 Operational Capabilities and/or Limitations

L.1.3.4.1 Flights under this Appendix are allowed to operate airplanes taking off or landing on unprepared surfaces, including seaplane operations. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace, Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With any specific modifications for NASA use, Appendix O also applies.
- f. With aircraft requiring a type rating; Appendix B also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix K also applies.
- i. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landing, Appendix J also applies.
- j. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- k. With rotorcraft performing shipborne operations, Appendix M also applies.
- l. Requiring developmental and experimental test flights, Appendix O also applies.
- m. Performing NVG operations, Appendix I also applies.
- n. On brokered medical flights, Appendix Q also applies.
- o. On ETOPS flights, Appendix F also applies.

L.1.4 through L.7.2 (No additional requirement or information)



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### L.7.3 Primary Aircrew Qualifications and Experience

The operator shall ensure the pilot or pilots meet the minimum applicable requirements as applicable in the table below:

**Table L.7. 3 Airplanes Conducting Water or Unimproved Surface Landings**

	Pilot-in-Command	SIC (if required by insurance/certification)
License	Commercial in the applicable class (Sea or Land)	Commercial in the applicable class (Sea or Land)
Total Hours	1,500	500
Total Hours in Class and Category	500	250
PIC hours in Class and Category	500	50
Turbine Hours (If Turbine Powered)	150	100
Total Hours in Make and Model	100	50
Total PIC Hours	300	50
Total PIC Hours in Make and Model	100	0
Tailwheel Time (if Tailwheel)	500	50
Float Time (if applicable)	500	50
Ski time (if applicable)	50	50
Amphibious (if applicable)	200 (Plus 300 on straight floats for a combined 500-hour minimum)	50

### L.7.4 Primary Aircrew Currency

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all pilots have made six takeoffs and landings from the type of surface to be utilized within the preceding 90 days (i.e., Six water takeoffs and landings would be needed for float operations).

### L.7.5 Primary Aircrew Medical (No additional requirement or information)

### L.7.6 Primary Aircrew Training

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L.7.6.1 For seaplane operations, if applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that pilots have received required training listed below:

- a. Received required ground and flight training and received seaplane certificate as required by the governing civil authority.
- b. Been evaluated for proficiency in seaplane operations by either the company, the governing civil authority, or another government agency in proficiency in float operations in the proceeding 12 months.

L.7.6.2 For land-born unimproved surface operations if applicable, the operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that pilots have received required training listed below:

- a. Received ground or flight training in conducting operations from unimproved surfaces and has passed an evaluation for proficiency for these type of operations within the preceding 12 months by the company, governing civil authority, or other government agency (i.e. the Office of Aviation Services).

**L.7.7 Primary Aircrew Responsibilities** (No additional requirement or information)

**L.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs L.7.3, L.7.4, and L.7.6.

L.7.9 through L.7.13. (No additional requirement or information)

**L.7.14 Operating Weather Minima**

All operations under this appendix are to be completed under Day VMC with the weather minima established in table 7.14 of this standard.

L.7.15 through L.7.17 (No additional requirement or information)

**L.7.18 Aircraft Performance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all pilots use a reliable method of aerial assessment to ensure sites selected for airplane operations have the distance required to conduct operations safely.

L.7.19 through L.7.20 (No additional requirement or information)

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## **L.7.21 Inflight Operations**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures no NASA personnel are carried to a site that has no published takeoff or landing distances available unless the operator has landed the same make and model of aircraft on that site within the previous 72 hours and completed an assessment of the location for suitability of applicable operations.

L.7.22 through L.12 (No additional requirement or information)

**APPENDIX M. ROTORCRAFT SHIPBORNE OPERATIONS**

**M.1. SCOPE**

M.1.1 through M.1.3.3 (No additional requirement or information)

M.1.3.4 Operational Capabilities and/or Limitations

M.1.3.4.1 Flights under this Appendix are allowed to operate rotorcraft while conducting shipborne operations. If flights are to be operated:

- a. Under IFR or Night VFR, Appendix A also applies.
- b. With aircraft requiring a type rating, Appendix B also applies.
- c. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- d. Between 29,000 ft MSL and 41,000 ft MSL, Appendix G also applies.
- e. On overwater operations, Appendix E also applies.
- f. With any specific modifications for NASA use, Appendix O also applies.
- g. On international flights, Appendix H also applies.
- h. With aerobatic maneuvers being performed, Appendix L also applies.
- i. Conducting commercial passenger carriage operations under governing civil authority, Appendix C also applies.
- j. Performing NVG operations, Appendix I also applies.
- k. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- l. Requiring developmental and experimental test flights, Appendix P also applies.
- m. On brokered medical flight operations, Appendix Q also applies.

M.1.4 through M.6.7 (No additional requirement or information)

**M.6. FLIGHT OPERATIONS REQUIREMENTS**

**M.7.1 Organization and Personnel**

The operator, if required to be certified and granted privileges by the governing civil authority to conduct rotorcraft shipborne operations, must demonstrate compliance outlined within the

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associated requirements of certification and granted privileges set forth by the governing civil authority.

