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**ENERGY**

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Prepared for the U.S. Department of Energy  
under Contract DE-AC05-76RL01830

# Pacific Northwest National Laboratory Flight Operations Manual

August 2011



**Pacific Northwest**  
NATIONAL LABORATORY

*Proudly Operated by **Battelle** Since 1965*

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PACIFIC NORTHWEST NATIONAL LABORATORY  
*operated by*  
BATTELLE  
*for the*  
UNITED STATES DEPARTMENT OF ENERGY  
*under Contract DE-AC05-76RL01830*

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August 2011

Prepared for  
the U.S. Department of Energy  
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory  
Richland, Washington 99352



# System of Revisions

The Director of Operations will issue temporary revisions. These temporary revisions shall be posted in this manual and maintained until a current version is printed. When a change is posted, it should be recorded on the following Record of Revisions.

## Record of Revisions

Revision Number	Date	Affected Pages	Initials



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# Policy

This Flight Operations Manual provides a guideline for Pacific Northwest National Laboratory (PNNL) staff and management personnel in the operation and use of leased, chartered, or Battelle-owned/PNNL-operated aircraft (hereinafter referred to as “PNNL aircraft”). The procedures and policies contained here are supplemental to Federal Aviation Regulations (FAR) and to U.S. Department of Energy (DOE), PNNL, and Battelle corporate policy designed to provide for safe and correct operating practices. Flight and maintenance personnel are required to become familiar with the contents of this manual and the correct procedures for the planning and performance of all flight activities. It is highly recommended that project and line management also become familiar with this manual.

# 1.0 Introduction

## 1.1 Purpose and Scope

This Flight Operations Manual outlines policies relative to the use of Pacific Northwest National Laboratory (PNNL) aircraft by PNNL employees and clients in the course of doing Department of Energy (DOE) and Laboratory business. This manual provides general guidelines for PNNL staff and management personnel in the operation and use of leased, chartered, or PNNL aircraft. In adopting a “best practices” operating standard, the procedures and policies contained herein are supplemental to Federal Aviation Regulations (FAR), a subsection of Title 14 of the Code of Federal Regulations (CFR), as well as any DOE orders and PNNL policies designated for safe and correct operations. Primarily, PNNL aircraft operate under the public aircraft mode, as defined by 14 CFR Section 1.1.<sup>1</sup>

Under most circumstances, this manual describes acceptable practices. Flight and maintenance personnel are required to become familiar with the contents of this manual and procedures for the planning and performance of all flight activities. All operating personnel also are expected to adhere to the provisions of this manual and the applicable FARs as part of PNNL flight operations. However, this manual is not intended as a substitute for common sense and sound judgment of the Pilot in Command (PIC), especially in matters that may require the modification of such procedures in the light of emergencies, adverse weather, or other extenuating circumstances.

As noted, this manual details aspects of PNNL flight operations associated with DOE work, including leased, chartered, and PNNL aircraft. The material also includes pilot and management responsibilities and authority, aircraft maintenance, flight operations (planning and conducting), and flight and ground crew training.

## 1.2 Publication and Organization of the Manual

The PNNL Environment, Safety, and Health Directorate publishes this manual. All questions concerning this manual should be directed to the Director of Environment, Health, Safety and Security (EHS&S) or the Aviation Safety Point of Contact (ASPOC).

Following the general policy statement, this *Flight Operations Manual* is organized into seven sections:

- Introduction
- Departmental Organization
- PNNL Aviation Policy and Procedures
- Standard Operational Procedures
- Training Curriculum
- Hazardous Materials
- Appendixes.

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<sup>1</sup>14 CFR Part 1.1, *Aeronautics and Space - Definitions and Abbreviations - General Definitions*, 1962, confirmed February 18, 2011.

The abbreviations and symbols and rules of construction of FAR 1.2 and FAR 1.3 (respectively) are used in this manual. Forms used in flight operations are presented in Appendix A. References used as guidance for this manual are listed in Appendix B. Appendix C contains a list of definitions and acronyms used in the text. Important telephone numbers are in Appendix D. Supporting material for the section on accident and incident reports is in Appendix E. Two charts that further define duty time limitations are included in Appendix F. A copy of the Aviation Management and Safety DOE Order 440.2C is included in Appendix H. The topic of Appendix G is low-altitude operations for the Gulfstream 159 (G-1).

Certain requirements in this manual are followed by a parenthetical reference to the applicable FAR.

### **1.3 Manual Changes**

Amendments in FARs and normal usage will frequently indicate a need for additions, deletions, or corrections of selected subject matter in this manual. Revisions to the manual will be issued periodically to reflect these changes. In addition, manual users who observe or experience a need for change are encouraged to submit their suggestions to the ASPOC for review and consideration. PNNL issues a copy of this manual, including all revisions, to all flight crew members, maintenance personnel, and ground operations personnel. All recipients are required to keep their manuals up-to-date with any furnished revisions. All PNNL flight, ground, and maintenance personnel must use this manual in the conduct of all operations. At least annually, the Chief Pilot tests all pilots on their knowledge of this manual.

PNNL also has furnished the DOE Richland Operations Office (DOE-RL) and DOE Headquarters with a current and complete copy of this manual. The Director of Flight Operations will provide DOE with all future revisions to this manual.

PNNL keeps a current and complete copy of this manual in each aircraft. When a PNNL airplane is away from home base, the PIC will make this manual available to local ground and flight personnel for their use. The Chief Pilot is tasked with keeping current the manuals assigned to the aircraft.

Great care has been taken to determine the material in this manual is not contrary to any applicable FAR, DOE regulation, PNNL policy, operations procedure, or foreign regulation. However, should a conflict occur, the FARs will take precedence. Staff are required to bring any such conflict to the attention of the Director of Flight Operations for correction.

## 1.4 Document Custody Form

I (user) am responsible for keeping this manual in usable and current condition, inserting revisions when received, and recording revision dates and insertion instructions on the Record of Revisions page.

If I resign my position, am terminated, or take an extended leave of absence, I will immediately return this manual to the Director of Flight Operations.

\_\_\_\_\_

Date

\_\_\_\_\_

Signature

\_\_\_\_\_

(Typed or Printed Name)

Position: \_\_\_\_\_



## 2.0 Departmental Organization

### 2.1 PNNL Aviation Staff Directory

**Table 2.1.** PNNL Aviation Staff Directory

Title	Name	Address	Company	Telephone Number
Director, Environment, Health, Safety and Security (EHS&S)	C.M. Andersen	ROB/1134	PNNL	O: (509) 372-6503
Aviation Safety Point of Contact (ASPOC)	R.V. Hannigan	3804 Stearman Ave. Pasco, WA 99301	PNNL	O: (509) 376-6707
Level II Manager, Atmospheric Sciences and Global Change Division	C.A. Geffen  B. Schmid ( <i>Designee</i> )	ETB/2332  ETB/2326	PNNL  PNNL	O: (509) 375-3646  O: (509) 375-2996
Director of Flight Operations	M.R. Hubbell	3804 Stearman Ave. Pasco, WA 99301	PNNL	O: (509) 376-6707
Chief Pilot	M.R. Hubbell	3804 Stearman Ave. Pasco, WA 99301	PNNL	O: (509) 376-6707
Director of Maintenance	E.W. Svancara	3804 Stearman Ave. Pasco, WA 99301	PNNL	O: (509) 376-6707
Flight Mechanic	E.H. Dukes	3804 Stearman Ave. Pasco, WA 99301	PNNL	O: (509) 376-6707
Pilot(s) Captain (PIC) Copilot(s)	M.R. Hubbell J.D. Hone E.W. Svancara	3804 Stearman Ave. Pasco, WA 99301	PNNL PNNL PNNL	O: (509) 376-6707
Scheduler	J.M. Comstock	ETB/2231	PNNL	O: (509) 372-4244
Contracts Specialist	J.R. Burks	LSB/1B26	PNNL	O: (509) 375-4501
DOE-RL Aviation Safety Officer (ASO)	R.M. Gordon	825 Jadwin/583-700	DOE-RL	O: (509) 372-2139

### 2.2 Qualifications, Duties, and Responsibilities

PNNL staff who serve in positions of authority and exercise control over operations conducted for PNNL and DOE/PNNL must be qualified through training, experience, and expertise and have a full understanding of the following flight operations:

- Aviation safety standards and safe operating practices
- All appropriate maintenance and airworthiness requirements of the *PNNL Flight Operations Manual*
- 14 CFR Chapter 1 (FAR) (e.g., Parts 1, 21, 23, 25, 43, 45, 47, 61, 65, 91, and 135).

PNNL may request from the DOE-RL Aviation Safety Officer (ASO) authorization to employ a person who does not meet the applicable airman, managerial, or supervisory experience requirements of a specific position as stated in this manual. If that person has comparable experience and can effectively perform the functions associated with the position, such requirements can be waived.

### **2.2.1 Level II Manager**

A Level II Manager or delegate within the Fundamental and Computational Science Directorate (FCSD) will be designated by the Associate Laboratory Director as responsible for aircraft operations. The designated Level II Manager/delegate and Laboratory Safety are responsible for aviation safety policy implementation and conducting periodic reviews of the *Flight Operations Manual*. The designated Level II Manager/delegate has the authority to employ, discharge, promote, award, and assign staff to support aircraft operations.

### **2.2.2 Aviation Safety Point of Contact**

The ASPOC reports to the Director of the EHS&S Directorate and acts as the top-level PNNL contact with RL and the Federal Aviation Administration (FAA).

#### **2.2.2.1 Qualifications**

The ASPOC must hold a current Airline Transport Pilot (ATP) certificate for any aircraft operations for which the PIC is required to hold such a certificate (FAR 119.69). To occupy this position, the ASPOC also must have successfully completed the required DOE Aviation Managers/Safety Officers training program described in Section 5.6 of this manual.

#### **2.2.2.2 Duties and Responsibilities**

The ASPOC shall:

- When appropriate, conduct periodic safety reviews of PNNL flight operations and contractor aviation operations/activities in accordance with DOE Order 440.2 and this manual
- Provide status reports to the DOE-RL ASO regarding the reviews made of aviation functions/activities
- Conduct safety assessments of proposed charter aircraft operators
- On a periodic basis, review the contractor and subcontractor aviation services procurement process.

### **2.2.3 Director of Flight Operations**

The Director of Flight Operations for PNNL aircraft reports to the designated Level II Manager or delegate for aviation safety matters and has operational control of Laboratory flight activities conducted using the G-1 aircraft.

### **2.2.3.1 Qualifications**

The Director of Flight Operations for PNNL must hold a current ATP certificate for any aircraft operations for which the PIC is required to hold such a certificate (FAR 119.69), have at least 3 years of supervisory or managerial experience in a position that exercised operational control over any operations conducting passenger transportation within the last 6 years, and either:

Have at least 3 years of experience as PIC of an aircraft operated for passenger transport within the past 6 years (a person becoming Director of Flight Operations for the first time)

Have at least 3 years of experience as PIC of an aircraft operated under 14 CFR Part 121 or 135 or equivalent (a person with previous experience as a Director of Flight Operations).

### **2.2.3.2 Duties and Responsibilities**

The Director of Flight Operations is responsible for:

- Supervising the Chief Pilot and other PNNL employees whose duties require work on, in, or around the aircraft.
- Safely conducting all flight operations and determining they are performed in compliance with DOE Aviation Procedures, as well as FAA and PNNL policies, rules, and regulations.
- Acting for Battelle/PNNL, including signing FAA correspondence and operations specifications.
- Communicating with the FAA Standards District Office and the National Transportation Safety Board (NTSB) and filing all required documents.
- Maintaining personnel, maintenance, and official correspondence files for PNNL flight operations.
- Revising this manual as needed, submitting the proposed revisions to DOE, receiving concurrence from DOE that revisions are accepted, and distributing those revisions to all manual holders.
- Determining all aircraft are maintained in compliance with all applicable FAR, PNNL, and DOE directives.
- Coordinating with the Director of Maintenance regarding the timely correction of mechanical or electrical irregularities and discrepancies.
- Monitoring security and environmental affairs, including complete material safety data sheets on all chemicals, fire drills, and safety training.
- Scheduling aircraft availability in consultation with the Chief Pilot and Scheduler.
- Directing the employment, oversight, and performance reviews of Flight Crew personnel.
- Managing development of organizational, facility, and equipment recommendations.
- Providing input to the G-1 aircraft annual business and operating plans.
- Participating in industry associations.
- Completing special projects as assigned by PNNL management.

- Establishing and maintaining rapport with corporate executives, customers, and industry associates.
- Approving flight crew assignments in accordance with this manual.

In the event of an incident/accident or off-normal event, the Director of Flight Operations will notify Battelle Columbus Operations' Director of Emergency Management and Business Continuity with the pertinent details.

## **2.2.4 Chief Pilot**

### **2.2.4.1 Qualifications**

PNNL's Chief Pilot (FAR 119.69) must hold a current ATP certificate with appropriate ratings and be qualified to serve as PIC on all PNNL aircraft. The Chief Pilot must also meet at least one of the following criteria:

- In the case of a person becoming Chief Pilot for the first time, he/she must have at least 3 years of experience as PIC of an aircraft operated for passenger transport within the past 6 years.
- In the case of a person with previous experience as a Chief Pilot, he/she must have at least 3 years of experience as PIC of an aircraft operated under 14 CFR Part 121 or 135.

### **2.2.4.2 Duties and Responsibilities**

The Chief Pilot reports to the Director of Flight Operations, may be delegated operational control of the flight operations in the Director of Flight Operations' absence, and is responsible for:

- Establishing flight schedules, assigning aircraft and flight crews to specific flights, and determining that such assignments and flight schedules are within the guidelines set forth in the sections on flight time/duty time limitations and days scheduled.
- Ascertaining that crew members are assigned in a manner that will maintain the currency requirements outlined in this manual as well as keeping records and monitoring the flight crew currency requirements.
- Scheduling and notifying the crew members, at least one week in advance, of recurrent training and flight checks.
- Scheduling aircraft flight crew in support of approved operations.
- Monitoring that all requirements of FAR 61 are in compliance concerning pilot certificates, medical certificates, training, and currency. The Chief Pilot is the primary contact for all communications with the FAA concerning PNNL flight operations.
- Continually reviewing all flight operations to confirm compliance to safe operating procedures.
- Coordinating closely with the lead scientist or technician regarding research equipment matters. The Chief Pilot oversees that all research equipment installations and modifications are accomplished in a manner that satisfies structural load and flight performance limitations.

- Coordinating schedules for crew member training, vacation, and days off, as approved by the Director of Flight Operations.
- Providing each passenger with a Customer Satisfaction Survey form that is returned to the Chief Pilot following completion of the flight. This survey contains questions regarding the passenger safety briefing, condition/cleanliness of the aircraft, pilot/crew member professionalism, and flight conducted in a safe manner (see Appendix A, Page A.6).
- Disseminating information to all crew members about routes, airports, notices to airmen (NOTAMS), navigation aids (NAVAID), PNNL directives, proficiency records, pilot files, flight schedules, duty time records, reports, and correspondence about flight operation activities.
- Maintaining proficiency as PIC on all PNNL aircraft.
- Conducting and documenting periodic safety meetings. Prior to each extended field program, a safety meeting will be conducted with all personnel included in the flight operation, including the project manager, to discuss and assess the specific risks of the program.
- Designating the PIC for each flight who is directly responsible for and final authority on aircraft operation. In matters affecting the safety of a flight operation, the PIC may deviate from any rule of the FAR and this manual to the extent required for safeguarding the operation (FAR 91.3).
- Maintaining a file of applicable Material Safety Data Sheets for all on-board chemicals.
- Participating in industry associations.
- Completing special projects as assigned by PNNL managerial staff.
- Establishing and maintaining rapport with corporate executives, customers, and industry associates.

## **2.2.5 Director of Maintenance**

### **2.2.5.1 Qualifications**

PNNL's Director of Maintenance [(FAR 119.69(a)] must hold a mechanic's certificate with airframe and power plant ratings, Inspectors Authorization, and have either of the following:

- 3 years of experience maintaining aircraft as a certified mechanic within the past 3 years, including, at the time of appointment as Director of Maintenance, experience in maintaining the same category and class of aircraft as those PNNL uses.
- 3 years of experience repairing aircraft in a certified airframe repair station within the past 3 years, including 1 year of approving aircraft for return to service.

### **2.2.5.2 Duties and Responsibilities**

The Director of Maintenance reports to the Director of Flight Operations and is responsible for the following:

- Inspection/Maintenance Program [FAR 91.409f(3)]

- PNNL aircraft shall be maintained in accordance with the FAA-approved manufacturer’s recommended maintenance inspection program.
- Major Work (contract with outside vendors)
  - Request for Proposals (RFP): The Director of Maintenance, in association with the Director of Flight Operations and the Contracts Specialist, shall solicit proposals from qualified vendors. Vendors shall be approved FAA repair stations, factory-trained technicians, or factory-authorized service centers.
  - Evaluation of Proposals: The Director of Maintenance, in association with the Director of Flight Operations and the Contracts Specialist, will evaluate all proposals and make vendor selection.
- Aircraft Maintenance Records
  - It is the Director of Maintenance’s responsibility to determine all aircraft log entries are accurate and current.
  - To assist the Director of Maintenance in tracking aircraft maintenance status, a (manufacturers’) Computerized Aircraft Maintenance Program (CAMP) will be maintained on PNNL aircraft.
- Aircraft Parts
  - All parts, when ordered from home base, will be ordered in accordance with PNNL and Battelle corporate procurement policies and procedures.
  - The Director of Maintenance will check all maintenance material for condition and accuracy and accept them for use upon their arrival at home base.
  - Inventory Control: All maintenance material will be rotated on a first-in-first-out-basis for timely usage of parts and supplies.
  - Periodic inventory and replacement of maintenance materials.
- Maintaining compliance with DOE, FAA, and PNNL directives.
- Determining appropriate and adequate tools and equipment are available, calibrated or certified, and maintaining all associated records.
- Maintaining budget responsibility for applicable budget line items.
- Maintaining all necessary work records and logbooks, including certification of the aircraft permanent maintenance records indicating the aircraft is approved for return to service.
- Maintaining the weight and balance records for aircraft.
- Participating in industry associations.
- Completing special projects as assigned by the Director of Flight Operations/Chief Pilot.
- Training and supervising maintenance personnel.
- Assisting with development of aviation policies, short- and long-range plans, the annual operating budget, and salary structure.
- Recommending proper staffing and performance standards for maintenance.
- Establishing maintenance safety rules and procedures.

- Assuring maintenance personnel are thoroughly familiar with DOE and PNNL directives, applicable FAR, pertinent manuals, practices, and publications.
- Establishing programs for maintenance technician proficiency training, reviews, and upgrades in accordance with FAA and PNNL requirements.
- Establishing aircraft handling procedures.
- Coordinating maintenance activities with flight operations.
- Providing efficient and timely scheduling of all maintenance.
- Directing compliance of minimum equipment list (MEL) maintenance procedures.