**M.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirements or information)

### M.7.3 Primary Aircrew Qualifications and Experience

The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the table below:

**Table M.7. 3 Rotorcraft Shipborne Operations**

	Pilot-in-Command	SIC (if required by aircraft certification)
License	Commercial	Commercial
Total Hours	1,500	250
Total Hours in Class and Category	500	100
PIC hours in Class and Category	250	0
Total Hours in Make and Model	200	75
NVG (If Required)	200	50
Total PIC Hours	500	100
Total PIC Hours in Make and Model	100	0

### M.7.4 Primary Aircrew Currency

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures that pilots have performed a rotorcraft shipborne operation of the same class and in an aircraft of the same type within the past 12 calendar months or have received the necessary recurrent training if defined and approved by the governing civil authority.

**M.7.5 Primary Aircrew Medical** (No additional requirement or information)

### M.7.6 Primary Aircrew Training

M.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all crew performing rotorcraft shipborne operations within the preceding 12 calendar months that the pilot has successfully completed either an approved initial or a recurrent training program or as required by the governing civil authority.

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M.7.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that every pilot successfully completes a test of knowledge (which may be oral or written) that covers the following subjects:

- a. Steps to be taken before starting operations, including a survey of the flight area.
- b. Weather and sea state limits and considerations
- c. Performance capabilities, under approved operating procedures and limitations, of the rotorcraft to be used.
- d. Approach and departure procedures to moored and underway ships.
- e. Proper instructions of flight crew and deck workers.
- f. Communication considerations.
- g. Hand and light signals.
- h. Deck hazards and preparations.
- i. Equipment.
- j. Deck and flight crew briefing.
- k. Passenger briefing.

### **M.7.7 Primary Aircrew Responsibilities**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews perform due diligence and precautionary measures throughout the rotorcraft shipborne operation.

### **M.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs M.7.3, M.7.4, and M.7.6.

M.7.9 through M.7.10. (No additional requirement or information)

### **M.7.11 Flight Preparation**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed, including safety/ operational briefs, equipment inspections, route plans, emergency action reviews, and operational contingencies.

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M.7.12 through M.7.14 (No additional requirement or information)

### **M.7.15 Weight and Balance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures weight and balance considerations be performed for all rotorcraft shipborne operations.

**M.7.16 Fuel Requirements** (No additional requirement or information)

### **M.7.17 Passenger & Qualified Non-Crewmember Briefings**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures) and equipment to be used during rotorcraft shipborne operations.

### **M.7.18 Aircraft Performance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures performance planning considerations be performed for all rotorcraft shipborne operations.

### **M.7.19 Aircraft Acceptance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all STC and manufacturer's requirements are met prior to rotorcraft shipborne operations.

### **M.7.20 Aircraft Documentation**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all required and current documentation is posted within appropriate logs prior to any rotorcraft shipborne operations as per the governing civil authority.

**M.7.21 Inflight Operations** (No additional requirement or information)

### **M.7.22 Stabilized Approach**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews do not operate rotorcraft in conditions that could induce vortex ring state and loss of tail rotor effectiveness while conducting rotorcraft shipborne operations.

### **M.7.23 Adverse Weather Operations**

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M.7.23.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews do not operate the aircraft into known or forecast weather that exceeds the equipment certification limitations while conducting rotorcraft shipborne operations.

M.7.23.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained, proficient, and able to safely escape weather conditions approaching equipment certification limits while conducting rotorcraft shipborne operations.

M.7.23.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are aware of the sea state, weather conditions, and the imposed limits and contingencies associated with rotorcraft shipborne operations. Sea state and deck pitch and roll limits will be established based on aircraft, equipment, and crew capabilities.

M.7.24 through M.12 (No additional requirement or information)



**APPENDIX N. ROTORCRAFT EXTERNAL LOAD OPERATIONS**

**N.1. SCOPE**

N.1.1 through N.1.3.3 (No additional requirement or information)

N.1.3.4 Operational Capabilities and/or Limitations

N.1.3.4.1 Flights under this Appendix are allowed to operate rotorcraft while conducting external load operations. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace; Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. On overwater operations, Appendix E also applies.
- d. With aircraft requiring a type rating; Appendix B also applies.
- e. On international flights, Appendix H also applies.
- f. With rotorcraft performing shipborne operations, Appendix M also applies.
- g. With any specific modifications for NASA use, Appendix O also applies.
- h. Requiring developmental and experimental test flights, Appendix P also applies.
- i. Performing NVG operations, Appendix I also applies.
- j. On brokered medical flight operations, Appendix Q also applies.

N.1.4 through N.6.7 (No additional requirement or information)

**N.7 FLIGHT OPERATIONS REQUIREMENTS**

**N.7.1 Organization and Personnel**

N.7.1.1 The operator is required to be certified and granted privileges by the governing civil authority to conduct commercial external load operations. The operator must demonstrate compliance outlined within the associated requirements of certification and granted privileges set forth by the governing civil authority.

N.7.1.2 The operator shall be able to provide the external-load operator certificate and a list of approved aircraft for external-load operations.

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**N.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

### **N.7.3 Primary Aircrew Qualifications and Experience**

The operator shall ensure the pilot or pilots meet the applicable minimum requirements as applicable in the table below:

**Table N.7. 3 Rotorcraft Conducting B, C, and D External Load Operations**

	Pilot-in-Command	SIC (if required by aircraft certification)
License	Commercial	Commercial
Total Hours	1,500	250
Total Hours in Class and Category	500	100
PIC hours in Class and Category	250	0
Total Hours in Make and Model	200	75
NVG (If Required)	200	50
Total PIC Hours	500	100
Total PIC Hours in Make and Model	100	0
B, C, and D External Loads	200	25
External Loads Vertical Reference Long Line (if required)	200	25

### **N.7.4 Primary Aircrew Currency**

N.7.4.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures that pilots have performed a rotorcraft external-load operation of the same class and in an aircraft of the same type within the past 12 calendar months or have received the necessary recurrent training as specified by the governing civil authority.

N.7.4.2 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures no pilot serves in operations conducted under this part unless that pilot:

- a. Has successfully demonstrated to the governing civil authority's knowledge and skill with respect to the rotorcraft-load combination in accordance with the governing civil authority.
- b. Has in their personal possession a letter of competency or an appropriate logbook entry indicating compliance with the governing civil authority regulations and requirements.

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**N.7.5 Primary Aircrew Medical** (No additional requirement or information)

**N.7.6 Primary Aircrew Training**

N.7.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all crew performing A, B, C, and D external load operations within the preceding 12 calendar months that the pilot has successfully completed either an approved initial or a recurrent training program or as required by the governing civil authority.

N.7.6.1.1 A pilot designated for A, B, C, and D external load operations by the governing civil authority must demonstrate to the governing civil authority satisfactory knowledge and skill regarding rotorcraft external load operations.

N.7.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that every pilot successfully completes a test of knowledge (which may be oral or written) that covers the following subjects:

- a. Steps to be taken before starting operations, including a survey of the flight area.
- b. Proper method of loading, rigging, or attaching the external load.
- c. Performance capabilities, under approved operating procedures and limitations, of the rotorcraft to be used.
- d. Proper instructions of flight crew and ground workers.
- e. Appropriate rotorcraft-load combination flight manual.

N.7.6.3 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures that every pilot successfully demonstrates the skills required for appropriate maneuvers for each class requested during an evaluation conducted by a person approved to conduct the evaluation by the governing civil authority. These appropriate maneuvers for each load class must be demonstrated in the rotorcraft:

- a. Takeoffs and landings.
- b. Demonstration of directional control while hovering.
- c. Acceleration from a hover.
- d. Flight at operational airspeeds.
- e. Approaches to landing or working area.
- f. Maneuvering the external load into the release position.
- g. Demonstration of winch operation, if a winch is installed to hoist the external load.

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N.7.6.4 The governing civil authority may approve pilots previously certified with prior experience conducting the same type of operations within 12 months with no additional training required, except for operator specific procedural differences if applicable.

### **N.7.7 Primary Aircrew Responsibilities**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews perform due diligence and precautionary measures throughout the external load operation.

### **N.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs N.7.3, N.7.4, and N.7.6.

N.7.9 through N.7.10. (No additional requirement or information)

### **N.7.11 Flight Preparation**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed, including safety/operational briefs, load inspections, equipment inspections, route plans, and emergency action reviews.

N.7.12 through N.7.14. (No additional requirement or information)

### **N.7.15 Weight and Balance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures weight and balance considerations be performed for all external load operations.

**N.7.16 Fuel Requirements** (No additional requirement or information)

### **N.7.17 Passenger & Qualified Non-Crewmember Briefings**

N.7.17.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that passengers are not allowed during rotorcraft B, C, and D external load operations unless that person is a flight crewmember, a flight crewmember trainee, performs an essential function in connection with the external load operation or is necessary to accomplish the work activity directly associated with that operation.

N.7.17.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that all persons are briefed before takeoff on all pertinent procedures to be

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followed (including normal, abnormal, and emergency procedures) and equipment to be used during the external load operation.

### **N.7.18 Aircraft Performance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures performance planning considerations be performed for all external load operations.

### **N.7.19 Aircraft Acceptance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all STC and manufacturer's requirements are met prior to external load operations.

### **N.7.20 Aircraft Documentation**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures all required and current documentation is posted within appropriate logs prior to any external load operations as per the governing civil authority.

### **N.7.21 Inflight Operations (No additional requirement or information)**

### **N.7.22 Stabilized Approach**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews do not operate rotorcraft in conditions that could induce vortex ring state and loss of tail rotor effectiveness while conducting external load operations.

### **N.7.23 Adverse Weather Operations**

N.7.23.1 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews do not operate the aircraft into known or forecast weather that exceeds the equipment certification limitations while conducting external load operations.

N.7.23.2 The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures crews are trained, proficient, and able to safely escape weather conditions approaching equipment certification limits while conducting external load operations.