## **2.2.6 Captain/Pilot in Command**

The Captain reports to the Chief Pilot. The Captain/PIC is responsible for determining the aircraft is in an airworthy condition prior to flight and operating the assigned aircraft. The PIC is directly responsible for the safety of the passengers, crew, and cargo. The decision regarding whether a flight may be safely completed rests with the PIC, who is the final authority regarding operation of the PNNL aircraft. The Captain must comply with this *Flight Operations Manual*, DOE and PNNL directives, and FAA regulations.

### **2.2.6.1 Qualifications**

An individual shall be considered qualified for the position of Captain when the following requirements are met:

- Total flight time—5000 hours
- Multi-engine turbine time—2500 hours
- Time in type —100 hours
- ATP Certificate
- Type Rating in equipment to which assigned
- Second Class Medical Certificate (current).

### **2.2.6.2 Duties and Responsibilities**

The following list describes the duties of the Captain/PIC:

- Notifying the Chief Pilot if he/she does not meet the currency requirements of this manual. No crew member will be scheduled for flight duty if any of the required certificates are not current.
- Performing a preflight self-evaluation of his/her mental and physical condition to competently and safely perform a scheduled mission and, without penalty, may cancel or refuse to fly that mission.
- Obtaining up-to-date weather, airport, and NAVAID condition reports prior to each departure.

- Obtaining required training regarding the handling of Classified or Business-Sensitive material as to how it shall be packaged and marked to meet the DOE or U.S. Department of Defense (DoD) requirements for the appropriate classification level.
- Confirming complete material safety data sheets for all on-board chemicals are on board the aircraft and the flight crew is trained in their use.
- Maintaining contact with the Scheduler while on a trip to coordinate changes, as necessary.
- Completing Trip Sheet, Flight Logs, and Aircraft Discrepancy Reports, as necessary (see Appendix A, Page A.10, A.17, A.18).
- Completing administrative assignments as directed by the Director of Flight Operations/Chief Pilot.
- Providing an aircraft that is clean and prepared for flight with all provisions on board for the safety and comfort of the passengers.
- Calculating and reviewing the aircraft weight and balance, fuel on board, and performance charts.
- Complying with published standard operating procedures.
- Supervising the first officer, or Second in Command (SIC), in any duties necessary for smooth, safe, and efficient operation of the aircraft.
- Coordinating the functioning of all crew members assigned to the flight.
- Making decisions necessary to start, delay, cancel, or deviate the flight from the planned route or destination when operating conditions dictate.

## **2.2.7 Copilot and Contract Copilot (First Officer)**

The Copilot and the First Officer report to the Chief Pilot and are accountable to the PIC of the flight for the conduct and execution of assigned duties.

### **2.2.7.1 Qualifications**

An individual shall be considered qualified for the position of Copilot when the following requirements are met:

- Total flight time—1500 hours
- Multi-engine time—500 hours
- Time in type—25 hours
- ATP Certificate or Commercial Pilot Certificate with appropriate category and class rating
- Second Class Medical Certificate (current).

### **2.2.7.2 Duties and Responsibilities**

The Copilot's responsibilities include:

- Assisting the Captain with discharging safety responsibilities.
- Performing duties as assigned during flight preparation and in flight.
- Being prepared to assume the PIC duties in the event the PIC is incapacitated.
- Being familiar with and following all FAR, DOE, and PNNL directives pertinent to assigned duties.
- Notifying the Chief Pilot if he/she does not meet the currency requirements of this manual. No crew member will be scheduled for flight duty if any of the required certificates are invalid.
- Performing a preflight self-evaluation of his/her mental and physical condition to competently and safely perform a scheduled mission and, without penalty, may cancel or refuse to fly that mission.
- Notifying the Chief Pilot if it appears he/she will exceed duty or flight time limitations.

Note: Duties undertaken by the Copilot, as well as any contracted or part-time pilot, will be limited exclusively to flight operations only.

### **2.2.8 G-1 Research Crew**

Personnel that install, operate, or maintain research equipment on the G-1 comprise the G-1 research crew and have the following responsibilities:

- Installing, operating, maintaining, and removing equipment according to the guidelines published in this manual.
- Providing to the PIC a copy of the complete material safety data sheet for all chemicals brought on board the G-1.
- Managing the safe transport, use, and disposal of all hazardous materials associated with equipment.
- Having the research crew and their field equipment ready for flight at least 15 minutes prior to the scheduled departure time.
- Knowing and adhering to the provisions of this manual.
- Following the PIC's directions.
- Understanding and following in-flight emergency procedures.
- Stowing securely all tools, supplies, and hand-held equipment for takeoff and landing.
- Using seat belts as instructed by the pilots and whenever seated during flight.
- Removing all refuse and unneeded supplies and equipment post flight.

If research electrical power is to be used, at least one member of the research flight crew must be trained in the operation of the research power distribution system.

If the aircraft research data acquisition system is to be used, at least one member of the research flight crew must be trained in its operation.

The Principal Investigator for a research mission should provide the Scheduler with an Initial Aircraft Support Request Form (available in Appendix A, page A.34) at least 6 months prior to the intended use date and a final Research Aircraft Deployment Document at least 1 month prior to scheduled use (available in Appendix A, page A.35).

If research electrical power is used on the ground for testing and/or calibrating research equipment, a staff member trained in operating the research power distribution system must be in attendance at all times.

### **2.2.9 G-1 Research Aircraft Scheduler**

All inquiries or requests for the use of aircraft for extended field study operations shall be directed to the G-1 Aircraft Scheduler using the Initial Aircraft Support Request form or the Research Aircraft Deployment Document found in Appendix A, Pages A.34 and A.35, respectively. To avoid any scheduling conflicts with aircraft availability and flight crews, requests should be submitted as early as possible.

The Scheduler is the manager of flight activities and reports to the cognizant Level II manager or delegate. His/her duties include:

- Coordinating and assimilating master flight schedules for the aircraft.
- Coordinating the schedules of remotely based aircraft and crew members, if applicable.
- Reporting aircraft usage to Laboratory officials.
- Formulating contingency plans for mechanical and weather delays, if appropriate.

### **2.2.10 Contracts Specialist**

This senior position is responsible for evaluating proposals, as well as negotiating, placing, and administering all subcontracts and/or purchase orders for charter aircraft services in support of programs, projects, and related services. Typically, these are complex and specialized in nature requiring the incumbent to secure the best balance of price, quality, delivery, and services available within the guidelines established by Battelle, the client, and applicable government acquisition regulations.

The position is responsible and accountable for confirming that contractual business is accomplished in accordance with established PNNL policies and procedures, as well as Battelle corporate policy. The position is responsible and accountable for maintaining and enhancing the business reputation of the client and Battelle Memorial Institute (BMI) using the highest ethical standards.

## **3.0 PNNL Aviation Policy and Procedures**

### **3.1 General Policy**

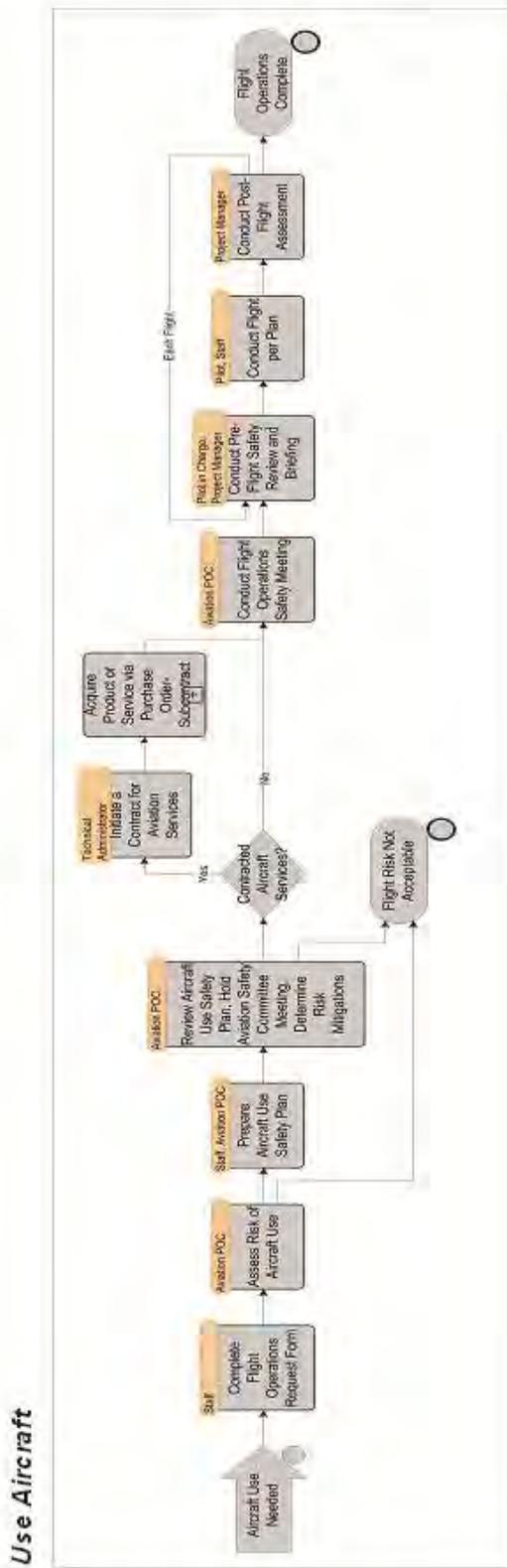
PNNL recommends using PNNL aircraft for all research conducted from the air. When air travel is required for company business, scheduled airlines should be used. PNNL Flight Operations' general policy and philosophy is that every effort will be made to accomplish each flight within the context of safety, FAR and DOE directives, and this manual. PNNL will revise this manual, as necessary, and will keep at least one copy at the principal PNNL operations base: 3804 Stearman Ave., Tri-Cities Airport, Pasco, Washington.

At all times, the safety of the crew, passengers, equipment, and property is paramount over other flight objectives. Pilots are required to plan flight missions from a safety standpoint. Should any doubt arise concerning the safe completion of a planned research or a passenger flight, rescheduling, consideration of every alternate method, or even cancellation of a flight is permitted. All operations will be conducted with maximum safety, consistent with flight requirements and reasonable economy, and in full compliance with applicable FARs and this manual.

All flight crew members are responsible for compliance with the FAR and policies set forth in this manual. All aircraft flight personnel will be knowledgeable of FAR (especially FAR Parts 61, 91, and 135), and this manual and will be responsible for assuring all of their activities are in compliance with these provisions. Each flight crew member is responsible for maintaining the qualifications required by the FAR and the policies of this manual for the flight position each holds.

Flight and scientific crew members are responsible for alerting other crew members, especially the designated PIC, of any condition, occurrence, procedural error, or malfunction that may affect the safe conduct of the flight. They also are responsible for a realistic evaluation of their own physical and mental well-being as it affects their duties. Pilots are expected to use good judgment relative to obtaining adequate rest prior to flight duty. All crew members are expected to discuss with the Chief Pilot any mental or emotional stress or physical condition that may have a detrimental effect on flight duty performance.

The procedures and guidelines in this manual are directed toward the safe and efficient operation of PNNL flight activities. However, it is emphasized throughout this manual that pilots will exercise prudence and good judgment in all flight operations. The policies and procedures outlined in this manual apply to all PNNL aircraft operations. The PNNL Aviation Risk Management Committee can grant deviations from these procedures and guidelines when circumstances are appropriate.



**Figure 3.1.** Use Aircraft Workflow Diagram

### **3.1.1 PNNL Aircraft**

Aircraft operated by PNNL normally will meet the requirements of standard and restricted airworthiness categories as set forth in the FAR. See Appendix A, Page A.29 for standard and restricted airworthiness certificates with operations limitations for aircraft with multiple airworthiness certificates and registration. In isolated instances, an experimental category may be required. This policy is consistent with that of PNNL and DOE, assuring maximum safety at a reasonable operating cost.

### **3.1.2 International Operations**

The Scheduler shall notify the Director of Flight Operations and Chief Pilot, as soon as possible, of international trips, so that appropriate flight crew assignments can be made.

The Director of Flight Operations and Chief Pilot will make the crew assignments for international trips, and the Scheduler shall coordinate with and provide assistance to the assigned PIC to make arrangements for such a trip.

The PIC assigned to an international trip is responsible for handling the arrangements for the trip.

### **3.1.3 Charter Operations**

#### **3.1.3.1 Contracting for Charter Aircraft Services**

PNNL staff requesting charter aircraft services to fulfill travel or research requirements must work with the ASPOC and the Contracts Specialist to place a contract with the charter service provider. All contracts for such services will be established in accordance with HDI Workflow, Acquire Product or Service via Purchase Order-Subcontract, PNNL procurement policy, and additional requirements outlined in Section 3.1.3.

#### **3.1.3.2 Guidelines for Use of Chartered Aircraft**

##### **Policy**

As a prerequisite to award but not for issuance of an RFP, aviation services contractors must be on the DOE-approved Commercial Aviation Services (CAS) Accepted Operators List (available at: [https://powerpedia.energy.gov/wiki/CAS\\_Accepted\\_Operators\\_List](https://powerpedia.energy.gov/wiki/CAS_Accepted_Operators_List)). Aviation services contractors shall also hold Air Carrier, Commercial Operator, or other appropriate certificates under 14 CFR Parts 91, 121, 125, 127, 133, 135, 137, and 145, as applicable for the type of operations conducted. The specifications and ownership of the prospective aircraft shall be listed on the Operating Specification.

Unless specific requirements call for single-engine aircraft, multi-engine modern aircraft shall be used. Flight crews shall include a minimum of two qualified pilots on multi-engine aircraft.

Minimum PIC qualifications are an FAA Commercial Pilot Certificate (ATP rating desired) with the appropriate category and class rating. PIC requirements are a second-class medical certificate, 1200 hours in category, 100 hours in class, 100 hours PIC in category during the previous 12 months, and 25 hours PIC in make and model of aircraft (10 hours of which shall have been in the preceding 6 months).

Pilots should be named in the operating specifications of the aviation service contractor and certified for the specific type of operations to be conducted. The pilots shall be full-time employees of the operator unless approved by PNNL. The charter operator and pilots shall be fully certified for the types of aircraft used.

All aircraft shall be certified for instrument flight and equipped in accordance with applicable FAA regulations. Manufacturer and FAA minimum equipment lists will be used as required. All aircraft, except military aircraft, shall have FAA certification. The charter operator shall have full control over aircraft maintenance, and all aircraft shall be maintained in accordance with applicable FAA directives.

Whenever possible, PNNL aircraft—not leased aircraft—shall be used.

Training programs for charter flight and ground personnel shall meet, to the extent possible, the requirements of 14 CFR Part 121 for large aircraft (gross weight of 12,500 pounds or greater) and 14 CFR Part 135 for small aircraft (gross weight under 12,500 pounds).

The charter operator also shall provide a suitable flight and ground crew training program for the safe handling of the types of materials and cargo to be transported. Certain special safety requirements may be necessary for air shipments of radioactive cargo and other special cargo.

The charter operator shall provide a suitable survival and first aid kit on board the aircraft. Also, the charter operator, to the extent possible, shall provide shoulder-harness-type seat belts.

### **Insurance**

The following insurance clause shall be included in all contracts for charter aircraft services. The Contracts Specialist should consult with the Battelle Insurance Specialist prior to making any deviations from the requirements set forth below. Contractor shall purchase and maintain during the term of this Contract, at its own expense, and any extensions thereof, insurance in amounts reasonable and customary for the industry in which Contractor is engaged. Contractor shall maintain all insurance which is required by any law, statute, ordinance, or regulation of any jurisdiction having authority in whole or in part over the Contractor's operations or Contract activities, including without limitation any non-U.S. jurisdictions. Nevertheless, the following minimum insurance coverage shall be maintained:

#### Aircraft and Passenger Liability

- \$3,000,000 (\$3 million) combined single limit if 4 or fewer passenger seats
- \$5,000,000 (\$5 million) combined single limit if 5 or more passenger seats
- \$100,000 per person minimum passenger liability
- *Additional Insured:* Battelle Memorial Institute should be named as “Additional Insured”
- *Hull Coverage:* Full coverage for the value of the aircraft.

A certificate of insurance is required before work begins.

### **Documentation**

The leased or charter operator shall submit PNNL's Aviation Operations Checklist Charter Aircraft (included in Appendix A, Page A.22) to document compliance with these requirements to the PNNL Contracts Specialist for verification.

### **Purchase Requisition, Statement of Work, and Flight Operations Request Form**

In addition to submittal of a Purchase Requisition and Statement of Work (SOW), the Technical Administrator (TA) must submit a Flight Operations Request form (shown in Appendix A, Page A.32, and see the HDI Use Aircraft section at <https://hdi.pnl.gov/document/B2167B46-A8C5-491B-B20C-460F72DDF43E.aspx>).

### **Competitive versus Noncompetitive Procurement**

It is PNNL policy that procurement of all aviation services be competitive to the maximum practical extent. A noncompetitive procurement is one in which only one source is solicited. To the maximum extent practical, the RFP should be issued to sources on the DOE-approved CAS Accepted Operators List (the “List”). RFPs may be issued to sources not on the List. However, if a source not on the List is the

successful offeror, the PNNL ASPOC then must review the source's flight operations and add the source to the List before the award can be made. If the PNNL ASPOC does not approve of adding the source to the List, an award cannot be made to that offeror source.

If the TA believes it is reasonable to expect that only one offeror could perform the work and procurement would be noncompetitive, the TA must include a sole source justification (SSJ) with the purchase requisition in accordance with PNNL procurement policy (i.e., Acquisition Guideline 12 *Noncompetitive Procurement*).

### **Risk Management**

Upon receipt of the Purchase Requisition, the Contracts Specialist will contact the ASPOC to evaluate the operation. If an above-normal-risk operation exists, the ASPOC must convene an Aviation Risk Management Committee (ARMC) to discuss the various risk factors involved with the proposed flight. The ARMC may determine the risks cannot be satisfactorily mitigated, and the project should not proceed further. Alternatively, the ARMC may make recommendations to mitigate all identifiable risks.

### **Proposal Evaluation**

Proposal evaluation is the assessment, if specified by the RFP, of the offeror's ability (as conveyed by the proposals) to successfully perform the SOW described by the RFP. Proposals shall be evaluated solely in accordance with the factors specified in the RFP.

As part of an overall responsibility determination, pre-award audits of one or more of the offeror's sites may be required. Such audits will often include a review of the offeror's operations, as well as the qualifications of the pilot and any other key personnel and the maintenance and general condition of the aircraft.

In addition to the pre-award onsite audit, the PNNL ASPOC will contact, on an as-needed basis, the cognizant FAA office to verify that the pilot and aircraft meet current FAA regulations.

The PNNL ASPOC will meet with the Contracts Specialist to review all facts ascertained regarding the offeror's operations, pilot currency, and aircraft maintenance records. The review will be conducted in accordance with PNNL's Aviation Operator Checklist Charter Aircraft (Appendix A, Page A.22).