### **N.7.24 Icing Requirements**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures aircrews do not operate the aircraft into known or forecast icing conditions while conducting external load operations.

### **N.7.25 Flight following requirements (No additional requirement or information)**

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### **N.7.26 Emergency Procedures**

N.7.26.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that personnel lifting devices are governing civil authority approved and have an emergency release requiring two distinctive actions.

N.7.26.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that pilots are prepared and knowledgeable for unstable and oscillating external loads and emergency conditions that may be complicated during external load operations.

N.7.27 through N.8.23 (No additional requirement or information)

### **N.8.24 Aircraft Maintenance**

The operator shall have an effective policy, process, or procedure for the size and type of operation that ensures scheduled maintenance and inspections specified by the supplemental type certificate (STC) and manufacturer are met prior to external load operations consisting of maintenance tasks performed according to a maintenance schedule including:

- a. Procedural instructions for the maintenance task and method of recording the results of inspection checks, tests, and other maintenance.
- b. Ensuring the serviceability of cargo nets, long lines, and other associated equipment utilized to perform external load operations.

N.8.25 through N.12. (No additional requirement or information)

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## APPENDIX O. OPERATIONS REQUIRING SPECIFIC MODIFICATIONS AIRCRAFT FOR NASA USE

### O.1. SCOPE

O.1.1 through O.1.3.3 (No additional requirement or information)

O.1.3.4 Operational Capabilities and/or Limitations

O.1.3.4.1 Flights under this Appendix are allowed to operate flights requiring specific modifications aircraft for NASA use. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With aircraft requiring a type rating, Appendix B also applies.
- f. On international flights, Appendix H also applies.
- g. With aerobatic maneuvers being performed, Appendix K also applies.
- h. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- i. With Airplanes from other than prepared runway surfaces, Appendix L also applies.
- j. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- k. With rotorcraft performing shipborne operations, Appendix M also applies.
- l. Requiring developmental and experimental test flights, Appendix P also applies.
- m. Performing NVG operations, Appendix I also applies.
- n. On brokered medical flights, Appendix Q also applies.
- o. On ETOPS flights, Appendix F also applies.
- p. Conducting commercial passenger carriage operations under governing civil authority, Appendix C also applies.

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O.1.4 through O.7.2 (No additional requirement or information)

### **O.7.3 Primary Aircrew Qualifications and Experience**

The most restrictive hours requirements listed in the applicable appendices for the type of operations to be conducted will be utilized. If the modification is to the extent that it requires flight testing, the flight test portion will need to comply with the requirements in Appendix P, Chapter 7.

O.7.4 through O.7.7 (No additional requirement or information)

### **O.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraphs O.7.3.

O.7.9 through O.7.10 (No additional requirement or information)

### **O.7.11 Flight Preparation**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews are thoroughly briefed on all aspects of mission parameters and operational differences induced by the modification.

O.7.12 through O.7.25 (No additional requirement or information)

### **O.7.26 Emergency Procedures**

O.7.26.1 The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews are aware of specific emergency actions required that differ from the aircraft's standard emergency actions for operations conducted for any of the modifications on the aircraft.

O.7.26.2 If the modification requires the utilization of aircraft power, the aircrew shall have a procedure to isolate any equipment not essential to flight from the aircraft power quickly.

O.7.26.3 If the equipment installed contains any batteries with the potential for thermal runaway, the crew will be trained and equipped to manage the emergency.

O.7.26.4 The crew will be trained and proficient in any additional emergency situations of differences in existing emergency procedures the modification of the aircraft has induced.

O.7.27 through O.8.55 (No additional requirement or information)

## **O.9 QUALITY SYSTEM REQUIREMENTS**



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## **O.9.1 Quality Management System (QMS)**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator ensures that organizations responsible for the maintenance of the aircraft have maintenance programs that are compliant with AS9100D or AS9110C. Maintainers will have a documented quality program (i.e., appropriate policies, procedures, and practices) that covers all aspects of maintenance, material acceptance, documentation review, maintenance instruction applicability, and currency that fits within the scope of the maintainers QMS.

## **O.9.2 Quality Policies, Procedures, and Practices** (No additional requirement or information)

## **O.9.3 Auditing and Surveillance**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that sampling and surveillance verifications will be used independently or in combination to accomplish the verification function of the quality program processes.

## **O.9.4 Required Inspection Items (RII) or In-Progress Inspection (IPI)** (No additional requirement or information)

## **O.9.5 Validation of Work Orders**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that QA validates all work orders (excluding minor aircraft write-ups/gripes) and oversees the installation of all work orders on aircraft.

## **O.9.6 QA Monitoring of Maintenance via Trend Analysis**

O.9.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator operates a program to provide for analysis and surveillance of its continuous airworthiness maintenance program, including work performed by other organizations.

O.9.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator monitors maintenance using a program to develop trend analysis of processes, including analyses of all reports of findings and/or actions taken during aircraft and component maintenance.

O.9.7 through O.9.19 (No additional requirement or information)

## **O.10 AIRWORTHINESS MANAGEMENT REQUIREMENTS**

### **O.10.1 Records Management**

O.10.1.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator has a records management system in place to ensure required documentation is available for airworthiness reviews and approvals. The following are

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typical of the information required for an airworthiness review board to review in order to approve an aircraft modification or flight operation for a specific aircraft configuration:

- a. A description of the aircraft modifications, including aircraft configuration, loads, flight envelope, aircraft weight, and balance data, reference to applicable mechanical and electrical design documents, reference to applicable software version description documents, and a listing of associated computer software configuration.
- b. Applicable engineering analyses describing design criteria, aircraft loads, and safety limits. The results of tests conducted to verify the engineering analysis also shall be considered.
- c. A description of the required flight operations, including operating procedures, test conditions, maneuvers, required instrumentation, mission control operations, mission rules and flight limitations, nonstandard operation or inspection criteria, and associated checklists. Actions to be taken in the event of in-flight malfunctions or emergency conditions associated with the aircraft modifications or nonstandard operations also shall be described.

O.10.1.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure a records management process is established to manage the requirements for design, documentation, and workmanship that meets or exceeds standard aerospace industry practices for flight hardware and includes:

- a. Engineering substantiation documentation and drawings.
- b. Material conformity for materials used in primary and secondary structures, whose failure could result in loss of or damage to the aircraft or injury to or loss of personnel based on experience gained through past or current testing.
- c. Electrical design requirements to include electromagnetic interference.
- d. Avionics requirements, including a review of all system vulnerabilities.
- e. Structural load and stability requirements.

### **O.10.2 Major Alterations and Repairs**

#### O.10.2.1 NASA Airworthiness Approval

O.10.2.1.1 If the operator conducts modifications that require NASA airworthiness approval in lieu of meeting FAA airworthiness standards, the operator will ensure the operator maintains the documentation required. Substantiation documentation enables the evaluation of compliance with applicable airworthiness requirements.

O.10.2.1.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the following supporting documentation will be included in an Airworthiness Review:

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- a. All design review documentation, results, RIDs/action items, and associated status.
- b. This shall include a Hazard Analysis, identifying real or potential conditions that could cause injury, illness, or death to the personnel; damage to or loss of a system, equipment, or property; or damage to the environment.
- c. Weight and balance.
- d. Traceability to closed work packages associated with modification.
- e. Status of any review or audit findings affecting the modification or flight. If applicable, include any mitigations put in place to address issues.
- f. Minimum Equipment List (MEL), if applicable.
- g. Associated waivers and deviations.
- h. Product verification results.
- i. QA results and issues.
- j. Maintenance results and issues.

O.10.2.1.3 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that major alterations and repairs have been approved by a designee (individual or organization) and associated alterations/repairs are within the scope of the designee's authority.

O.10.2.1.4 If the modifications are NASA directed and in advance of NASA flights, airworthiness approval is based on the results of Center approved engineering and safety analyses. The final approval shall contain a description of the configuration of the aircraft, operating instructions and procedures, operating limitations and restrictions, and specific maneuvers or operations for which the aircraft is cleared.

### **O.10.3 Aircraft Configuration** (No additional requirement or information)

### **O.10.4 Design Hazard Analysis**

#### O.10.4.1 Aircraft Modification and Payload Integration

The operator shall ensure that all aircraft modification and payload integration are compliant with requirements and be able to provide evidence of compliance through applicable approved forms (e.g., FAA Form 337, FAA Form 8110, Supplemental Type Certificates (STCs), or NASA Approvals, etc.) and associated substantiating documentation demonstrating engineering compliance to the applicable requirements.

### **O.10.5 Work Card System**

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The operator shall use a work card system to track and control all aircraft modifications by aircraft type and model. The operator will design the work card system to reduce the likelihood that steps within a complex task are not inadvertently missed. The operator needs to ensure work cards contain and make precise reference to the maintenance data required for the task(s) and are protected against unauthorized alteration. The operator must ensure the revision status of the work card system is kept fully aligned with the Aircraft Maintenance Manual (AMM), such that the work card system identifies and cross-references the AMM revision in use, and that complex maintenance tasks are sub-divided into clear stages allowing a record of accomplishment at each stage of the completed task.

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## APPENDIX P. OPERATIONS INVOLVING DEVELOPMENT OF NEW AIRCRAFT OR NEW TECHNOLOGY

### P.1. SCOPE

P.1.1 through P.1.3.3 (No additional requirement or information)

P.1.3.4 Operational Capabilities and/or Limitations

P.1.3.4.1 Flights under this Appendix are allowed conduct operations involving the development of new aircraft or new technologies. If flights are to be operated:

- a. Under IFR or Night VFR, or above 18,000 ft MSL outside of special use airspace Appendix A also applies.
- b. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- c. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- d. On overwater operations, Appendix E also applies.
- e. With aircraft requiring a type rating, Appendix B also applies.
- f. On international flights, Appendix H also applies.
- g. With aerobatic maneuvers being performed, Appendix K also applies.
- h. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- i. With airplanes from other than prepared runway surfaces, Appendix L also applies.
- j. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- k. With rotorcraft performing shipborne operations, Appendix M also applies.
- l. Performing NVG operations, Appendix I also applies.
- m. On ETOPS flights, Appendix F also applies.