### **Contract Administration**

Only the PNNL Contracts representative has the authority to issue a contract to authorize the commencement of any flights. No person shall attempt to arrange for or participate in any flight under a contract for flight services unless the PNNL Contracts Specialist has issued a contract.

Staff members with the appropriate training (must have completed "Electronic Purchase Req-ePro" Course No. 001975) may request a contract for aircraft services by completing a Purchase Requisition via PNNL's Purchasing and Expense System (online at <https://fscm.pnl.gov/>) for the specific contract to be used. A SOW or itinerary shall be attached to the Work Order describing the nature of the flights requested, the flight plan to be used, and the names of staff members participating in the flights.

The requisition shall show the name of and be signed by a PNNL Line Manager who is aware of all details associated with the flight. The staff members using the flight services shall, for each flight, confirm this Line Manager is fully aware of the time of departure, the intended flight plan, and the return time of the flight.

In addition to the Line Manager, the individual requesting the flight services, the cognizant financial specialist, and the ASPOC shall sign the requisition.

The signed requisition shall be provided to the PNNL Contracts Specialist. Prior to issuance of the contract, this Contracts Specialist shall review the requisition to determine the flights requested are within the contract scope and adhere to any risk management prescriptions developed for and in support of the contract.

Unless otherwise approved by the PNNL ASPOC, the PNNL Contracts Specialist will request that the Contractor provide a report delineating the current status of all aircraft maintenance items and pilot flight history.

Prior to each flight, the PNNL ASPOC must accept all items on the aircraft maintenance report and the pilot flight history.

#### **Post-Award Audits**

When deemed necessary by the PNNL Contracts Specialist and the PNNL ASPOC, a post-award audit of the contracted charter operator shall be conducted. Generally, such audits will include a review of the Contractor's operations and verification of the Contractor's FAA certifications, as well as the pilot's and any other key personnel qualifications and the maintenance and general condition of the aircraft.

#### **Reporting of All Aircraft-Related Near-Misses or Any Off-Normal Events**

Within 72 hours, PNNL staff members participating in a chartered or leased aircraft flight shall notify in writing the PNNL ASPOC, the cognizant Laboratory Safety representative, and the PNNL Contracts Specialist of any near-misses or other off-normal events that occur during any phase of flight. At a minimum, the notification will contain the following information:

- The name of the contractor providing the service and the PNNL contract number
- A summary of all pertinent facts relating to and describing the near-miss or off-normal event.

#### **Other Factors**

Contract requirements for Research Flight Operation TAs must be aware of the following items contained in contracts for research flights. By fully executing the contract, the charter service operator has agreed to abide by these terms. All TAs are also expected to abide by these terms.

During the operation of the flights described here, the PIC of the aircraft shall have complete authority over all aircraft operations. PNNL staff members are not authorized to change the parameters of the flight in any way that would jeopardize the safety of the passengers and crew.

Prior to the first flight under this contract, a safety meeting must be held that includes the TA, a Safety representative, the flight crew, and all PNNL and Contractor personnel associated with the flight, including ground personnel. In addition, prior to all subsequent flights under this contract, the TA, the flight crew, and all personnel associated with the flight, including ground personnel, shall hold a safety meeting and review all aspects of the flight mission.

### **Emergency Responses**

In case of an emergency involving a PNNL chartered aircraft, the Contractor shall immediately contact the PNNL Emergency Phone Number at 509-375-2400. At the earliest possible time thereafter, the Contractor also should notify the ASPOC and the Contracts Specialist.

### **3.1.4 PNNL Internal Self-Assessment**

At least annually, one or more line managers to whom the Director of Flight Operations, the Chief Pilot, and the Director of Maintenance report will conduct a self-assessment of PNNL aircraft operations using the checklist for aircraft operations presented in Appendix A, Page A.44. This checklist details many aspects of research flight operations and maintenance and verifies compliance with the provisions of MA-530, applicable DOE Aviation Orders, and Occupational Safety and Health Administration (OSHA) and FAA regulations. Similar checklists are used by the PNNL ASPOC and DOE ASO to audit providers of charter aircraft services (see Section 3.1.3.2). A signed and dated copy of the completed checklists will be retained by the Director of Flight Operations for a period of 3 years.

## **3.2 Safety Procedures/Policy**

The Figure 3.1 illustrates the aviation safety drivers at PNNL. Responsibilities and accountabilities are shown next in the aviation safety table.

### **3.2.1 Safety Program Goals**

It is the responsibility of every PNNL employee involved with the aviation activities to understand and help achieve the following safety goals:

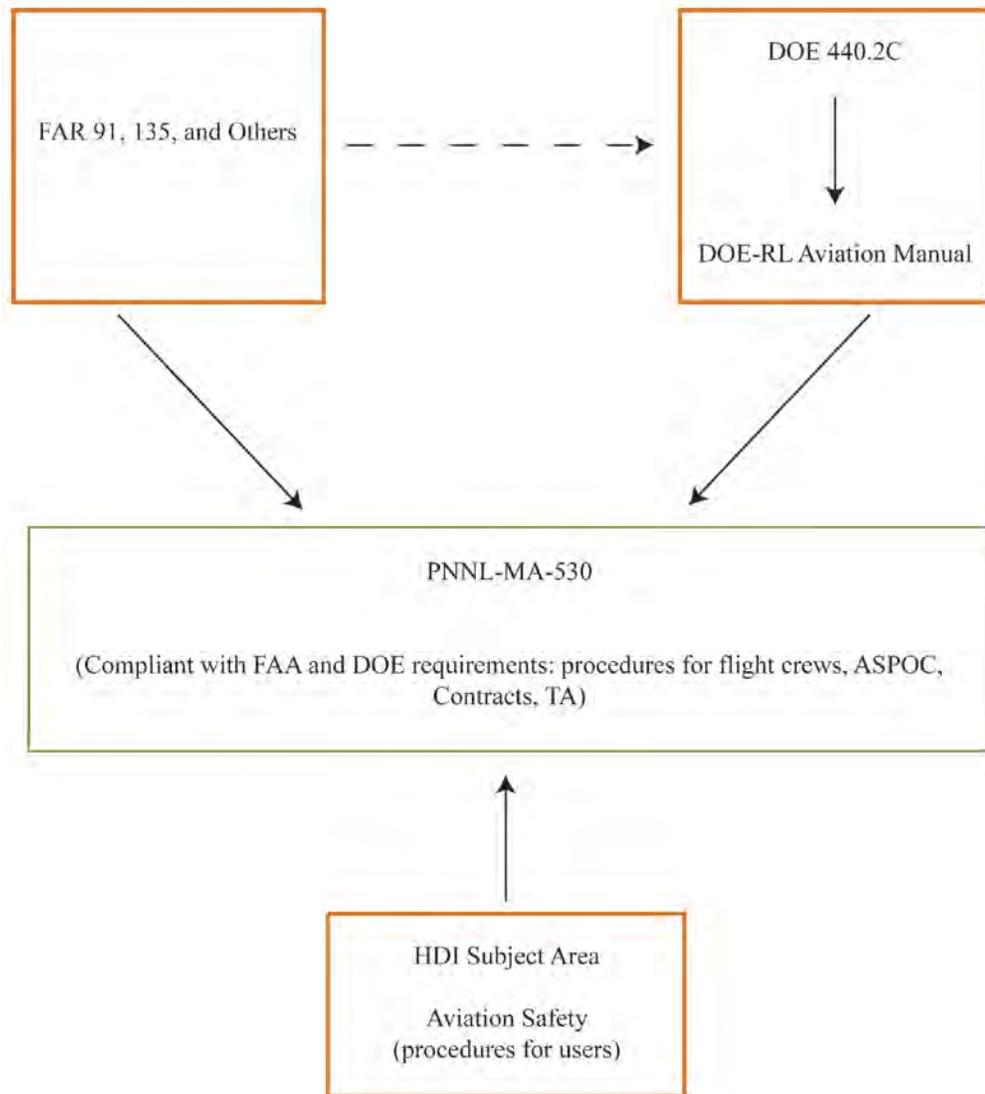
- Provide a safe and healthy working environment for all employees
- Prevent aviation accidents
- Minimize damage and severity of injury resulting from aviation mishaps
- Incorporate safety aspects into flight and maintenance operations planning
- Reduce operating costs and increase mission capability by protecting human and material assets
- Eliminate hazardous conditions.

### **3.2.2 Aviation Safety Policy**

PNNL supports all requirements of law regarding aircraft safety and intends to provide all employees with a safe and healthy working environment.

Every attempt will be made to prevent accidents and reduce the effects of accidents that may occur.

The Director of Flight Operations and the Director of Maintenance will establish and maintain a program that helps identify/manage risks and hazards.



**Figure 3.2.** Aviation Safety Drivers

The PNNL aircraft safety program will include all aspects of flight and maintenance safety.

Responsibility for implementing the safety program rests with the Director of Flight Operations and the Director of Maintenance.

The DOE-RL ASO will be provided access to aviation activities and charter aircraft operations for assessments.

### 3.2.3 Accident Prevention Program

The aviation safety program is composed of three elements: standardization, compliance, and hazards identification.

Standardization is an ongoing responsibility of all personnel associated with aviation activities.

Compliance with safety policies, procedures, and practices as spelled out in this manual, the FAR, and manufacturer's manuals is the responsibility of all aviation personnel. The Director of Flight Operations is responsible for annually inspecting the organization for compliance.

The Hazard Identification System is both an informal and formal reporting system. Aviation personnel are expected and encouraged to inform their manager of any hazards.

### **3.2.4 Safety Reporting System**

#### **3.2.4.1 Hazard Report**

Personnel may fill out a PNNL Aviation Safety Hazard Report form (Appendix A, Page A.21). All PNNL employees use this form to report any hazard in their work area. The completed form may also be used as an equipment deficiency report.

This report is sent to the Director of Flight Operations, and the sender can remain anonymous. The Director of Flight Operations assures the confidentiality of the Hazard Report.

It is the responsibility of the Director of Flight Operations to respond to all Hazard Reports.

Inspections regarding hazard elimination are also the responsibility of the Director of Flight Operations.

#### **3.2.4.2 Aviation Safety Incident/Accident or Off-Normal Event Operations Checklist**

This checklist form is located in Appendix A, Page A.26. Should there be an incident, the form is intended to provide crew members with an on-site checklist. The Emergency Notification Chart is also located in Appendix A, Page A.27. The Director of Flight Operations is responsible for recording and tracking incidents, accidents, or off-normal events. The Emergency Notification Chart serves as a guide for the type of incidents that are tracked.

#### **3.2.4.3 Incident/Accident or Off-Normal Event Forms**

The PNNL Aviation Safety Incident/Accident or Off-Normal Event Worksheet (Appendix A, Page A.26) is intended to provide the basic information needed for an investigation of an incident, accident, or off-normal event. If an investigation of an incident, accident, or off-normal event by PNNL, DOE, or the NTSB is required, additional information may be requested of flight and scientific crew.

The Incident/Accident or Off-Normal Event Report is submitted to the Director of Flight Operations. After reviewing the recommendations, the Director and his/her staff will develop specific tasks to address certain recommendations.

#### **3.2.4.4 Information Distribution System**

The Director of Flight Operations distributes general safety information on a continuing basis to all applicable PNNL employee groups.

#### **3.2.5 Safety Education and Training**

Safety-related training for aviation employees is the joint responsibility of the Director of Flight Operations, Chief Pilot, and Director of Maintenance. The priority for receiving safety training is:

1. Director of Flight Operations
2. Chief Pilot
3. Director of Maintenance
4. Flight crew members and other staff
5. Customers (passengers).

##### **3.2.5.1 Hearing Conservation**

Flight crew (pilots) must wear noise-reduction headsets during flight operations.

Scientific flight crew must wear noise-reduction ear plugs and/or headsets whenever the engines of the G-1 are in operation.

Ground support personnel must wear noise-reduction ear plugs and/or muffs whenever within 100 ft of the G-1 aircraft with its engines running.

PNNL flight operations and scientific support personnel will be enrolled in the Hearing Conservation Program.

Minimum acceptable manufacturer's noise reduction rating for ear plugs is 31 db and 23 db for ear muffs.

#### **3.2.6 Specialized Training**

##### **3.2.6.1 Flight Operations**

Training will be provided on a continuing basis on topics such as wind shear, air traffic control (ATC) procedures, seasonal weather, survival equipment, hazardous materials handling (as needed), first aid, and medical aspects for aviators. The Director of Flight Operations will manage these elements of training.

### **3.2.6.2 Maintenance**

Specialized maintenance training will be provided on a continuing basis on topics such as hazardous materials handling (as needed), special equipment operation, OSHA requirements, first aid, and other relevant topics. The Director of Maintenance manages these elements of training, while the Director of Flight Operations retains training oversight.

## **3.2.7 Accident Notification and Investigation**

### **3.2.7.1 Incident/Accident or Off-Normal Event Notification**

The hierarchy of responsibility for notifying PNNL, DOE, the FAA, or the NTSB of an incident, accident, or off-normal event is 1) the Captain/PIC, 2) the First Officer, 3) the Director of Flight Operations, and 4) the Scheduler. The Emergency Notification Chart (Appendix A, Page A.27) shows which agencies must be notified for different types of incidents. Other than this notification, the flight crew will not make any statements until they have an opportunity to recover fully from shock, review the details of the event in a thoughtful manner, and seek competent legal counsel. The flight crew will not discuss the incident/accident or off-normal event with or make any statements to the media.

### **3.2.7.2 DOE and NTSB Accident Investigations**

The Director of Flight Operations will be the principal PNNL contact with DOE or NTSB investigators and will submit a complete Incident/Accident or Off-Normal Event Report (Appendix A, Page A.26) to external investigators and PNNL management. The report shall follow the International Civil Aviation Organization (ICAO) format as closely as possible and include:

- History
- Analysis
- Findings
- Recommendations and Actions.

### **3.2.7.3 PNNL Accident Investigations**

For an incident, accident, or off-normal event for which no DOE or NTSB investigation is required, the Director of Flight Operations, with participation from the PNNL Laboratory Safety Department, will conduct a root cause analysis that:

- Uses an expert team with skills needed to thoroughly assess an event. Depending on the significance (e.g., life-threatening) of an incident, accident, or off-normal event, the causal analysis team will issue direction to secure the scene to allow accurate documentation of conditions associated with the event while an investigative team observes those conditions. Whenever possible, photographs of the scene with reference objects (e.g., pencil for dimensional perspective) and a written narrative describing conditions associated with an event will be included. The analysis team:

- Defines the basic problem/effect that is to be prevented from recurring
- Uses cause and effect process analysis to define the root cause and alternative solution(s)
- Assesses the risks with solution implementation
- Incorporates root cause solutions through process improvement(s)
- Measures success of process performance/productivity improvement.

### **3.2.8 Drug Testing—Flight and Maintenance Crew Members (FAR 135.251, Part 121, Appendix I)**

Testing of PNNL staff for prohibited drugs will be conducted per the policy, procedures, and requirements dictated by PNNL's drug testing program.

#### **3.2.8.1 Flight Crew Use of Non-Prescription Drugs**

Certain drugs and narcotics in common use sometimes have a marked effect on the nervous system and can be highly detrimental to flight crew members' ability to function properly. Even common cold remedies, nose sprays, antihistamines, sulfa, and streptomycin can have adverse side effects. Crew members should ask their doctors if a prescribed drug would have any effect on judgment or flying ability. Other than simple aspirin, all nonprescription drugs are suspect and should be evaluated before use.

### **3.2.9 Alcoholic Beverages (FAR 135.121)**

Consumption of alcoholic beverages by flight crew members on duty, or within the time period specified by the FAR prior to a scheduled flight, shall be cause for immediate dismissal. The greater the quantity of alcohol consumed, the longer the period of time required to eliminate its lingering effect. Personal discretion and good judgment shall be the primary considerations for flight crew personnel.

No flight crew member will partake of alcoholic beverages of any kind while on duty or within 12 hours of anticipated flight duty (FAR 91.17). Accepting flight duty when intoxicated or when suffering from the after-effects of alcohol consumption will be grounds for immediate dismissal.

Except in an emergency, the pilot of a PNNL aircraft may not allow a person who appears to be intoxicated, or who shows physical indications of being under the influence of drugs (except a medical patient under proper care), to be carried in that aircraft.

On request of a law enforcement officer and whenever the law enforcement officer is authorized under state or local law to conduct the test or to have the test conducted, a PNNL flight crew member must submit to a test for the alcohol percentage by weight in the blood.

### **3.2.10 Smoking**

Smoking is prohibited on PNNL aircraft.

### **3.2.11 Blood Donations**

Flight crew members who have donated blood will not perform flight duties for at least 72 hours after that blood donation.

### **3.2.12 FAA Enforcement Actions**

Upon notification that an enforcement investigation has been initiated against a PNNL aviation staff member or contracted staff member, that staff member has 48 hours to report to the Director of Flight Operations the full facts surrounding the event that precipitated the enforcement action. The staff member named in the action may be removed from duty at the Director of Flight Operations' discretion.

PNNL will investigate the violation to determine the facts associated with the event. Legal assistance will be provided to a staff member who acted in good faith and in the best interests of PNNL, its property, and passengers.

### **3.2.13 Flight and Maintenance Crew Duty/Rest Limits (FAR 135.267)**

Flight time and duty time limitations, as set forth in FAR Part 135, are based on experience factors accumulated by the FAA, safety studies, and various air carriers. Duty time for the flight, maintenance, and research crew starts when leaving their places of residence and ends at the return to their places of residence. Flight time begins with engine start and ends with engine stoppage. The safety of PNNL flight operations and the concentration necessary for the effective completion of aircraft operations requires pilots who are rested and alert. Except in emergencies or other extenuating circumstances, pilots who have exceeded their flight and duty time limitations will not be scheduled for flight.

A pilot shall not be assigned, nor will accept, any flight duty if that duty will cause the crew member's total flight time to exceed specific time limitations.

- During any consecutive 24 hours, the following limitations apply:
  - For single-pilot operations, the limits are 8 hours of flight time or 12 hours duty time.
  - For two-pilot operations, the limits are 10 hours of flight time or 12 hours duty time.
- Crew members must be provided with 10 consecutive hours of rest within the 24 hours preceding the completion of that flight duty (refer to Appendix F for charts defining these regulations).
- All flight, maintenance, and research crews involved in flight operations must be relieved of all aircraft duties for at least one, continuous 24-hour period during any 7 consecutive days.

If a pilot anticipates exceeding flight time limitations while away from home base, the pilot will inform the Chief Pilot of his or her physical condition and request relief or an authorization to extend the limitation. In the event of mutual agreement, the Chief Pilot may authorize the pilot to complete the flight.

A Maintenance Technician will work no more than 12 continuous hours in any 24-hour period. The minimum acceptable rest period following a duty period is 8 continuous hours. Each Maintenance Technician should be relieved from all duty for at least one period of 24 continuous hours during any 7 consecutive days.