P.1.4 through P.6.7 (No additional requirement or information)

### P.7 FLIGHT OPERATIONS REQUIREMENTS

P.7.1 **Organization and Personnel** (No additional requirement or information)

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**P.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

**P.7.3 Primary Aircrew Qualifications and Experience**

The operator shall ensure the pilot or pilots conducting flight test operations have graduated from an approved military or civilian flight test training program that meets the requirements for the flight testing to be performed and meets any applicable requirements of the governing civil authority. In addition, pilots must meet the applicable minimum requirements in the tables below:

**Table P.7. 3 Airplane Operations Requiring Flight Testing**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial with IFR
Type Rating	Yes	Yes
Total Hours	2,000	1,500
Total Hours in Class and Category	750	400
PIC hours in Class and Category	500	250
Turbine Hours (If Turbine Powered)	1,000	500
Hours in Type	50 (0 if new type)	50 (0 if new type)
NVG (If Required)	250	50
Total PIC Hours	1,000	250
PIC in Type	250	0
Tailwheel, Ski, and Float equipped (If required)	300	100

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**Table P.7.3. 1 Rotorcraft Requiring Flight Testing**

	Pilot-in-Command	Second-in-Command (SIC)
License	Commercial with IFR	Commercial with IFR
Type Rating	Yes	No (Required for International)
Total Hours	1,500	500
Total Hours in Class and Category	750	250
PIC hours in Class and Category	500	0
Turbine Hours (If Turbine Powered)	500	100
Hours in Type	50 (0 if new type)	50 (0 if new type)
NVG (If Required)	250	50
Total PIC Hours	500	250

P.7.4 through P.7.7 (No additional requirement or information)

## **P.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed, as spelled out in paragraphs P.7.3.

P.7.9 through P.7.10 (No additional requirement or information)

## **P.7.11 Flight Preparation**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews are thoroughly briefed on all aspects of the flight test plan, the current flight test parameters and procedures, and all associated contingencies.

P.7.12 through P.7.25 (No additional requirement or information)

## **P.7.26 Emergency Procedures**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews are aware of specific emergency actions required that differ from the aircraft's standard emergency actions for operations conducted under the test plan.

P.7.27 through P.8.55 (No additional requirement or information)

## **P.9 QUALITY MANAGEMENT SYSTEM REQUIREMENTS**

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### **P.9.1 Quality Management System**

Operations under this appendix must meet the requirements in O.9.1 of this standard.

### **P.9.2 Quality Policies, Procedures, and Practices**

Operations under this appendix must meet the requirements in O.9.2 of this standard.

### **P.9.3 Auditing and Surveillance**

Operations under this appendix must meet the requirements in O.9.3 of this standard.

### **P.9.4 Required Inspection Items (RII) or In-Progress Inspection (IPI)**

Operations under this appendix must meet the requirements in O.9.4 of this standard.

### **P.9.5 Validation of Work Orders**

Operations under this appendix must meet the requirements in O.9.5 of this standard.

### **P.9.6 QA Monitoring of Maintenance via Trend Analysis**

P.9.6.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator operates a program to provide for analysis and surveillance of its continuous airworthiness maintenance program including work performed by other organizations.

P.9.6.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator monitors maintenance using a program to develop trend analysis of processes, including analyses of all reports of findings and/or actions taken during aircraft and component maintenance.

### **P.9.7 Aircraft Configuration and Components**

P.9.7.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that QA personnel ensures that aircraft configuration and components have been properly maintained are correct and that all essential modifications have been incorporated, and that all requirements have been properly documented.

P.9.7.2 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the Inspection for acceptance of maintenance will be performed by qualified persons other than those who performed or directly supervised the work being inspected.

### **P.9.8 QA Personnel Qualifications** (No additional requirement or information)



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### **P.9.9 Government-Industry Data Exchange Program (GIDEP)**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that personnel are trained in the GIDEP.

### **P.9.10 Suspected Unapproved Parts (SUP) (No additional requirement or information)**

### **P.9.11 Design and Development Planning**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that in determining the stages and controls for design and development, the organization will consider:

- a. The nature, duration, and complexity of the design and development activities.
- b. The required process stages, including applicable design and development reviews.
- c. The required design and development verification and validation activities.
- d. The responsibilities and authorities involved in the design and development process.
- e. The internal and external resource needs for the design and development of products and services.
- f. The need to control interfaces between persons involved in the design and development process.
- g. The need for the involvement of customers and users in the design and development process.
- h. The requirements for the subsequent provision of products and services.
- i. The level of control expected for the design and development process by customers and other relevant interested parties.
- j. The documented information needed to demonstrate that design and development requirements have been met.

### **P.9.12 Configuration Management**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the organization will plan, implement, and control a process for configuration management as appropriate to the organization and its products and services in order to ensure the identification and control of physical and functional attributes throughout the product lifecycle. This process must:

- a. Control product identity and traceability to requirements, including the implementation of identified changes.