### **3.2.14 Crisis Planning**

Notification to PNNL of an accident involving a PNNL aircraft in which a fatality or serious injury has occurred is normally made by the state or local police department in the area where the accident happened. If not incapacitated, the flight crew must assume control of the accident site and, as soon as practical, call the PNNL emergency number at 509-375-2400. When notified by any party, the Director of Flight Operations or the Scheduler will immediately report the accident to the PNNL Emergency Number. A call to the PNNL Emergency Number initiates the PNNL occurrence reporting/notification procedure that includes further notifications to the DOE, NTSB, or FAA, as appropriate (see the PNNL Emergency Notification Chart in Appendix A, Page A.27). That call also brings the resources of PNNL Public Relations, Insurance, Legal, and Human Resources departments to bear on addressing the ramifications of the accident on PNNL staff, their families, and other parties affected by it.

### **3.2.15 Security**

#### **3.2.15.1 Planning**

The PIC must confirm that destination airports and surroundings for a planned flight do not present a threat to safety or security. This recommendation is particularly true of international flights to destinations that have a poor reputation for safety and security. PNNL Security should be contacted prior to any international flight to check for unusual or hazardous situations that may impact the security of a planned flight.

#### **3.2.15.2 Security Considerations**

To reduce the possibility of sabotage, extortion, and hijacking, certain operational procedures shall be strictly adhered to and be the equal responsibility of each crew member assigned to the aircraft. The PNNL Research Aircraft Preflight Security Checklist (Appendix A, Page A.12) must be completed. For PNNL aircraft, cargo, and passengers to meet required security conditions, all of the following rules shall apply:

- The destination and occupants of PNNL aircraft shall be considered need-to-know information. Therefore, conversations shall not include passenger identities or destinations.
- Positive identification shall be obtained for all passengers. Luggage must be tagged with the owner's name.
- Unauthorized personnel shall not be allowed in the aircraft and will be monitored when in the vicinity of any PNNL aircraft.
- Avoid discussing your schedule or company affiliation with strangers.

- Aircraft preflight inspection shall be performed to determine if clandestine explosive or incendiary devices have been secreted on board the aircraft. Such inspection shall be performed as part of the Security Checklist.
- At intermediate stops and whenever the aircraft is not under crew surveillance, the main cabin and baggage doors will be closed and locked, if possible. At the final destination, the aircraft will be secured by placing covers in position, inserting appropriate pins, and locking the aircraft. When terminating at flight operations base, the pins, if applicable, will be inserted, and the door closed and locked.
- Passengers and crew carrying classified material must receive courier training and periodic certification as required and applicable by the originating agency directives.

### **3.2.15.3 Rules Governing PNNL Aircraft Cargo**

Materials designated as hazardous or radiological cargo must meet the applicable federal or state regulations relating to the interstate or intrastate transport of such material.

Materials designated as controlled substances and covered by federal or state statutes must meet the applicable PNNL policy or federal or state regulations relating to such transport.

All packages and cargo received for transport shall bear the identity of the sender and the receiver. Such material shall be packaged to permit visual examination of the package exterior to determine if the package has been opened or tampering has occurred.

Non-PNNL passengers must meet PNNL, DOE, or DoD requirements for transport of classified, hazardous, toxic, controlled, or radiological material.

### **3.2.15.4 Prohibition Against Carriage of Weapons (FAR 135.119)**

Firearms being transported shall be stored in the cargo area and must be unloaded. Ammunition shall be stored in containers approved for air transport of such materials. Possession of hand-held sidearms shall not be permitted, except for persons authorized by applicable federal or state license to carry such weapons.

While on board an aircraft being operated by PNNL, no person may carry a deadly or dangerous weapon, either concealed or unconcealed. This restriction does not apply to crew members and other persons authorized by PNNL to carry arms.

Sporting firearms will be allowed in the passenger cabin when unloaded and enclosed in a suitable case. Firearms will not be removed from the case while inside the aircraft.

### **3.2.15.5 Packages and Mail on PNNL Aircraft**

The following procedures must be followed in order for a package/mail requiring special handling to be accepted by the PIC:

- Classified or Business-Sensitive material shall be packaged and marked to meet the originating agency requirements for the appropriate classification level.
- Contact the ASPOC and inform him an item will be delivered to the PIC and when.
- Item must be hand carried to the aircraft and given to the PIC.
- Person delivering and receiving the package must be a PNNL employee with PNNL identification.
- Package must be clearly labeled and handling of package at the other end must be communicated to the PIC responsible for transporting the package.

### 3.3 Aircraft Scheduling Procedures

#### 3.3.1 Contact

**Applicability.** The section applies to all current and prospective PNNL staff members and clients. Research users of the PNNL aircraft must follow the procedure presented in Section 3.3.2. Non-research users should follow the procedure provided in Section 3.3.3.

**Requirement.** Requests for the use of the PNNL aircraft by both PNNL and non-PNNL users are made in writing to the Scheduler.

**Responsibility.** Staff members requesting non-research use of PNNL aircraft must obtain their line manager's and Level I manager's written approval before submitting their request to the Scheduler.

#### 3.3.2 Scheduling Research Flights

The required procedure for requesting and scheduling use of the PNNL aircraft for research flights is as follows:

**Requesting Aircraft Support.** All potential research users of the PNNL aircraft must complete a Flight Operations Request Form (Appendix A, Page A.32) and submit it to the ASPOC. Then, the users must submit an Initial Aircraft Support Request (Appendix A, Page A.34) to the Scheduler at least 6 months prior to intended use. A more detailed Research Aircraft Deployment Document (Appendix A, Page A.35) must be completed by the requester and submitted to the Scheduler no less than 1 month before scheduled use. Both forms are available electronically from the Scheduler. The more detailed deployment document solicits information in the following areas:

- Project Identification
- Research Sponsor
- Other Aviation Facilities
- Flight Operations
- Supplemental Information for Compliance with DOE 440.2C
- Requested PNNL-Provided Scientific Payload

- User-Supplied Scientific Payload
- Ground Support Facilities.

**Evaluation of Request.** Because the DOE funds the PNNL aircraft, the request, as detailed on the form, is evaluated by an advisory panel of the DOE Research Aircraft Facility and a team of PNNL safety and environmental compliance specialists. The advisory panel determines if the requested flights constitute appropriate use of the DOE Research Aircraft Facility. The PNNL safety and environmental compliance specialists determine whether the risks associated with the requested flights are within the normal bounds of research flying. If either the advisory panel or PNNL team raises specific issues about the request, these issues are communicated to the requestor for clarification and resolution.

**Approval of Request.** After review by the advisory panel and PNNL safety and environmental compliance specialists, approval of the request is confirmed with return of a signed copy of the form to the user. The user then can work directly with the Scheduler and other Research Aircraft Facility staff to complete the plan for the flights. The PNNL ASPOC will notify the DOE-RL ASO of all approved research flights. Flight Operations that are outside of the parameters established in PNNL MA-530 must be approved by the PNNL ARMC and the DOE-RL ASO.

**Scheduling Guidelines.** Research flights in support of DOE-funded projects have priority over other uses, except as authorized by the advisory panel. The Scheduler will attempt to accommodate all approved requests and negotiate with users and the Director of Flight Operations a mutually satisfactory schedule for research flights. Changes in schedules that occur while the aircraft is away from the home station will be reported to the Scheduler by the assigned PIC. The Scheduler will then coordinate with all users a new schedule for the remaining flights.

**Method of Payment for Research Use of the PNNL Aircraft.** The advisory panel to the DOE Research Aircraft Facility determines whether a request is an appropriate use of the facility. If so, most of the financial cost for using the aircraft is borne by DOE and no fee is charged for use of the PNNL aircraft. If the use is not appropriate, the user will be charged the hourly use rate established for the PNNL aircraft when the plane is actually flown. Note that an appropriate contracting mechanism for billing the cost to use the PNNL aircraft to the user must be in place before aircraft use can occur.

### 3.3.3 Scheduling Non-Research Flights

The required procedures for using the PNNL aircraft for non-research business travel are described as follows:

**Making Air Transportation Arrangements.** The PNNL staff member requesting non-research air transportation on board the PNNL aircraft completes the Requester portion of the PNNL Passenger Transport Request form (Appendix A, Page A.8) and submits this form to the PNNL Aircraft Scheduler. A copy of this form should be sent by the Requester to his/her line manager and Level I manager for approval.

The PNNL Passenger Transport Request form requires the following information:

- Name and title

- Payroll number
- Organization code
- Phone number
- Travel funding (government or non-government) and account or work package number
- Travel dates
- Destination
- Ground transportation required
- Special information (such as catering, unusual baggage, or medical concerns).

The Scheduler will:

- Arrange and confirm seat availability for PNNL staff on the PNNL aircraft
- Request the Non-Research Passenger Transport Manifest for the PNNL aircraft (Scheduling Form, Appendix A, Page A.11) be faxed to his/her attention prior to confirming space if special approval is required.

**Scheduling Guidelines.** Staff are scheduled on a first-come, first-served basis. A staff member may bump another staff member when the PNNL Lab Director or his/her designee approves such scheduling priority. Staff should contact PNNL media relations and PNNL legal departments regarding regulations governing the carriage of elected officials and candidates on the PNNL aircraft prior to scheduling such guests.

All flights shall originate and be scheduled through the Scheduler. All schedules will be coordinated with the Director of Flight Operations and Chief Pilot. Changes in schedules that occur while the aircraft is away from the home station will be reported to the Scheduler by the assigned PIC. It shall then become the responsibility of the Scheduler to coordinate the remainder of that trip sequence for all passengers and crew.

For a departure time outside of normal working hours, the Scheduler shall furnish the telephone number(s) where the passenger(s) may be reached to the PIC.

The PNNL ASPOC will provide the DOE-RL ASO with a PNNL Passenger Transport Manifest Form (Appendix A, Page A.11) prior to all scheduled passenger flights on the PNNL aircraft.

**Method of Payment for Use of the PNNL Aircraft.** The PNNL Accounting Office will charge the cost of air transportation at the customary commercial full coach fare, using a non-cash transfer process. Cost will be charged to the staff member's applicable work package number for which business travel is being funded.

Note: Staff must document on their travel expense report forms that a PNNL aircraft was used for transportation. However, they do not include the transportation cost processed by PNNL.

**Use of the PNNL Aircraft by Non-Employees.** Staff may request scheduling for PNNL clients on the aircraft. Advance approval of the PNNL Director or designee is required.

**Travel Restriction.** Use of the PNNL aircraft for non-business purposes is prohibited.

### **3.3.4 Flight Schedules and Crew Assignments**

The Chief Pilot or designee schedules crews on a rotation basis. A crew member may make arrangements to switch with other qualified crew members. Approval is required from the Chief Pilot or his/her designee to maintain normal schedule continuity. Crew members requesting swaps may be required to work additional days to avoid increasing the schedule burden of non-requesting crew members.

The Chief Pilot will make the regular flight crew assignments. Also, the Chief Pilot must approve Contract Copilot assignments.



## 4.0 Standard Operational Procedures for PNNL Aircraft

All flights will be planned in detail, and crew members will have a clear understanding of flight objectives and desired results. Pilots and crew members will be on hand a minimum of 1 hour prior to a scheduled flight. It will be the designated PIC's responsibility to determine if each crew member fully understands the mission profile and is aware of any special requirements. The judicious use of checklists is a basic requirement of flight planning.

### 4.1 Documentation Required

Whenever required, each aircraft used by PNNL will be registered with the FAA and state or local agencies. A field operation of short duration will normally require little or no advance registration with local authorities. If it is expected that an aircraft will be required to operate out of a certain flight operations hangar for long periods, local regulations or registration could become a requirement and possibly affect the research operation. Registration is especially important if low-level operation is required.

In accordance with FAR 91.203, every civil aircraft will and must display a current airworthiness certificate and the owner's registration certificate in the aircraft where they are legible to the passengers or crew. As part of preflight duties, the assigned PIC will, as required by FAR 135.203(e), adhere to the following standards:

- Note the date and the aircraft tach time and compare them with the inspection due dates and times listed on the aircraft status sheet.
- Determine whether the flight or series of flights can be completed without any required inspection being due before the aircraft returns to home base.
- If the scheduled flight(s) cannot be completed without one of the previously mentioned inspections becoming overdue, the PIC will immediately contact the Director of Flight Operations for instructions. Under no conditions will a PIC begin a flight if any required inspection time has been exceeded.
- Concerning deferred and corrected mechanical irregularities, the PIC will determine the aircraft has been certified as ready for return to service by an Airframe and Powerplant (A&P) Mechanic (or by the Director of Maintenance). This certification will appear on the mechanical irregularity report (MIR) in the area of the form reserved for maintenance use.

If the FAA requires a waiver for any portion of a flight, a copy of such waiver will be carried in the aircraft. Also, a copy of the flight plan, showing all conditions of such waiver as will be exercised, must be filed with the FAA prior to the flight.

*Special Use Airspace* in the United States is defined as those areas that are prohibited, restricted, warning, or alert areas and designated as such on aeronautical charts. Permission to operate in these areas can sometimes be obtained by a telephone call, but occasionally the controlling agency may require detailed descriptions of flight patterns before giving specific written authorization. A copy of such authorization will be carried on the aircraft when operating in Special Use Airspace. Permission to operate in the area will be noted on the FAA flight plan.

An FAA-approved Aircraft Operating Manual with current revisions is required to be on board the aircraft at all times.

A copy of the *PNNL Flight Operations Manual* will be carried on board each aircraft operated by PNNL.

Current weight and balance data will be carried on board each aircraft operated by PNNL.

Material Safety Data Sheets for all chemicals brought aboard the aircraft will be carried on board each aircraft operated by PNNL.

Pertinent visual flight rules (VFR), aeronautical charts such as the World Aeronautical Chart (WAC) or Sectional Aeronautical Charts (SEC), and instrument flight rules (IFR), Navigation, En route, and Let Down Charts will be carried on board each aircraft operated by PNNL.

#### **4.1.1 Checklists**

Checklists shall be available in the cockpit and used for all phases of flight from preflight inspection to parking and securing of the aircraft, including the outlining of emergency and abnormal procedures. Checklists shall be based on the manufacturers' recommended operating instructions, and checklist flow shall be standardized as nearly as possible for all PNNL aircraft.

Using the challenge-and-response system indicated on the checklist, it shall be the PIC's responsibility to confirm the appropriate checklist is used for all phases of flight.

Deletions, additions, or alterations to any checklist must first be approved by the Director of Flight Operations and Chief Pilot.

The Pilot Flying the aircraft makes all calls for checklists.

Checklists are to be accomplished in the following priority:

1. Emergency procedures
2. Normal procedures
3. Abnormal procedures.

#### **4.1.2 Development of Aircraft Checklists**

The following list of criteria and principles will be used in the development and use of aircraft checklists.

- Include as many required systems checks in the cockpit preflight as practical to preclude unnecessary distractions while taxiing.
- During critical phases of operation, such as runway lineup, in-range, and landing, checklist items should be limited to facilitate crew member attention and focus on flying activities.
- Checklists should be manageable in terms of physical dimensions and legibility.

- Procedures should enable delay of climb checks until clearing the airport traffic area.
- Checklists should be designed ergonomically. Flow patterns should direct the pilot through the cockpit in an efficient manner.
- Checklists are not a substitute for good pilot judgment.
- Checklists cannot contain all standard operating procedures and operating policies delineated by this manual and FAR.
- Checklists should facilitate good challenge-and-response procedures by cockpit crews.

## **4.2 Preparation for Research Flight**

### **4.2.1 Cross Country Flights**

Flight plans for all IFR flights and all VFR cross-country flights will be filed with the FAA. Flight plans will be filed prior to takeoff, except in those cases where communications facilities are not available or inoperative. In such cases, the PIC will file in flight as soon as practical after takeoff. If VFR cross-country flights are to be conducted through areas served by radar, VFR flight following will be acceptable in lieu of a formal FAA flight plan (Airman's Information Manual [AIM] Part 1, Section II B.)

### **4.2.2 Project Flights**

Due to the specialized and varying nature of research flight activities, it is not always practical to file a formal flight plan for VFR operations. However, when flight operations are conducted in areas served by radar or high-density traffic areas, the appropriate ATC personnel will be contacted and advised of the type of operation and the pilot's intentions. This policy is applicable whether the area is covered by radar or not (e.g., terminal areas, airway intersections, or very high frequency omnidirectional radio range [VOR]). When available, VFR flight following should be used during VFR flight operations. When extended offsite operations are planned in areas of high traffic density, the ATC facility should be visited and the Chief of Operations advised of the operational details of the project.

### **4.2.3 Preflight Planning**

The PIC will be responsible for all flight preparations and submission of flight plans to the FAA (when required). Depending on the operation being conducted (e.g., cross-country versus Project or IFR versus VFR), flight preparation will vary. However, the preparation will generally include the following:

The correct amounts of fuel and oxygen as well as the correct seating installation, equipment, and necessary supplies will be verified. These preparations will start at the earliest practical time to confirm that all is ready at the proposed time for departure.

A detailed preflight weather briefing is essential to the preparation and use of a flight plan. These briefings may be obtained from an FAA Flight Service Station (FSS), a Combined Station/Tower (CS/T), or a National Weather Service Office (NWSO). For a detailed forecast and comprehensive briefing, the

pilot should identify himself and give the aircraft number, flight route, times, and any other information that may be pertinent to the flight. The pilot should obtain and record all weather advisories along the route of flight or in the intended area of operation, en route weather, destination and alternate destination weather, prognostic forecasts for later flights, and the winds aloft.

NOTAMS will be checked with the FSS to make sure that all en route facilities are operational and terminal information is accurate.

In planning the flight, the most direct route available is normally used as long as it is consistent with the safety of the flight. It must comply with FAR, ATC instructions, terrain, weather conditions, availability of navigational aids, and other influencing factors. In the event it is necessary to conduct research flights below 2000 ft above ground level (AGL), the PIC shall maintain obstacle maps that are updated prior to each flight. The maps indicate the AGL height of all existing obstacles to flight in the area of operations. If the use of a waiver or permission to operate in a Prohibited or Restricted Area is required, it will be noted in the *Remarks* section of the flight plan.

The PIC will file the flight plan with the FAA (when required), giving a proposed departure time as accurately as practical. In the event of a delay in departure of 1 hour or more, the PIC notifies the FSS of the new proposed time of departure or a new flight plan is filed.

When conducting passenger transport, the PIC and SIC, when required, will perform a preflight inspection of the aircraft using an approved Research Aircraft Preflight Security Checklist (Appendix A, Page A.12). To provide for maximum safety in flight, close attention must be given to every item on the aircraft-approved preflight checklist.

#### **4.2.4 Weather Requirements and Reporting (FAR 135.213)**

The PIC or First Officer shall obtain a weather briefing prior to every flight and shall use the U.S. National Weather Service or a source approved by the Weather Service. However, for operations under VFR if such a report is not available, the PIC may use weather information based on the pilot's own observations or on those of other persons competent to supply appropriate observations.

The PIC shall determine that all required crew members have received a complete weather briefing prior to each flight. Such briefings should also include NOTAMS, the pilot reports, Significant Meteorological Information (SIGMETS), and Airman's Meteorological Information (AIRMETS).

#### **4.2.5 Weight and Balance [FAR 135.23(b)]**

##### **4.2.5.1 Weight and Balance Checks**

PNNL research flight operations frequently require that scientific research equipment be added, removed, or repositioned. Accordingly, the PIC will closely and continually check the aircraft weight and balance to confirm it is properly computed and documented.

#### 4.2.5.2 Calculations

The PIC will calculate the gross takeoff weight, gross landing weight (if the maximum allowable gross landing weight is less than the maximum allowable gross takeoff weight for this aircraft), and the actual center of gravity for the loaded weight. The PIC will determine that these calculated values fall within the manufacturer's allowable weight and balance limits for the aircraft. The PIC will make these calculations using the actual weights of the airplane, fuel, oil, crew, passengers, cargo, and baggage. Estimated or average weight figures are not permitted during research operations.

#### 4.2.5.3 Weight Determination

The following weights are used when loading aircraft and when determining the loaded condition:

- Actual weights of passengers and crewmembers will be used. In the event a scale is not available, the PIC will ask the person's weight and add to it the estimated weight of hand-carried articles or heavy clothing.
- All baggage, cargo, or equipment loaded at the main base of operations will be weighed, and the actual weight used in computations. When away from the main base, the PIC will judiciously estimate the weight of all articles and check loading of passengers and baggage.

The standard unit weights of fuel and oil will be used for determining quantity of fluids to be carried. If the weight and balance conditions for takeoff and landing permit, all fuel tanks should be filled to capacity and oil tanks filled to optimum for all flights of more than 1 hour. If fuel supply is limited for the flight, the PIC will verify the specified amount of fuel, as computed, is in each tank. If too much fuel is on board, the PIC will have the aircraft de-fueled to the specified amount or will offload cargo and baggage to accommodate the extra fuel weight. Sufficient fuel will be carried on all flights to meet the following minimum requirements:

- **VFR**—Fuel to fly to the first point of intended landing and, assuming normal cruising fuel consumption, to fly thereafter for 30 minutes in daytime or for 45 minutes at night (FAR 91.151).
- **IFR**—Fuel to fly to the point of intended landing and thereafter to an alternate airport (if required) and then to fly for an additional 45 minutes at normal cruising fuel consumption (FAR 91.167).

When seats are used to hold cargo during a flight, the weight will be restricted to 170 pounds per seat, and the cargo must be properly secured. Heavy cargo with locally concentrated weights or weight points must be secured so that the load is equally distributed on the floor. Good judgment will be used in the placement of all equipment or cargo. All securing will meet or exceed FAA-approved requirements.

Weight, airport elevation, temperature, wind, runway gradient, and runway conditions affect the aircraft's takeoff and landing performance. The PIC will check the aircraft-approved flight manual to make sure the aircraft will be able to take off safely at the calculated gross weight with the runway available and then land at a safe and allowable weight (FAR 91.103).

#### **4.2.6 Airworthiness Release**

A PNNL PIC will not accept an aircraft for flight unless it has a current airworthiness release. While away from home base, the PIC is responsible for determining airworthiness based on the initial release and subsequent events that may affect airworthiness.

The airworthiness release consists of a signed copy of the PNNL Aircraft Maintenance Status Checklist for the aircraft to be flown (see Appendix A.28). This sheet attests to compliance with all FAR, the manufacturer's inspection program, and PNNL/DOE directives regarding airworthiness.

#### **4.2.7 Flight Locating Procedures [FAR 135.23(I)]**

PNNL has established the following procedures to be used if an FAA flight plan cannot be filed for a particular flight:

- The PIC will complete a flight plan (FAA form 7233-1) and leave a copy with research ground personnel at the point of departure. The PIC will complete the flight plan information as if it were being filed with the FAA. In addition, the PIC will give the research ground personnel the estimated time to expect a telephone call after completion of the flight.
- If the flight goes beyond the calculated search commence time (1 hour after the contact time given by the PIC or the time calculated for fuel exhaustion, whichever is sooner), ground research personnel will immediately contact the appropriate FSS (identified in advance by the PIC). Ground personnel will give the FSS the particulars of the flight and request commencement of a search.

#### **4.2.8 Fueling/Refueling Procedures**

Although line service personnel have the technical responsibility for the actual fueling/refueling process, the PIC has the primary responsibility for confirming correct procedures are followed. This responsibility of the PIC is especially acute when refueling is accomplished en route or at remote bases. In all cases, the safety of equipment and personnel is of prime concern.

During fueling/refueling the aircraft, PNNL personnel use the following procedures and precautions for detecting and preventing fuel contamination, protecting against fire, and supervising and protecting personnel. Before the refueling is started, the PIC should determine the grade and quantity of fuel.

- No aircraft will be fueled or de-fueled inside hangars or while engines are operating.
- No smoking, flames, or fires are permitted within 50 ft of an aircraft being fueled or de-fueled.
- The aircraft must be grounded to the dispensing unit before tank caps are removed.
- Aircraft batteries will not be installed or removed during fuel servicing.
- Battery chargers will not be physically connected, operated, or disconnected during fuel servicing.
- Aircraft ground power units should be located as far away as practical and neither connected nor disconnected during fuel servicing.

- No aircraft or research equipment electrical switch may be turned on or off while refueling is in progress.
- No aircraft will be refueled with personnel on board other than one crew member to monitor gages, if required.
- Fueling operations should not be conducted within 100 ft of energized airborne radar equipment or within 300 ft of energized ground radar equipment.
- Photo-flash should not be used within 50 ft of a refueling aircraft.
- Flashlights used should be of the type approved by the Underwriter's Laboratories for use in hazardous locations.
- No aircraft will be refueled during thunderstorms. Covers for fuel openings should be provided when refueling in rain, snow, or sleet.

The three most common sources of ramp fires are smoking, fuel spills, and engine starts. In the interest of maximum safety, smoking is not allowed within 50 ft of a refueling operation, and the pilot will watch all personnel in the area to enforce the *no smoking* rule. Fuel spills require immediate attention. If it is more than 6 ft in any direction, the spill should be blanketed with foam. Every spill is considered very dangerous and a potential fire. A fire guard will be posted to keep unauthorized persons away, and the spill will be cleaned up as quickly as possible.

After the refueling operation is completed and before the flight, the PIC will take fuel samples from the tank and sump drains and verify these fuel samples are free from moisture and other contamination. The PIC also will verify the fuel and oil caps and associated access doors are secure.

#### **4.2.9 Passenger Briefings**

It is the PIC's responsibility to confirm compliance with FAA regulations regarding the use of seat belts, smoking, oxygen, and emergency exits.

When applicable, reference to survival equipment is included in the briefing. On an aircraft with a Cabin Attendant, the briefing is normally accomplished while taxiing for takeoff. On an aircraft with two pilots, one of the pilots will give the briefing in the cabin immediately after boarding, pointing out the exits, seat belts, oxygen masks, fire extinguishers, and survival gear location. The standard briefing for the PNNL aircraft is:

*Welcome on board PNNL's aircraft. Before getting underway, I would like to review the important safety features of our aircraft. Please read the passenger briefing form. In the unlikely event that we should have to evacuate the aircraft on the ground, we can use (specify how many exits).*

At this point, specify where the exits are located, how to operate them, and how to get out via the exit.

*Should there be a sudden or abnormal change in cabin pressure, oxygen masks can be found (show location). Place the mask over your nose and mouth and breathe normally. Should a cabin fire break out, fire extinguishers are located (show locations). In the event of an injury or incident, first aid kits and*

*survival gear are located (show locations). Observe and comply with the seat belt and no smoking signs. A reminder, smoking is prohibited.*

Whenever possible, the passengers should be briefed on destination weather, estimated time of arrival (ETA), flight route, and alternate plans if destination weather is marginal.

An announcement should be made any time turbulence is expected. Unless it is necessary for them to move about the cabin, it is recommended that passengers keep their seat belts securely fastened.

When possible, prior to descent below 10,000 ft, an announcement should be made with updated destination weather.

Note: The G-1 Passenger Briefing Form is shown in Appendix A, Page A.5.

#### **4.2.10 Ground Handling**

In North America, operators are accustomed to the assistance of Airport Service Operations, normally known as Fixed Base Operator (FBO). However, with the exception of Western Europe, such assistance may not exist at overseas destinations. Most countries do not have enough general aviation traffic to support such specific services. Therefore, the assistance of a ground handling agent is often required to procure services.

Domestic, regional, or international airlines with operations at a specific airport, as well as affiliates of U.S.-based flight-planning companies, can provide many of the necessary services. Other services, such as help with customs, immigration, and public health procedures, expediting shipment of spares, and aircraft maintenance, may also be arranged through such agents.

#### **4.2.11 Use of Auxiliary Power Unit**

On aircraft equipped with an Auxiliary Power Unit (APU), such equipment shall be used primarily to provide heating, cooling, and lighting for passengers and crew or for the warm-up of required equipment. To meet these requirements, an APU normally needs to be turned on 30 minutes before the scheduled departure.

When an APU is running, at least one crew member shall be available to monitor the unit in the event a malfunction occurs. If the APU is required to run an engine, at least one crew member shall be at a cockpit station to permit the use of aircraft brakes and the handling of a malfunction.

#### **4.2.12 Catering**

The PIC verifies that all cabin supplies and catering are on board.

### **4.2.13 Noise Abatement Procedures**

Pilots must be considerate and sensitive to surrounding populations. At airports where specific procedures have been established, those procedures will be followed commensurate with safe operating practices.

At airports where specific procedures have not been established, profiles outlined in this *Flight Operations Manual* will be followed.

Regarding noise abatement, safety of flight shall be the overriding factor in decisions.

## **4.3 Pilot In-Flight Operational Procedures**

Prior to any flight, the PIC shall become familiar with the route and the airports to be used by obtaining NOTAMS, Airport Traffic Information System (ATIS), and any pertinent data from the Jeppesen Manuals.

### **4.3.1 Departure**

#### **4.3.1.1 Takeoff and Landing Data**

PNNL aircraft will have takeoff and landing airspeed designators. Crew members are expected to complete the Takeoff & Landing Data Cards (see Appendix A, Page A.15).

For takeoff, airspeed designators will be set for critical engine failure recognition speed (V1), rotation speed (VR), and takeoff safety speed (V2). Landing approach speed (VREF) will be designated for landing.

#### **4.3.1.2 Weather Briefing**

The PIC or First Officer shall obtain a weather briefing prior to every flight. The briefing should include information required to plan the flight and complete the trip.

The PIC will verify that all required crew members have received a complete weather briefing prior to each flight.

#### **4.3.1.3 Fuel Planning**

It shall be the responsibility of the PIC to ascertain that fuel planning for any flight segment is correct, using all of the pre-planning data available at that time.

Special consideration shall be given to extra fuel used, contingent upon extended APU run; departure delays; use of anti-icing equipment; altitude blocks; more adverse wind or temperature than forecast; weather detours; ATC reroutes; or holds.

#### **4.3.1.4 Radio Equipment Checks**

It shall be the PIC's responsibility to determine that all required radio and navigation equipment is functioning normally prior to departure.

VOR checks shall be accomplished in accordance with FAR 91.171 and noted in the Flight Logbook. A ground or in-flight check must be accomplished within each 30-day period and an error greater than  $\pm 4$  degrees noted for maintenance action.

#### **4.3.1.5 Departure Sequence**

No PNNL aircraft shall be moved from the chocks until the AFTER START checklist is completed. The time to call for a checklist is as follows:

1. After Start (prior to taxi)
2. Taxi (during taxi to runway)
3. Line Up (prior to taking runway)
4. Climb (out of 3000 ft AGL, leaving the airport traffic area).

#### **4.3.1.6 Takeoff Briefing**

The Pilot Flying will handle the takeoff briefing. It is the PIC's responsibility to determine that a briefing has been accomplished.

The takeoff briefing will include power adjustments, compass checks, speeds to be called out, abort procedures (including which pilot will execute the abort), initial climb instructions, and emergency return procedures. A complete takeoff briefing will be provided by the Pilot Flying for the first flight of the day for a particular crew combination. For subsequent multiple flights, the takeoff briefing may consist of the numbers, compass checks, the term *standard brief*, the pilot who will execute the abort, and initial climb instructions.

#### **4.3.1.7 Takeoff Procedures**

Power shall be set in accordance with the Aircraft Flight Operations Manual.

Power levers are to be advanced by the Pilot Flying. The Pilot Not Flying (PNF) will confirm that minimum takeoff power has been obtained. The PNF shall make the call "Takeoff Power Set" and monitor the engine instruments.

Pilot Flying will take his hands off the power levers at V1.

#### **4.3.1.8 Abort Decision**

The decision to abort a takeoff will be made using the following criteria:

- Up to 80 knots, Call “ABORT, ABORT” for:
  - Any system malfunction
  - Any yellow or red system warning lights
  - Any aural warnings.
- After 80 knots up to V1, Call “ABORT, ABORT” for:
  - Engine power loss
  - Engine fire
  - Loss of directional control.

Either pilot will call “ABORT, ABORT.”

Under all conditions, the Captain has the authority to execute an abort at any time.

PNF will notify Tower of ABORT.

#### **4.3.1.9 Radar Altimeter**

The radar altimeter will be set for 400 ft for takeoff as a reminder of the minimum flap retraction altitude.

#### **4.3.1.10 Airspeed Callout**

The airspeeds to be called out by the PNF are 80 knots, V1, Rotate, V2. The 80-knot callout is for an airspeed cross check between the airspeed indicators.

The Pilot Flying will acknowledge the 80-knot callout and call: “My Yoke.”

#### **4.3.1.11 Climb**

After the landing gear is retracted, the PNF will report “gear up and landing gear lights out.”

After flap retraction, the PNF will report “flaps indicate up.”

The climb checklist shall be called for by the Pilot Flying.

#### **4.3.1.12 Maximum Deck Angle**

For passenger comfort and safety, a maximum deck angle during a climb of 15 degrees should not be exceeded, except for specific noise-abatement situations.

#### **4.3.1.13 Noise Abatement**

When applicable, follow recommended noise-abatement procedures.

#### **4.3.1.14 Departure/Climb Airspeeds**

Climb schedules will be calculated for each flight using gross weight data.

### **4.3.2 Cruise/Route**

#### **4.3.2.1 Cockpit Duties**

During takeoff, climb, descent, and landing, both pilot crew members shall have their flight controls and seats in position to hand fly the aircraft.

During VFR conditions, it shall be the responsibility of the PIC to assign at least one crew member to watch for conflicting traffic.

#### **4.3.2.2 Altitude Callout**

PNF will call out 1000 ft prior to assigned altitude, the Pilot Flying will verify and acknowledge.

#### **4.3.2.3 Flight Level 180 Callout**

Both pilots call out the climb and descent altimeter settings for flight level (FL) 180 (18,000 ft).

#### **4.3.2.4 Weather Updating**

At least once during any flight of more than two hours, it shall be the PIC's responsibility to obtain current weather and forecasts for the destination and alternate airports.

#### **4.3.2.5 Flight Crew Members at Stations**

A PNNL Captain shall occupy a pilot seat for takeoff and landing. Flight crew members shall be at their stations for all takeoffs, approaches, and landings. Pilot flight crew members shall be at their stations for all climbs and descents, except for urgent reasons.

Pilot flight crew members shall not leave their stations for reasons other than physiological needs, to perform duties in connection with the operation of the aircraft, or to attend to medical emergencies. Crew members shall keep their seat belts fastened while at their stations.

#### **4.3.2.6 Pilot Incapacitation**

In pilot incapacitation situations, adhere to the following:

- **Obvious incapacitation:** Fly the aircraft and engage the auto pilot. Then, restrain/remove the incapacitated crew member.
- **Subtle incapacitation:** Whenever a pilot does not respond to the second attempt at communication concerning any deviation from normal flight profiles, announce: “I’ve got the airplane.” Then, proceed as follows:
  1. Take control of the aircraft.
  2. Use auto pilot.
  3. Use cabin assistance to restrain/remove crew member.
  4. Declare an emergency and land.

#### **4.3.2.7 Paperwork En Route**

Other than logbook entries, brief notes, and flight plan entries, no paperwork shall be done in the cockpit while en route.

#### **4.3.2.8 Supplemental Oxygen (FAR 91.2110)**

As prescribed by FAR 135.89, supplemental oxygen will be provided and used by all personnel on the flight. PNNL aircraft at flight altitudes above FL250 (25,000 ft) can operate only if a 10-minute supply of supplemental oxygen is available for each aircraft occupant in the event that a descent is necessitated by loss of cabin pressurization. If for any reason or any time it is necessary for one pilot to leave the controls of the aircraft when operating above FL350 (35,000 ft), the remaining pilot at the controls shall use an oxygen mask until the other pilot has returned to that crew member’s station.

During research flight operations, each pilot of an unpressurized aircraft shall use oxygen continuously at altitudes above 10,000 ft through 16,000 ft mean sea level (MSL) for that part of the flight at those altitudes exceeding 30 minutes in duration.

#### **4.3.2.9 Icing Conditions**

No flight shall be operated in areas of known icing, unless the aircraft is equipped with functioning de-icing/anti-icing equipment that is suitable for the condition to be encountered. The recommended anti-ice procedures from the approved Aircraft Flight Operations Manual shall be used. In no case shall a PNNL aircraft be flown into a known forecast condition of heavy icing. In applying these restrictions, the following definitions shall apply:

*Trace of ice*—an ice accumulation of no consequence that does not affect the performance characteristics of the aircraft.

*Light ice*—de-icing/anti-icing equipment will manage the accumulation safely and permit the aircraft to be flown indefinitely.

*Moderate ice*—de-icing/anti-icing equipment will still manage the accumulation safely, but it is an indication to the PIC to alter course or altitude to avoid this condition.

*Heavy ice*—de-icing/anti-icing equipment cannot control the accumulation. The PIC shall change altitude or course immediately or locate the nearest suitable airport and land.

All icing conditions shall be reported to ATC.

#### **4.3.2.10 Turbulence and Thunderstorms**

The following rules shall apply:

- Weather and storm scope will be on for all adverse weather operations.
- At altitudes greater than FL230 (23,000 ft), thunderstorm echoes shall be avoided by at least 20 miles.
- At altitudes less than FL230, echoes shall be avoided by at least 5 miles if outside air temperature (OAT) is 0°C or higher and by 10 miles if OAT is 0°C or lower. If radar indicates rapid increase in size or changes in echo shape, hooks, fingers, or scalloped edges associated with the cell(s), double these distances.
- Deviate upwind when possible.
- Flying under a cumulonimbus overhang shall be avoided when possible.
- When turbulence is expected or encountered, air speed shall be reduced to the rough air penetration speed.
- Flights shall proceed with extreme caution through areas of forecast tornadoes. While flying through these areas, a listening watch shall be maintained on appropriate frequencies giving weather information, and radar shall be monitored carefully to avoid sharply defined echoes.
- A deviation in routing shall be considered preferable to flying through areas of known or forecast tornadoes.