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- b. Ensure that the documented information (e.g., requirements, design, verification, validation, and acceptance documentation) is consistent with the actual attributes of the products and services.

### **P.9.13 Product Safety**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the organization will plan, implement, and control the processes needed to assure product safety during the entire product life cycle, as appropriate to the organization and the product. Examples of these processes include:

- a. Assessment of hazards and management of associated risks.
- b. Management of safety critical items.
- c. Analysis and reporting of occurred events affecting safety.
- d. Communication of these events and training of persons.

### **P.9.14 Design and Development Controls**

P.9.14.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the organization will apply controls to the design and development process to ensure that:

- a. The results to be achieved are defined.
- b. Reviews are conducted to evaluate the ability of the results of design and development to meet requirements.
- c. Verification activities are conducted to ensure that the design and development outputs meet the input requirements.
- d. Validation activities are conducted to ensure that the resulting products and services meet the requirements for the specified application or intended use.
- e. Any necessary actions are taken on problems determined during the reviews or verification and validation activities.
- f. Documented information of these activities is retained.
- g. Progression to the next stage is authorized.

P.9.14.2 Participants in design and development reviews shall include representatives of functions concerned with the design and development stage(s) being reviewed.

### **P.9.15 Identification and Traceability**

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The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the organization will maintain the identification of the configuration of the products (i.e., drawings) and services in order to identify any differences between the actual configuration and the required configuration.

**P.9.16 Supplier Approval** (No additional requirement or information)

**P.9.17 Flow Down Requirements**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator will flow applicable quality assurance requirements down to successive levels of the supply chain to ensure control of sub-tier suppliers and verification of safety and mission-critical attributes at all levels of the supply chain.

**P.9.18 Verification of Supplier QMS**

P.9.18.1 The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator has a documented subcontract management process detailing the scope of the contracted activity and the interfaces between the operator and the contracted party.

P.9.18.2 The organization shall ensure the adequacy of requirements prior to their communication with the external provider and documentation of a supplier approval process to include a supplier list, selection criteria, evaluation, and monitoring. The operator will define the process, responsibilities, and authority for the approval status decision, changes of the approval status, and conditions for controlled use of external providers depending on their approval status.

P.9.18.3 The operator shall require that external providers apply appropriate controls to their direct and sub-tier external providers to ensure that requirements are met. The organization will retain documented information on these activities and any necessary actions arising from the evaluations. The organization must communicate to external providers its requirements for:

- a. The processes, products, and services to be provided, including the identification of relevant technical data (e.g., specifications, drawings, process requirements, and work instructions).
- b. The approval of products and services; methods, processes, and equipment; the release of products and services.
- c. Competence, including any required qualification of persons.
- d. Design and development control.
- e. Special requirements, critical items, or key characteristics.
- f. Test, inspection, and verification (including production process verification).

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- g. The use of statistical techniques for product acceptance and related instructions for acceptance by the organization.
- h. The right of access by the organization, their customer, and regulatory authorities to the applicable areas of facilities and to applicable documented information at any level of the supply chain.

### **P.9.19 Quality Management System Compliance for Supplied Critical Parts and Processes**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that the operator's suppliers of critical items, processes (e.g., plating, polishing, soldering, brazing), and services(e.g., machining, laboratory testing, transportation, and storage) maintain a QMS that complies with one of the following:

- a. Compliance with or third-party certification to AS9100D (preferred).
- b. Compliance to or third-party certification to ISO 9001, Fifth Edition, Quality Management Systems - Requirements.
- c. Compliance with AS9003A, Inspection and Test Quality Systems, Requirements for Aviation, Space, and Defense Organizations.
- d. Compliance with or third-party certification to ISO/IEC 17025:2017, general requirements for the competence of testing and calibration laboratories (preferred for laboratory testing and calibration services).

### **P.10 AIRWORTHINESS MANAGEMENT REQUIREMENTS**

#### **P.10.1 Records Management**

Operations under this appendix must meet the requirements in O.10.1 of this standard.

#### **P.10.2 Major Alterations and Repairs**

##### **P.10.2.1 NASA Airworthiness Approval**

Operations under this appendix must meet the requirements in O.10.2.1 of this standard.

#### **P.10.3 Aircraft Configuration** (No additional requirement or information)

#### **P.10.4 Design Hazard Analysis**

The operator shall have an effective policy, process, or procedure for the size and type of operation to ensure that hazard analysis will be provided, identifying real or potential conditions that could cause injury, illness, or death to the personnel; damage to or loss of a system, equipment, or property; or damage to the environment. This will include a safety hazard analysis

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of systems and operations, including risk assessment and risk reduction actions and the methodology used to reduce the risks to acceptable levels (e.g., design, safety devices, warnings, procedures, training, or other methods).

### **P.10.4.1 Aircraft Modification and Payload Integration**

P.10.4.1.1 Operations under this appendix must meet the requirements in O.10.4.1 of this standard.

### **P.10.5 Work Card System**

Operations under this appendix must meet the requirements in O.10.5 of this standard.

## APPENDIX Q. BROKERED MEDICAL FLIGHT OPERATIONS

### Q.1. SCOPE

Q.1.1 through Q.1.3.3 (No additional requirement or information)

Q.1.3.4 Operational Capabilities and/or Limitations

Q.1.3.4.1 Flights under this Appendix are allowed to operate brokered medical flights and must also comply with Appendix A, C, and any other applicable appendices to their type of operation. If flights are to be operated:

- a. Above 12,000 ft MSL and above 10,000 ft MSL for more than 30 minutes, Appendix D also applies.
- b. Between 29,000 ft MSL and 41,000 ft MSL; Appendix G also applies.
- c. On overwater operations, Appendix E also applies.
- d. With any specific modifications for NASA use, Appendix O also applies.
- e. On international flights; Appendix H also applies.
- f. With aerobatic maneuvers being performed, Appendix K also applies.
- g. With Airplanes below 1,000 ft AGL in non-mountainous terrain or below 2,000 ft AGL in mountainous terrain, with the exception of take-off and landings, Appendix J also applies.
- h. With airplanes from other than prepared runway surfaces, Appendix L also applies.
- i. With rotorcraft performing any rotorcraft external load operations, Appendix N also applies.
- j. With rotorcraft performing shipborne operations, Appendix M also applies.
- k. Requiring developmental and experimental test flights, Appendix P also applies.
- l. Performing NVG operations, Appendix I also applies.
- m. On ETOPS flights, Appendix F also applies.

Q.1.4 through Q.4.4 (No additional requirement or information)

### Q.4.5 CAS Inspection Process

For brokered medical operations, the CAS inspection team shall conduct a minimum of three onsite inspections as follows:

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a. An onsite inspection of the brokerage to review their process and to observe how they perform an audit of an operator that ensures compliance with this standard and appendices applicable to that operator. The inspectors will also collect audit results from two operators (including an international operator if applicable) the brokerage has previously audited.

b. The inspection team will then conduct a CAS inspection per this standard on the two operators selected in Q.4.5.a and provide a combined detailed inspection report to NASA reporting the findings from all three inspections. This inspection report will highlight the effectiveness of the brokerage's own audit procedures in ensuring compliance with the standard and applicable appendices.

Q.5 through Q.6.7 (No additional requirement or information)

### **Q.7. FLIGHT OPERATIONS REQUIREMENTS**

#### **Q.7.1 Organization and Personnel**

The operator is required to be certified and granted privileges by the governing civil authority to conduct commercial medical flight operations. The operator must demonstrate compliance outlined within the associated requirements of certification and granted privileges set forth by the governing civil authority.

**Q.7.2 Flight Operations Manuals, Publications, and Policies** (No additional requirement or information)

#### **Q.7.3 Primary Aircrew Qualifications and Experience**

Q.7.3.1 If medical personnel are required for the type of medical flight being performed, a person shall be trained in air medical environment. Medical personnel may also be trained and assigned to perform other duties by the operator.

Q.7.3.2 The operator shall ensure the pilot or pilots meet the applicable minimum requirements in the tables below:

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**Table Q.7. 3 Airplanes Conducting Brokered Medical Flight Operations**

	Pilot-in-Command	SIC (if required)
License	Commercial with IFR	Commercial with IFR
Total Hours	1,500	500
Total Hours in Class and Category	500	250
PIC hours in Class and Category	250	50
Turbine Hours (If Turbine Powered)	250	100
Total Hours in Make and Model	250	50
NVG (If Required)	250	50
Total PIC Hours	500	50
Total PIC Hours in Make and Model	150	0
Tailwheel Time (if Tailwheel)	300	50

**Table Q.7.3. 1 Rotorcraft Conducting Brokered Medical Flight Operations**

	Pilot-in-Command	SIC (if required by aircraft certification)
License	Commercial with IFR	Commercial with IFR (If required by certification for IFR flight)
Total Hours	1,500	250
Total Hours in Class and Category	500	100
PIC hours in Class and Category	250	0
Turbine Hours (If Turbine Powered)	250	100
Total Hours in Make and Model	100	75
NVG (If Required)	200	50
Total PIC Hours	500	100
Total PIC Hours in Make and Model	100	0

Q.7.4 through Q.7.7 (No additional requirement or information)



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### **Q.7.8 Flight Crew Scheduling**

The operator shall have an effective process, policy, or procedure for the size and type of operation that ensures flight crews meet the additional requirements for the duties to be performed as spelled out in paragraph Q.7.3.

Q.7.9 through Q.7.30 (No additional requirement or information)

### **Q.7.31 Life Support and Emergency Equipment**

The operator shall ensure any required additional equipment utilized for medical activities onboard the aircraft are approved for aircraft use.

Q.7.32 through Q.9.16 (No additional requirement or information)

### **Q.9.17 Flow down requirements**

Must comply with the requirements of P.9.17.

### **Q.9.18 Verification of Supplier QMS**

Must comply with the requirements of P.9.18.

Q.9.19 through Q.12 (No additional requirement or information)