#### **4.3.2.11 Portable Electronic Devices**

Passengers are prohibited from using portable electronic devices while in flight with the exception of:

- Portable voice recorders
- Electric shavers
- Hearing aids
- Mission research equipment
- Electric watches
- Heart pacemakers

- Laptop computers.

Normally, none of the allowable communication devices will be used below 10,000 ft.

### **4.3.3 Arrival**

#### **4.3.3.1 Arrival Sequence**

Checklists will be called for as follows:

- Descent—Initial descent from altitude
- In Range—Out of 10,000 ft AGL (approximately 30 miles out)
- Approach—After completion of the In Range check and prior to reaching the Initial Approach Fix (IAF) for the approach to be flown
- Landing—Landing checklist is to be completed before the final approach fix inbound or 3 miles out on a visual approach
- After Landing—No items are to be completed until the aircraft has cleared the runway or called for by the PIC
- Shut Down—In the chocks.

#### **4.3.3.2 Descents and Descent Altitude Callout**

Descents shall be initiated so the aircraft is at approximately 10,000 ft, nearly 30 miles from destination.

The descent checklist is requested upon initiation of descent.

When using a profile descent procedure, the Pilot Flying the aircraft will retain the descent plate and fly the appropriate procedure.

The callout for descent altitude is 18,000 ft for altimeters and 10,000 ft for the 250-knot speed reduction.

The In-Range checklist will be called for at either 10,000 ft AGL or 30 miles from the destination.

#### **4.3.3.3 Approach Briefing**

Upon receiving the appropriate approach information and verifying that both altimeters are correctly set, the PNF will pull the approach plate for review by the Pilot Flying.

The approach briefing will include the following items:

- Minimum Safe Altitude (MSA)

- Type of approach
- Runway of intended landing and length
- Visual aids
- Initial approach altitude
- Minimum Descent Altitude (MDA), Decision Height (DH), or Visual Director Visual Descent Point (VDP)
- Landing approach speed, time to the missed approach or the missed approach point, and missed approach procedure
- VREF speed.

Visual Approach Briefings may be abbreviated to the following items:

- Airport MSA
- Pattern Altitude
- Runway Being Used
- VREF Speed.

The approach plate will be retained by the PNF for monitoring purposes.

#### **4.3.3.4 First Officer Approach and Landing**

Normally, the First Officer may make approaches and landings at the PIC's discretion.

A First Officer shall not make an approach and landing when the Captain has less than 100 hours of PIC time in the assigned equipment.

It is the PIC's prerogative to make the approach and landing during inclement weather or adverse runway conditions.

#### **4.3.3.5 Arrival Message**

For the purpose of coordinating and expediting the ground handling of the aircraft and passengers, an arrival message shall be transmitted to the FBO at the intended point of landing.

#### **4.3.3.6 Landing/Taxi/Pulse Lights**

Landing lights should be turned on anytime a PNNL aircraft is in Class B airspace or near an active airport. Landing lights have proven to diminish bird strikes, so PNNL aircraft will use them anytime flight is performed below 1000-ft AGL or when exercising the provisions of low-level waivers.

During flight under day VFR conditions, pilots should use the anti-collision and position lights available in the aircraft they are flying. These lights include rotating beacons, strobes, and navigation lights. This procedure is consistent with the FAA *see and avoid* concept for in-flight safety.

#### **4.3.3.7 NAVAID Tuning/Radar Altimeter**

When cleared for the approach or receiving radar vectors, the PNF will tune and identify the appropriate NAVAID. When necessary, the radios of the PNF will be left on the NAVAID required for orientation or intersections.

Prior to intercept, the PNF will leave his radios tuned to the appropriate NAVAID for the approach for monitoring and redundancy unless required for other approach fixes.

The radar altimeter will be set either for the MSL or DH for an instrument approach or to 500 ft for a visual approach as a minimum altitude reminder.

#### **4.3.3.8 Approach Speeds**

PNNL aircraft will fly an approach at VREF + 10 knots with full flaps.

It is recommended the gust velocity be added to the VREF + 10 speed for approaches in gusting conditions. No more than VREF + 20 is recommended.

Nonstandard aircraft configurations will be flown at the recommended speed without a 10-knot addition, except for gust factors.

#### **4.3.3.9 Monitoring of Approach and Callout**

Any callout outside normal parameters requires a response from the Pilot Flying.

During final approach, the PNF shall follow through on the flight controls for the purpose of assuming immediate control of the aircraft in the event the other pilot becomes suddenly incapacitated.

#### **4.3.3.10 Instrument Approaches**

The PNF of the aircraft shall also monitor airspeed, altitude, and basic instrument approach references. Each following callout is mandatory:

- Airspeed callout is made upon any deviation below VREF + 10 or above VREF + 20.
- Altitude callout on all aircraft is 500 ft above minimums, 100 ft above minimums, and at minimums.
- Callout is made to back up audible advisory systems.
- The 500-ft callout is acknowledged by the Pilot Flying.
- Altitude callout is made until the Pilot Flying states, "I am visual." Then, the visual approach callout applies.

- Deviations are called out any time more than one dot displacement or  $\pm 5^\circ$  of bearing deviation occurs.
- Sink rate is called out anytime it exceeds 1000 ft per minute (FPM) on final approach.

Upon reaching minimums, the PNF will call out one of the three options below. The Pilot Flying then will fly the procedure associated with the callout.

1. “MISSED APPROACH”—The Pilot Flying then will execute the missed approach procedure.
2. “APPROACH LIGHTS IN SIGHT, STAY ON INSTRUMENTS”—The Pilot Flying will continue flying the approach until the PNF calls either “runway in sight” or “missed approach.”
3. “RUNWAY IN SIGHT, GO VISUAL”—The Pilot Flying will then go to visual approach; call out, “I am visual;” and land the aircraft. The PNF will monitor the instruments and give the standard, mandatory callout.

#### **4.3.3.11 Visual Approaches**

If available, an electronic guide slope shall be tuned, identified, and used while making a visual approach.

The PNF shall monitor airspeed, altitude, and other aircraft. Each of the following callouts is mandatory:

- Airspeed callout is made upon any deviation below  $VREF + 10$  or above  $VREF + 20$ .
- Sink rate is to be called out anytime it exceeds 1000 FPM on final approach.
- Altitude is called out at 500 ft AGL. This callout will be acknowledged by the Pilot Flying.

#### **4.3.3.12 Stabilized Approaches**

Flight crews are expected to fly stabilized approaches during visual and instrument approaches.

Approaches are considered stabilized when the aircraft is fully configured for landing and is on the glide slope or on a 3-degree visual glide slope. On an Instrument Landing System (ILS)-equipped runway, or no less than 3 miles out on a visual runway, approaches are considered stabilized when the landing checklist is completed by the outer marker.

At times, the ATC may request speeds to the outer marker or some other fix that precludes final flap settings. It is the PIC’s responsibility to determine the approach can be safely executed and the checklist and final flap setting can be completed as close as possible to the 3-mile out point.

Under no circumstance will an approach continue from a point 500 ft above MDA/DH or 500 ft AGL on a visual approach unless the aircraft is fully configured for landing, airspeed on target, and the landing checklist is complete.

#### **4.3.3.13 Required Runway**

Except in an emergency, PNNL aircraft shall not operate from a runway less than 5000 ft long and 75 ft wide. Under no circumstance shall a PNNL aircraft take off or land on runways shorter than that required by the Aircraft Flight Operations Manual.

Landing distance factors due to abnormal aircraft equipment operations shall be computed using the Aircraft Flight Operations Manual.

#### **4.3.4 Navigation Procedures**

Normally, the PNF will program navigation information and monitor flight progress.

##### **4.3.4.1 VOR-Only Navigation**

The PNF normally will tune and identify radio frequencies. On NAVS, he/she will set the intercept radial on the Pilot Flying side and any cross radials on the PNF's side. On legs between stations, he/she will set the outbound radial on #2 course deviation indicator (CDI) as a reference to be used by the Pilot Flying on the next leg. After station passage, the #2 NAV information will be transferred to the #1 NAV, and the #2 NAV then will be tuned to the next station with the inbound radial set in.

##### **4.3.4.2 Global Positioning System Navigation**

The PIC is responsible for determining the accuracy of the Global Positioning System (GPS) signal in accordance with the procedures set forth in the appropriate operator's manual. During en route operations, GPS and VOR navigation information shall be routinely crosschecked and updated as required. The following procedures shall be followed when navigating by reference to GPS:

- To monitor navigational progress, both navigation radios shall be tuned to the VORs.
- Failure of the GPS navigation system shall be reported to the controlling ATC facility as soon as practicable.

#### **4.3.5 Interruption of Flight Due to Passenger Medical Problems**

Unless the event occurs in the takeoff, landing, or initial climb or descent phases, the PIC should immediately attend to passengers experiencing distress or a life-threatening emergency. If the event occurs during these phases of flight, a decision will be made whether to expedite the arrival or return to the departure airport. If the event occurs during some other phase of flight and the PIC feels further action is needed, the PIC will administer first aid when appropriate and instruct the SIC to find and head toward a suitable airport.

Depending on the severity of the situation, the PIC shall make the decision whether to request priority handling by the ATC or to declare an emergency.

The PIC will make a report of the incident to the Director of Flight Operations as soon as practicable.

#### **4.3.6 Manipulation of Flight Controls by Non-Employee Pilots (FAR 135.115)**

Only the PIC and SIC may manipulate the flight controls of an aircraft during flight. No other person may manipulate the flight controls during flight unless that person has the PIC's permission and is an authorized safety representative of the FAA administrator or a pilot employed by PNNL and qualified in the aircraft.

#### **4.3.7 Admission to Cockpit**

When below 10,000 ft, admission to the aircraft flight deck is restricted to:

- Crew members
- Factory or Instructor Pilot
- Aviation Maintenance Technician
- Approved jump seat passengers.

When operating above 10,000 ft, passengers may be admitted to the flight deck at the PIC's discretion.

Below 10,000 ft, passengers may be allowed in the jump seat at the PIC's discretion. This practice is not encouraged and only the PIC can extend invitations to occupy the jump seat.

#### **4.3.8 Operations Using Visual Flight Rules**

PNNL aircraft shall not fly a VFR flight segment unless the weather is current and forecasted to have a ceiling of at least 5000 ft AGL, 5 miles visibility, and is to remain so until at least 1 hour after ETA at the destination.

ATC communication should be maintained throughout the flight. An IFR or VFR flight plan must be filed for all flights.

No PNNL pilot may begin a flight operation in a PNNL aircraft under VFR unless, considering wind and forecast weather conditions, the aircraft has enough fuel to fly to the first point of intended landing and, assuming normal cruising fuel consumption, to fly after that point for at least 30 minutes during the day or to fly for at least another 45 minutes at night [*VFR Fuel Supply* (FAR 135.209)].

#### **4.3.9 Operations Using Instrument Flight Rules**

PNNL aircraft are normally required to operate on IFR flight plans. An IFR flight plan shall be filed and a clearance received for each flight segment.

Per the *VFR Over-the-Top Operating Limitations* (FAR 135.211), no PNNL pilot may operate a PNNL aircraft unless weather reports, forecasts, or any combination of them indicate the weather at the intended point of termination of the over-the-top flight:

- Allows descent to beneath the ceiling under VFR and is forecast to remain so until at least 1 hour after the ETA at that point.
- Allows an IFR approach and landing with flight clear of the clouds until reaching the prescribed initial approach altitude over the final approach facility unless the approach is made with the use of radar under FAR 91.175(i).
- In addition, if an engine fails, it is operated under conditions allowing a multi-engine aircraft to descend or continue the flight under VFR.

Per *IFR Operating Limitations* (FAR 135.215), no PNNL pilot may operate a PNNL aircraft under IFR outside of controlled airspace or at any airport that does not have an approved standard instrument approach procedure except when it is necessary to:

- Conduct an instrument approach to an airport for which a current approved standard or special instrument approach procedure is in use
- Climb into controlled airspace during an approved missed approach procedure
- Make an IFR departure from an airport having an approved instrument approach procedure.

Per *IFR Takeoff Limitations* (FAR 135.217), no PNNL pilot may take off a PNNL aircraft under IFR from an airport where weather conditions are at or above takeoff minimums, but below authorized IFR landing minimums, unless an approved alternate airport is within 1 hour flying time (at normal cruising speed, in still air) of the airport of departure.

Per *Destination Airport Weather Minimums* (FAR 135.219), no PNNL pilot may take off a PNNL aircraft under IFR or begin an IFR or over-the-top operation, depending on the weather, unless the latest weather reports, forecasts, or any combination of them indicate that weather conditions at the ETA at the next airport of intended landing will be at or above authorized IFR landing minimums.

Per *IFR Alternate Airport Weather Minimums* (FAR 135.221), no PNNL pilot may designate an alternate airport unless the latest weather reports, forecasts, or any combination of them indicate that weather conditions will be at or above authorized IFR landing minimums for that airport at the ETA.

Per *IFR Alternate Airport Weather and Fuel Requirements* (FAR 135.223), no PNNL pilot may operate a PNNL aircraft in IFR conditions unless it carries enough fuel (considering weather reports, forecasts, or any combination of them) to:

- Complete the flight to the first airport of intended landing
- Fly from that airport to the alternate airport
- After that time, fly for 45 minutes at normal cruising speed.

Per *IFR Takeoff, Approach, and Landing Minimums* (FAR 135.225), no pilot of a PNNL aircraft may begin an instrument approach procedure to an airport unless it has a weather reporting facility operated by the U.S. National Weather Service, a source of weather information approved by the U.S. National Weather Service, or the latest weather report issued by that airport's weather reporting facility indicates weather conditions are at or above the authorized IFR landing minimums for that airport.

No pilot of a PNNL aircraft may begin the final approach segment of an instrument approach procedure to an airport unless the latest approved weather report indicates that weather conditions for that airport are at or above the authorized IFR landing minimums for that procedure.

If the final segment of an instrument approach to an airport is in progress and a later weather report indicating below minimum conditions is received, the pilot may continue the approach and landing if, upon reaching the authorized MDA or DH, actual weather conditions are at least equal to the minimums prescribed for the procedure. In this instance, approach and landing only occurs after the aircraft is on an ILS final approach and has passed the final approach fix; on an Airport Surveillance Radar (ASR) or Precision Approach Radar (PAR) final approach and has been turned over to the final approach controller; or on a final approach using a VOR, non-directional beacon (NDB), or comparable approach procedure. The aircraft also must pass the appropriate facility or final approach fix or where a final approach fix is not specified, and the pilot must have completed the procedure turn and is inbound toward the airport on the final approach course within the distance prescribed in the procedure.

Each PNNL pilot making an IFR takeoff or approach and landing at a military or foreign airport shall comply with applicable instrument approach procedures and weather minimums prescribed by the authority having jurisdiction over that airport. In addition, no PNNL pilot may take off under IFR when the visibility is less than 1 mile or make an instrument approach when the visibility is less than half a mile at that airport.

#### **4.3.9.1 Alternate Airport Requirements**

A destination alternate airport shall be included in the IFR flight plan when the ceiling at the destination is forecast to be below 2000 ft and 3 miles visibility from 1 hour prior to scheduled arrival time to 1 hour after scheduled arrival.

The weather forecast at the selected destination alternate shall meet the published air carrier alternate airport weather requirements on the back of the first approach plate for the alternate airport.

An alternate airport shall also be selected when the destination airport is reporting one of the following:

- Forecast thunderstorms or low-level wind shear
- One operational runway
- Ice, slush, or snow on the runway.

When visibility at the departure airport is reported as less than that required for an approach, an emergency alternate airport within 100 nautical miles of the departure airport shall be entered in the IFR flight plan.

For aircraft with two engines, the *emergency* alternate shall be within 30 minutes of flying time with one engine inoperative.

The weather forecast at the selected emergency alternate shall meet the published air carrier alternate weather requirements on the back of the first approach plate for the alternate airport.

#### **4.3.9.2 Limitations on the Use of Auto Pilot—Minimum Altitudes for Use (FAR 135.93)**

No PNNL PIC may use an auto pilot at an altitude above the terrain that is less than 500 ft or less than twice the maximum altitude loss specified in the approved Aircraft Flight Operations Manual or equivalent for a malfunction of the auto pilot, whichever is higher.

When using an instrument approach facility other than ILS, no PNNL pilot may use an auto pilot at an altitude AGL that is less than 50 ft below the approved minimum descent altitude for that procedure or less than twice the maximum altitude loss specified in the approved Aircraft Flight Operations Manual (or equivalent) for a malfunction of the auto pilot, whichever is higher.

For ILS approaches when reported weather conditions are less than the basic weather conditions defined in FAR 91.155, no PNNL pilot may use an auto pilot with an approach coupler at an altitude that is less than 50 ft AGL or the maximum altitude loss specified in the approved Aircraft Flight Operations Manual (or equivalent) for a malfunction of the auto pilot with approach coupler, whichever is higher.

#### **4.3.9.3 Wind Restrictions**

The PIC shall consider runway conditions and demonstrated crosswind components stated in the Aircraft Flight Operations Manual or this manual (whichever is most restrictive).

PNNL aircraft will not depart or land when ground winds exceed the following velocities:

- 55 knot headwind component
- 30 knot crosswind component
- 10 knot tailwind component.

#### **4.3.9.4 Runway Requirements and Conditions**

As outlined in the Aircraft Flight Operations Manual, the PIC shall be responsible for calculating the Gross Weight/Takeoff and Landing Performance Requirements for airports of intended use.

The PIC shall be responsible for meeting FAR 121.189 and FAR 121.195 Transport Category Turbine Engine Powered Airplanes Takeoff and Landing Limitations.

PNNL aircraft shall not operate when braking action is reported as poor or nil.

PNNL aircraft shall not depart when standing water, slush, or wet snow greater than half an inch in depth covers an appreciable part of the runway.

PNNL aircraft shall not depart when dry snow greater than 4 inches in depth covers an appreciable part of the runway.

When takeoffs or landings are made on wet, slush-, or snow-covered runways and braking action reports are available, the following guideline shall be used:

- Wet runways add 15% to the runway length required in this section.
- Pilots are encouraged to consider a more conservative approach when operating on wet or slippery runways.

#### **4.3.9.5 Clearance Readbacks**

All flight plan clearances, including the aircraft registration number; ATC instructions; taxi instructions; ATC clearances; and instructions regarding active runways will be read back.

#### **4.3.9.6 Jeppesen Revisions**

It is the responsibility of both pilots assigned to verify the aircraft's Jeppesen Revisions are current and complete.

### **4.4 Post Flight Operations**

#### **4.4.1 Maintenance/Flight Forms and Records (Maintenance Status and Problem Notification)**

All aircraft discrepancies discovered during flight will be substantiated by the PNF using a complete and legible entry in the PNNL Aircraft Discrepancies Form (see Appendix A, Page A.18). Although verbal descriptions of the fault are helpful and should be provided to maintenance personnel performing the repair, these descriptions will not substitute for a written discrepancy report.

#### **4.4.2 Post-Flight Inspection**

It is the PIC's responsibility to confirm a thorough post-flight inspection of the aircraft is conducted.

#### **4.4.3 Securing Aircraft**

It is the PIC's responsibility to park and secure the aircraft in a manner that is as free as possible from the hazards of weather, intrusion, or collision with service vehicles or aircraft under tow/taxiing. If doubts exist about the aircraft's security, the PIC, with the concurrence of the Director of Flight Operations or Chief Pilot, shall be responsible for taking the steps necessary to maintain aircraft security. Some examples of these steps are taxiing to a better location, obtaining hangar space, obtaining guard, or flying the aircraft out of the hazard area. It is the PIC's responsibility to determine the aircraft has been properly secured with chocks, pins, and covers.

## 4.5 Adverse Weather Operations

Weather is the single most influential factor in the planning and execution of a flight operation. When conducting a flight operation away from the PNNL home base, it is the flight crew's responsibility to monitor the FSS for severe weather warnings or forecasts. If severe weather (thunderstorms with large hail, strong winds over 50 knots, tornadoes, hurricanes, or any phenomenon that would endanger a PNNL aircraft left outside on the ramp) is forecast, the airplane must be moved. The flight crew is responsible for placing the aircraft in a hangar or repositioning it to a safe area until the danger has passed.

All pilots have their own limitations and know better than anyone what they should—or should not—do. A pilot must never allow external pressures to influence a decision to permit a flight, especially if any doubt exists concerning a safe outcome. A pilot must never push his or her limitations or exceed the limitations of the aircraft. After evaluating every practical source of weather information, it is the PIC's prerogative and responsibility to make the *go/no go* decision for any flight. The provisions of this manual are to be used as aids to the pilot in making these decisions.

### 4.5.1 Cold Weather (FAR 135.227)

No PNNL PIC may take off an aircraft that has frost, ice, or snow adhering to any windshield; wing; stabilizing or control surface; a power plant installation; or an airspeed, altimeter, rate of climb, or flight attitude instrument system. See Aircraft Flight Operations Manual for details on cold weather operations.

### 4.5.2 Hot Weather/Density Altitude Advisories

At airports with elevations of 2000 ft and higher, control towers and the FSS will broadcast the advisory "Check Density Altitude" when the temperature reaches a predetermined level. These advisories will be broadcast on appropriate tower frequencies or, where available, ATIS. FSS will broadcast these advisories as a part of Local Airport Advisory and on a Transcribed Weather Broadcast (TWEB).

These advisories are provided by air traffic facilities as a reminder to pilots that high temperatures and high field elevations will cause significant changes in aircraft performance characteristics. During these conditions, the PNNL PIC retains the responsibility to compute density altitude as a part of preflight duties.

### 4.5.3 Clear Air Turbulence

Clear air turbulence (CAT) is an extremely serious operational factor for flight operations at all levels, especially to jet traffic flying above 15,000 ft. The best available information on CAT comes from pilots via the Pilot Reporting (PIREP) system. All pilots encountering CAT conditions are urgently requested to report *time, location, and intensity* (light, moderate, severe, or extreme) of the turbulence to the FAA facility with which they are maintaining radio contact. If time and conditions permit, turbulence should be reported according to the standards for other PIREP and position reports. When operating PNNL aircraft above 15,000 ft, it is the PIC's responsibility to monitor for CAT and give PIREP.

#### 4.5.4 Turbulent Air Penetration

PNNL pilots will not intentionally fly through areas of reported severe turbulence and will bestow careful consideration to flying into areas of forecast moderate turbulence. If any turbulence is encountered in flight, a report of its duration and position should be given to the nearest FAA facility. The following terminology is to be used for reporting the degree of turbulence:

- *Light* refers to a condition where occupants may be required to use seat belts, but objects in the aircraft remain at rest.
- *Moderate* refers to a condition where the occupants require seat belts and are occasionally thrown against the belt. Unsecured objects in the aircraft may move about.
- *Severe* refers to a condition where the aircraft may be momentarily thrown out of control. Occupants are thrown violently against the seat belt, and objects not secured are tossed about.
- *Chop* refers to a light or moderate condition of washboard-type fluctuations occurring at rapid and frequent intervals.

#### 4.5.5 Wind Shear Conditions

Whenever a cold front moving at 30 knots or more is expected to arrive at the airport at the same time as the flight's ETA, pilots should anticipate significant wind shear when flying through the frontal surface.

A warm front with a temperature difference of 10°F or more may pose a potential wind shear problem.

Any time fighting a headwind or strong tailwind en route and the surface wind is reported calm, wind shear exists between the aircraft's altitude and the ground.

Expect serious wind shear encounters anytime a thunderstorm is in the immediate environs of the airport.

- *VFR*: If wind shear conditions exist, plan to fly down the final approach a little faster and a little higher than normal (if airspeed starts to bleed off, add power immediately). Watch out for overshoot.
- *IFR*: If the approach speed is 120 knots, to make a 3-degree glide slope without wind, descend about 600 FPM. If it requires only 400 FPM to stay on the glide slope, a headwind of about 40 knots is present. If the surface wind is 10 knots, during descent, expect to lose 30 knots with a need to get power on and scramble to keep from getting too low.

If the necessary descent rate to stay on glide slope is near 800 FPM, a 40-knot tailwind is indicated, and it will be a scramble not to overshoot. The formula for descent rates versus ground speed is half the ground speed times 10 equals the descent rate. For example, when coming down the glide slope at 900 FPM, divide that by 10 to get 90 and multiply by 2 to get 180, which is the ground speed. If the normal air speed is 120 knots, there is a 60-knot tailwind.

These numbers are true airspeed at sea level.

#### **4.5.6 Thunderstorms**

Flights will not be planned into areas where tornadoes or heavy thunderstorms are reported. It is permissible to conduct flights into areas of scattered thunderstorms where detours may be made around storms or heavy rain areas. Even under these conditions, the pilot should monitor available weather broadcasts to be aware of trends toward increased activity. When detouring around thunderstorms, the flight path should avoid the overhang of a cumulonimbus because it would be possible, even flying in the clear, to encounter a hail shaft from the overhang.

#### **4.5.7 Lightning and Static Discharges**

Static discharges occur frequently in shower-type clouds at levels where the air temperature is close to freezing. Lightning and static discharges are usually preceded by sharp increases in radio static, especially in the low-frequency range. The pilot should make the following checks for visible or functional indications of damage:

- A check of the magnetic compass on as many cardinal headings as practical using other cockpit indicators, such as heading indicator, radio magnetic indicator (RMI), and radios, for known headings as references.
- Operational checks of communications and navigation equipment for erratic or sluggish operations.

Upon landing, a visual check of the exterior of the aircraft should be made for possible structural or skin damage, with particular attention to trailing edges, control hinge points, visible bonding and wiring, and fuel tank vents and access ports.

#### **4.5.8 Radar/Storm Scope Requirements**

At altitudes less than FL230, echoes shall be avoided by at least 5 miles if OAT is 0°C or higher and 10 miles if OAT is 0°C or lower. If radar indicates rapid increase in size or shape of hooks, fingers, or scalloped edges associated with the cell(s), these distances are doubled (see subsection 4.3.1.10 for other requirements).

Flights shall proceed with extreme caution through areas of forecast tornadoes. When flying through these areas, a listening watch shall be maintained on appropriate frequencies giving weather information. Radar shall be monitored carefully to avoid sharply defined echoes (see subsection 4.3.1.9 for other requirements).

#### **4.5.9 Icing and Freezing Precipitation**

When ice accumulation is encountered, an increase in power is required to maintain altitude or airspeed. If large increases in power are required, action should be taken immediately to change altitude or otherwise avoid the icing conditions that may abnormally tax the de-icing or anti-icing capability of the aircraft (FAR 91.209). All icing conditions will be reported to the FAA using the following terminology:

#### **4.5.9.1 Degree of Intensity**

*Light ice* is an accumulation of little or no consequence and does not affect the performance of the aircraft, but it should be reported for meteorological reasons. Such accumulations can be handled safely by the normal de-icing or anti-icing equipment. The aircraft can be flown indefinitely in such conditions with use of this equipment.

*Moderate ice* is a serious condition, and one the aircraft de-icing or anti-icing equipment can handle. However, it is a signal to the pilot to alter the flight to avoid further operation in that condition.

*Severe ice* is an adverse and dangerous condition that the aircraft de-icing or anti-icing systems cannot handle. Freezing rain is considered a severe icing condition, and immediate action should be taken to change the altitude or course of the plane or to take whatever action is required to provide for the safety of all passengers and crew members. If the icing condition continues, the pilot should land at the nearest suitable airport and wait for a weather change.

#### **4.5.9.2 Types of Ice**

*Rime ice* is hard, porous, white, opaque ice consisting of small grains, air space, and frost-like crystals.

*Clear ice* is hard, clear, solid ice that is very heavy.

*Mixed ice* is a combination of rime and clear ice.

#### **4.5.10 Flight Restrictions Due to Actual or Forecast Weather Conditions**

PNNL aircraft do not operate under the following conditions:

- Take off or land in moderate or heavy freezing rain or sleet
- Take off with frost, snow, or ice adhering to any windshield; power plant installation; or airspeed, altimeter, rate-of-climb, or flight-altitude instrument system
- Take off with frost, snow, or ice adhering to any airfoil or control surface
- Take off into known or forecast icing conditions that exceed the anti-icing or de-icing limitation of the aircraft
- Take off into known or forecast conditions of severe turbulence or severe CAT
- Take off into known areas where thunderstorms of moderate intensity or greater exist unless the thunderstorms can be avoided using visual or radar guidance
- Take off or land with a thunderstorm adjacent to or over the airport.

## **4.6 Security Procedures**

To provide assurance that the aircraft, cargo, and passengers meet the required security conditions, the following regulations shall apply:

- Passengers and crew carrying classified material must receive courier training and periodic certification as required and applicable by originating agency directives.
- Material designated as hazardous or radiological cargo must meet the applicable federal or state regulations relating to the interstate or intrastate transport of such material.
- Transport of materials designated as controlled substances and covered by federal or state statutes must comply with applicable PNNL policies, DOE or DoD policy, or federal or state regulations relating to such transport.
- Both PNNL and Non-PNNL passengers must comply with PNNL, DOE, and DoD requirements for transport of classified, hazardous, toxic, or radiological material.
- Classified or Business-Sensitive material shall be packaged and marked to meet the originating agency requirements for the appropriate classification level.
- All packages and cargo received for transport shall bear the identity of the sender and the receiver. To determine if the package has been opened or tampering has occurred, such material shall be packaged to permit visual examination of the package exterior.
- Firearms being transported shall be stored in the cargo area and must be unloaded. Ammunition shall be stored in containers approved for air transport. Possession of handheld firearms shall be excluded, except for persons authorized by applicable federal or state license to carry such weapons.
- Aircraft preflight inspection shall be performed to determine if clandestine explosive or incendiary devices have been secreted on board the aircraft. Such inspections shall be performed as part of the Research Aircraft Preflight Security Checklist (see Section 3 and Appendix A, Page A.12).
- The Corporate Aircraft Preflight Security Checklist must be completed for each applicable package.

## **4.7 Accident Notification Procedures and Responsibilities**

For detailed information on the notification/reporting of aircraft incidents, accidents, or off-normal events; overdue aircraft; and the preservation of aircraft wreckage, mail, cargo, and records, refer to Appendix E.

## **4.8 Incident, Accident, or Off-Normal Event On-Scene Procedures**

### **4.8.1 Crew Member Responsibilities**

In the event of an incident, accident, or off-normal event involving an aircraft operated by an aviation staff member, the Senior Crew Member not incapacitated will coordinate the following procedures:

- If fire or explosion is imminent, remove all passengers to a safe distance.

- Request medical assistance and initiate first aid as necessary. Arrange for medical examination of all passengers whether injured or not and secure a doctor's report on each one.
- Secure the scene to allow accurate documentation of conditions associated with the event and an investigative team to observe those conditions.
- Call the PNNL Emergency Number (509-375-2400) and notify the proper agencies and personnel as listed in the Emergency Notification Chart (Appendix A, Page A.27).

All accidents involving Hanford-associated aircraft shall be reported promptly to the PNNL ASPOC, DOE-RL Manager/Aviation Manager/ASO, the HQ Senior Aviation Management Official, the NTSB, and the FAA, as required. Refer to Appendix D for names and telephone numbers.

Make no statements regarding the accident to anyone other than the FAA, the NTSB, the local police, and the Federal Bureau of Investigation (FBI).

If requested by an authorized representative of the FAA, NTSB, airport police, or other state or local police to issue a statement, crew members are not required to say anything that might tend to incriminate themselves. They also are entitled to legal counsel. All crew members have these rights whether or not the person asking for the statement advises of them. If any crew members choose to assert their rights, they must affirmatively state them or it may be considered as having been waived.

Crew members should attempt to satisfy such requests by referring the requesting party to the Director of Flight Operations/Chief Pilot or PNNL Media Relations. Information for the general public, press, radio, TV, and company employees concerning accidents, emergencies, or bomb hoaxes is developed and released only by PNNL Media Relations.

After surveying the wreckage to determine and record factors that may have contributed to the cause, crew members should complete the Aviation Safety Incident/Accident or Off-Normal Event Operations Checklist (Appendix A, Page A.26), making sure not to enter, touch, or disturb the aircraft, its controls, or parts.

Crew members may assist uninjured persons, after a doctor's examination, toward their destination, as necessary.

#### **4.8.2 Emergency First Aid**

First aid kits and survival equipment (as required) will be readily available for emergency uses, and each person on board must be briefed on its location and use. Unless it is equipped with required emergency materials, no person may operate a PNNL aircraft having a passenger seating configuration with more than 19 people (excluding any pilot seat). Once approved for use, a first aid kit that meets the following requirements for treatment of injuries likely to occur in flight or in a minor accident must be available:

1. The kit must be dust- and moisture-proof and contain only materials that either meet the Federal Specifications GGK-319a, as revised, or approved by the FAA Administrator.
2. The kit must be readily available to the cabin flight crew members.

3. Gloves may be placed in the first aid kit or in a location readily accessible to crew members.
4. The contents of the kit must be checked prior to each deployment.
5. Unless otherwise indicated, the kit must contain the specific items and quantities showcased on Table 4.1.

**Table 4.1.** Emergency First Aid Kit Minimum Requirements

Contents	Quantity
Adhesive bandage compressors, 1 in.	16
Antiseptic swabs	20
Ammonia inhalants	10
Bandage compressors, 4 in.	8
Triangular bandage compressors, 40 in.	5
Arm splint, non-inflatable	1
Leg splint, non-inflatable	1
Roller bandage, 4 in.	4
Adhesive tape, 1-in. standard roll	2
Bandage scissors	1
Pair of protective latex gloves or equivalent	1

### 4.8.3 Incident/Accident or Off-Normal Event Operations Checklist

This checklist is found in Appendix A, Page A.26.

## 4.9 Medical Emergencies

### 4.9.1 General

Medical aid shall be secured immediately for all injured persons. As soon as possible, notify the PNNL Emergency Number (509-375-2400) and, in the event of fatalities, also notify the coroner. Notification of relatives should be handled through PNNL Media Relations.

Physicians examining injured persons should be requested to submit a medical report covering each person.

The full names and addresses of each injured person should be obtained, as well as the names and addresses of the owners of damaged property.

## **4.9.2 Injury or Illness**

The PIC should quickly obtain a complete and detailed illness or injury report from the flight crew. After examining the person for injury or illness, the PIC should decide whether the seriousness of the person's condition warrants the quickest possible medical attention. If a physician is on board the plane, request his/her advice as to the necessity of securing immediate additional medical attention. If the decision is made to land, the PIC shall divert to the nearest suitable airport consistent with safe conduct of the flight, including return to point of origin, and announce the decision to land and radio a request that an emergency medical response team meet the aircraft.

Note: The PIC should use his/her judgment as to whether an ambulance and/or physician should be summoned. With doctors in short supply and the possibility of critical time being lost waiting for a doctor to arrive, the best possible medical service might be obtained by calling only for the ambulance service.

## **4.9.3 Loss of Consciousness or Death in Flight**

When a person loses consciousness or breathing or heart action appears weak or stopped and administering ammonia, oxygen, defibrillator, or other measures fails to bring about improvement, it is the PNNL flight crew's responsibility to land the aircraft at a suitable airport and place the person in the care of a physician as quickly as possible. Request, through control tower or other agency, for public authorities (police, airport officials, coroner, and another doctor) to come to the airport, as a person on board has a life threatening condition or appears to be dead.

## **4.9.4 Radioactive Materials Involvement**

In incidents involving aircraft transporting radiological materials and there is a fire, fight the fire from upwind, keeping out of any smoke, fumes, or dust arising from the accident. Until it has been released by monitoring personnel, do not handle any suspected material. Segregate clothing and tools used at the fire until radiological teams have checked them.

With as little contact as possible, remove injured persons from the accident area. Take any measures necessary to save life, but perform only essential first aid and surgical procedures until help is obtained from physicians familiar with radiation medicine. Segregate and detain those who have had possible contact with radioactive material until they can be examined further.

Do not eat, drink, or smoke in the area. Do not ingest food or drinking water that may have been in contact with material from the accident.

## **4.10 Aircraft Emergencies**

Aircraft emergencies can be generally classified as either of two options:

- **Planned**—PIC has sufficient time to tell the crew of the nature of the emergency and what they should do.
- **Unplanned**—These events happen unexpectedly, often during taxi, takeoff, or landing, giving the PIC no time to coordinate a course of action with the crew. About 80 percent of emergency landings are unplanned.

Emergency procedures described in this manual were included only after repeated testing and thorough investigation. They represent the best known available facts about the subject. Pilots should follow these procedures as long as they fit the emergency. However, if they are, at any time, inadequate or not applicable, the PIC's best judgment should prevail. Only the flight crew operating the aircraft at the time the emergency occurs can evaluate the situation sufficiently to make the proper decision. Crew members should assume the worst in abnormal situations and emergencies and act accordingly. The procedures are essentially the same as those contained in the FAA-approved aircraft flight manual.

Although not all emergencies or malfunctions can be addressed, generally the PIC will make all landings whenever any problem with the aircraft arises unless, in his/her judgment, it would be safer for the First Officer to land the aircraft.

All crew members should be thoroughly familiar with emergency procedures and the location and use of emergency equipment. Any flight crew member should be equipped to handle the emergency duties of any other crew member.

All crew members must realize the PIC is completely in charge of the aircraft, and his/her orders, although they may be in variance with written instructions, are to be obeyed. Any potential or actual emergency situation should be immediately called to the PIC's attention. Only the PIC shall initiate emergency procedures, such as engine shutdown or fire extinguisher discharge. If the PIC is absent from the cockpit, the First Officer is in command.

Emergency checklists are used in the same challenge-and-response method as the normal checklists with one additional step: the pilot reading the checklist should read aloud *both* the challenge and response. This way, there will be no doubt as to the correct course of action flight crew members must take. The pilot responding has the same responsibility for checking or accomplishing the item and responding to the challenge, as if it were not being read aloud.

The PIC is to call out all memory items for completion by the First Officer.

Prior to complying with emergency procedures, engine identification is accomplished by the Pilot Flying the aircraft and confirmed by the PNF.

For obvious reasons, fires are in the category of most urgent emergency and require immediate action in the earliest stages for proper control. Any warning of fire must be treated as an actual fire and fire-fighting procedures initiated. Procedures may be terminated, only if it can be definitely determined that no fire exists.

#### **4.10.1 Engine Failure**

In the event of an engine failure, the aircraft will be landed at the nearest practical airport in point of time, and crash/fire-fighting equipment will be requested (see the Emergency Notification Chart in Appendix A, Page A.27).

When an engine fails on an over-water flight and the aircraft is more than 100 miles from point of departure, destination, or other suitable landing area, the PIC should immediately notify ATC in the routine manner. ATC will then be responsible for alerting Search and Rescue.

## 4.10.2 Emergency Landings—Crew Duties

### 4.10.2.1 Captain/PIC Duties

The PIC must first determine the extent of the emergency. Next, he or she must notify the ground station about the emergency. The PIC must also advise the Flight Deck Crew and issue necessary orders.

Other tasks regarding an emergency landing include:

- Warning passengers just prior to landing with public address system or other prearranged signal
- Position all switches and controls, as appropriate, just prior to touch down.

If possible, avoid landing until a) emergency equipment and crews are standing by, b) passengers are instructed in evacuation procedures, and c) aircraft emergency exits are ready for use.

### 4.10.2.2 First Officer Duties

The major duties of the First Officer during an emergency landing are to:

- Perform initial duties as directed by the PIC.
- Depressurize aircraft when directed.
- Secure all loose equipment in the cockpit.
- Help prepare passengers, emergency exits, and equipment, if possible.
- Actuate all switches and controls, as appropriate, just prior to touchdown.
- Give passengers instructions on (able-buddy system):
  - How to open exits
  - Who goes out first, second, third, and so forth
  - Assisting injured passengers
  - Securing main cabin door curtain OPEN.
- Make sure all passengers know how to unfasten their seat belts and provide the following instructions:
  - In front-facing seats, put their heads in their laps and firmly hold their arms under their knees just before touch down.
  - In rear-facing seats, clasp their hands firmly behind their heads and lean back in the seat just before touch down.
  - If it is a wheels-up landing, two impacts will occur. The second one is more severe.
  - Remain seated in brace position until the aircraft stops all movement.
  - Give passengers blankets, pillows, and coats for impact protection (if available).
  - Instruct passengers to assume their proper brace position upon a prearranged signal.

#### **4.10.2.3 Emergency Ground Equipment Request**

If the PIC wishes emergency equipment alerted for a landing, he/she will normally request this through ATC or the control tower at the airport of intended landing.

Before making a landing when emergency equipment has been requested, the PIC will provide the following information to the ATC, tower, or approach control:

- Description of problem
- Whether the landing will be long, short, or normal
- Number of passengers on board
- Handicapped passengers and their locations on the aircraft
- Type of cargo (if unusual)
- Amount of fuel on board (in minutes).

When an emergency condition is reported to any FAA facility, the emergency equipment at the airport will be standing by. If there is the slightest doubt that the gear is not fully locked down, a hydraulic failure or engine malfunction exists, or any condition exists that might make the landing anything but normal, the PIC should not hesitate to request that the tower have emergency vehicles standing by.

#### **4.10.3 Emergency Passenger Evacuation Procedures—Crew**

Availability of various exits will differ from one situation to another. Crew members on the scene must make the decision as to which exit would be most preferable to use under the prevailing circumstances.

Bearing in mind that not all situations can be described, the following basic procedures best accommodate most incidents requiring the aircraft evacuation. In Stage 1, securing the aircraft and initiating the evacuation, the Pilot Flying proceeds by:

1. Stopping the aircraft
2. Making the public address announcement
3. Securing cockpit and engines as appropriate.

In this stage, the First Officer is responsible for calling for assistance over the radio and opening the main door.

During Stage 2, the First Officer, after opening forward door, will proceed to mid-cabin to assist in passenger evacuation. The PIC also will assist in passenger evacuation. After the cockpit is secure and prior to exiting the aircraft, he/she will proceed to mid-cabin for a final check to see that everyone is out.

After evacuation, the PIC is responsible for determining all crew and passengers are accounted for.

#### 4.10.4 Ditching

Ditching, a landing in water, can be divided into two categories: planned (time available for preparation) and unplanned (unexpected crash into water). Exact procedures and crew duties, as well as explanations, are outlined in the Aircraft Flight Operations Manual. These procedures and duties should be followed to the extent possible.

The following is a general guide for flight crew duties in a planned ditching:

- *Communicate*—International distress frequencies are: 500 kHz, 2182 kHz, 8364 kHz, and 121.5MHz.
- *Set transponder to Code 7700*—Note: you may not be in radar contact.
- *Determine options*—Communicate intentions and position to ATC and any nearby vessels.
- *Plan water landing*—Evaluate sea and wind conditions and determine best ditching heading.

Prepare cabin and passengers by accomplishing the following tasks:

- Brief the flight crew
- Stow and secure loose items
- Locate rafts and survival equipment
- Turn lights up to maximum intensity
- Brief passengers
- Pass out life vests.

Prepare flight crew and the Flight Deck Crew by

- Securing cockpit items
- Donning life vest and/or crab suit
- Securing seat belt and shoulder harness
- Securing flashlight nearby
- Turning on emergency exit lights
- Discussing duties and exit routes with crew.

These also should be included in preparing the aircraft for ditching:

- Dump fuel, if possible
- Depressurize below 10,000 ft
- Set heading bug to ditch heading
- Turn on all lights
- Silence gear warning system
- Make final position check
- Communicate new position and intentions again.

The PIC ditching procedure is as follows:

- Set flaps to recommended setting
- Hold minimum speed for wind conditions
- Touch down slightly tail low
- Maintain control as long as possible
- Secure flight deck and start evacuation.

The evacuation process entails:

- Each crew member will carry out planned duties
- Assure all crew members can evacuate
- Do not open any exits below water level
- Account for all passengers and crew.

In the event of an unplanned ditching, all crew members will assist in the evacuation procedures to the extent possible. Life vests should be handed out and every attempt made to position rafts and survival equipment for use. Do not attempt to open any exits below the water level.

#### **4.10.5 Aircraft Decompression**

Aircraft decompression can be divided into three categories: 1) slow decompression, 2) rapid decompression, and 3) explosive decompression.

Exact procedures and crew duties, as well as explanations for each category, are outlined in the Aircraft Flight Operations Manual. These procedures and duties should be followed to the extent possible.

Slow decompression normally provides adequate time to cope with the problem and the resulting situation. Rapid or explosive decompression may require immediate action on the part of the PIC and Flight Deck Crew. The following list is presented as a general guide to this immediate action:

- Don oxygen mask and user oxygen.
- Initiate emergency descent.
- Establish cockpit communications.
- Contact ATC to advise of situation.
- Assure passenger oxygen is turned on.
- Make public address announcement to use oxygen masks, fasten seat belts, and no smoking.
- Level off aircraft at completion of descent.
- Assist any passengers with decompression problems.

#### **4.10.6 Static Discharge on Aircraft**

When an aircraft is subjected to static discharge, immediately check the airplane for any visible or functional indication of damage. If evidence of damage makes the airplane's airworthiness suspect and the Captain/PIC deems it advisable, land at the nearest suitable airport.

If no damage to the airplane is apparent in flight and the PIC deems no hazard is involved, continue to the next scheduled stop and check:

- Magnetic compass for accuracy—check against other cockpit indicators with gear up and gear down (nose gear magnetism cannot be readily detected by ground crews).
- Communication and navigation equipment—check for normal operation.
- Electrical instruments—monitor for erratic or sluggish operation.

Enter all available information in the aircraft logbook and, upon landing at the next scheduled stop, notify the Director of Maintenance of detailed information that may have a bearing on possible damage.

#### **4.10.7 Special Precautions in Research Flying**

When a PNNL pilot encounters a meteorological condition or any irregularity in a ground or navigational facility that may affect the safety of other flights, the pilot will provide a report to the appropriate ground stations as soon as practical.

When research test functions are in progress and the pilot is required to concentrate on aircraft placement or has other additional duties, a second pilot or competent observer shall be in the cockpit to look for other aircraft or obstructions to flight. Maximum cockpit vigilance is especially important when maneuvering at low altitude.

The cabin seat belt sign will be lit whenever the aircraft is in motion on the ground, the aircraft takes off or lands, and/or the pilot suspects turbulent air conditions. Crew members will have their seat belts fastened at all times except when moving from one station to another. When cabin signs are not operational, the pilot will confirm that passengers and crew know when they should have their seat belts fastened.

Without the PIC's permission, passengers and crew members will not operate electronic devices (such as radios, computers, or scientific apparatus). Unless the PIC has determined the devices will not cause interference with the communication or navigation systems of the aircraft, these devices are never operated in IFR conditions.

Due to the nature of research flying, single-pilot IFR operations generally are not recommended. However, instances may occur during single-pilot operations where it is safer or more practical to operate under IFR. The decision whether to operate under VFR or IFR (the FAR notwithstanding) is left to the discretion of the PIC. Single-pilot IFR operations during cross-country or non-research flights are permissible.

#### **4.10.8 Other Precautionary Measures**

When mechanical failure, such as gear or flap, occurs that may require alerting ground fire protection equipment, the PIC shall follow the same procedure as outlined in Section 4.10.2, giving the reason for the request.

### **4.11 Hijacking, Sabotage, or Bomb Threat**

In the event of hijacking, hostage, or bomb threat, the following philosophy will serve as a guide:

- An offender of this sort shall be considered dangerous, desperate, or unbalanced.
- The safety of the passengers shall be paramount.
- A calm attitude, coupled with good judgment, will do much toward calming the situation and attaining a safe outcome.
- If a landing site is considered unsafe, too short, or not surfaced, explain the facts to the hijacker.
- The aircraft shall be considered expendable, but every effort shall be made to safeguard the passengers and crew.

#### **4.11.1 Hijacking**

In the event of a hijacking on a PNNL aircraft, the following procedures should be executed to the extent possible.

No special effort should be made to notify the Laboratory directly when such action would antagonize the hijacker(s) or jeopardize flight safety. Normally, if the hijacking starts in airspace controlled in the United States or its agencies, information to the Laboratory will be provided by the appropriate ATC

facility as a result of normal ATC communications, which will include response to the hijacking Code 7500 or the emergency code 7700.

#### **4.11.1.1 Voice Communications**

Should voice communications be permissible, the following procedures should be established:

- If both pilots were already on headsets, attempt to establish a discrete communications system. Do not antagonize or alert the hijacker by donning headsets in his presence.
- Assure the PIC's speaker is off.
- Turn the #2 receiver to Corporate or Aeronautical Radio, Inc. (ARINC) for domestic operation and to 121.5 for overseas operation.
- The First Officer is to monitor the #1 receiver for ATC with use of headphones at their discretion. To maintain the impression for the hijacker(s) that he/she is in receipt of all radio communications, the First Officer's speakers must be on at all times, when available. Here, the intent is to allow the PIC to receive messages unmonitored by the hijacker(s).

Note: If verbal communications are possible, follow the outline under subsection 4.11.1.4.

#### **4.11.1.2 Pilot/Controller/Transponder Code/Set Up**

Pilot Message: "I AM BEING HIJACKED."

Pilot Signal: Set transponder to Code 7500. When unable to change the transponder setting or when not under radar control, transmit a radio message which includes the phrase, "(AIRCRAFT CALL SIGN) TRANSPONDER SEVEN FIVE ZERO ZERO."

Controller Signal: Acknowledge receipt of Beacon Code 7500 by transmitting "(AIRCRAFT CALL SIGN) (NAME OF FACILITY) YOU ARE SQUAWKING 7500. IS THIS INTENTIONAL?" An affirmative reply from the pilot indicates confirmation, and proper authorities will be notified. When an in-the-clear radio transmission of a hijacking is received, controllers shall assign Code 7500 to the aircraft. This announcement does not preclude a subsequent change to Code 7700 by the pilot, if necessary.

Pilot Message: "SITUATION APPEARS DESPERATE. WANT ARMED INTERVENTION."

Pilot Signal: After using Code 7500, change the transponder to Code 7700. When unable to change the transponder setting or when not under radar control, transmit "(AIRCRAFT CALL SIGN) TRANSPONDER SEVEN SEVEN ZERO ZERO." Pilots who change from Code 7500 to Code 7700 should remain on 7500 for at least 3 minutes or until a confirmation of Code 7500 has been received from the Controller, whichever is sooner, before changing to Code 7700.

Controller Signal: Acknowledge receipt of Code 7700 by transmitting, "(AIRCRAFT CALL SIGN) (NAME OF FACILITY) NOW READING YOU ON TRANSPONDER SEVEN SEVEN ZERO ZERO."

An aircraft squawking Code 7700 and not in radio contact with the ground will be considered by ATC to have an in-flight emergency (in addition to hijacking), and the appropriate emergency procedures designated shall be followed. In these cases, notification of concerned authorities shall indicate the aircraft displayed Code 7500 as well as Code 7700.

#### **4.11.1.3 Pilot/Controller/Use of Flaps**

Pilot Message: “SITUATION STILL DESPERATE, WANT ARMED INTERVENTION AND AIRCRAFT IMMOBILIZED.”

Pilot Signal: Leave full flaps down while landing or lower full flaps after on the ground.

Pilot Message: “LEAVE ALONE. DO NOT INTERVENE.”

Pilot Signal: Retract flaps after landing.

Note: Unless the situation changes again, the pilot who retracts flaps after squawking Code 7700 should return to Code 7500 for the next leg of the scheduled flight. The pilot may transmit “(AIRCRAFT CALL SIGN) BACK ON SEVEN FIVE ZERO ZERO” to emphasize the fact that intervention is no longer desired.

#### **4.11.1.4 Hijacking in Foreign Airspace**

**By Transponder**—In the event the PIC decides not to report the hijacking or diversion verbally and he/she is in an area where transponder decoding equipment may be available, use transponder Code 7500, which means hijacking. ATC facilities receiving this code will not question the pilot, but they will immediately be responsive to his/her requests. Switching from Code 7500 to Code 7700 will indicate the “situation appears desperate, need all possible assistance.” This message will be interpreted to mean that intervention from armed ground personnel or other appropriate emergency action is desired.

**Verbal Communication**—Should verbal communication be possible, the following procedures and information should be transmitted:

- If circumstances permit, Distress or Urgency Radiotelephone procedures apply.
- If conditions do not permit use of prescribed Distress or Urgency procedures, the message sent by the aircraft should be on the air/ground frequency in use at the time. It also should consist of as many as possible of the following elements spoken distinctly and, if possible, in the following order:
  - Name of station addressed (time and circumstances permitting)
  - Identification of the aircraft
  - Nature of the special emergency condition (circumstances permitting).
- If unable to describe the nature of the special emergency condition, use, if possible, code words for the indicated meaning as follows:
- Spoken: “TRANSPONDER SEVEN FIVE ZERO ZERO” (transponder beacon Code 7500 should be activated).

- Meaning: “I have been forced to divert to new destination. No immediate assistance required.”
- Spoken: “TRANSPONDER SEVEN SEVEN ZERO ZERO” (transponder beacon Code 7700 should be activated).
- Meaning: “I am under extremely serious threatening constraint and require maximum assistance.”
- Indicate the intention of the PIC (circumstances permitting).
- Present position, level (flight level or altitude, as appropriate) and heading (circumstances permitting).
- Any other possibly useful information.

#### 4.11.1.5 Special Procedures

Recommended procedures for PNNL aircraft hijacked to the People’s Republic of China, Vietnam, and North Korea follow.

If it is possible to do so without jeopardizing the safety of the flight, the pilot of a PNNL aircraft, after departing from the cleared route over which the aircraft was operating, will attempt one or more of the following actions, insofar as circumstances may permit:

- Maintain a true airspeed of no more than 400 knots, and preferably an altitude of between 10,000 and 25,000 ft.
- Fly a course toward the destination the hijacker has announced.
- Transmit the international distress signal, MAYDAY, on any of the international distress frequencies available (121.5 MHz or 2182 kHz).

If these procedures result in either radio contact or air intercept, the pilot will attempt to comply with any instructions received that may direct him to an appropriate landing field. Additionally, if the aircraft is equipped with an operational transponder, the pilot may use transponder Code 7500 to indicate his aircraft has been hijacked or Code 7700 to indicate his aircraft is in distress. (See preceding “Spoken” and “Meaning” lists.)

#### 4.11.2 Sabotage or Bomb Threat

Any aviation employee receiving a sabotage or bomb threat should use the Bomb Threat Checklist located near the phones and throughout the ground facility (see Appendix A, Page A.2). Also, see the Emergency Notification Chart (Appendix A, Page A.27).

When a sabotage or bomb threat is received, the Scheduler will immediately notify the flight crew involved. If the aircraft is in the air, the Scheduler will contact ATC and advise them of the location of the aircraft and the nature of the situation. If the aircraft is on the ground, contact will be made through the FBO or ground handler.

Upon receipt of a threat, aviation personnel will call authorities and will not search for a device. If a device is found, **do not** approach or touch it.

#### **4.11.2.1 Sabotage/Bomb Threat Received on Ground**

The following procedures reflect a policy of treating every threat as though it is real and viable. Use of these procedures is recommended, but the PIC's judgment shall be overriding in any specific instance.

If parked, the procedures are as follows:

- Notify the flight crew to evacuate passengers
- Notify ground control
- Maintain electrical power; shut down engines
- Assist in evacuation.

If taxiing, the procedures are as follows:

- Do not return to terminal
- Proceed to designated or nearest safe area for evacuation
- Follow applicable flight or operations manual evacuation procedures
- Notify tower of intentions and request them to keep vehicles away from doors/slides
- Notify the flight crew of evacuation plans; keep the flight crew advised of any change in evacuation plan
- Make an announcement such as:

*We have received a message that a sabotage threat has been made against one of our aircraft. We intend to take all possible precautions. Therefore, we are parking the aircraft and asking everyone to get off promptly. Do not take any personal belongings. Follow the flight crew's instructions.*

- Evacuate down the stairs. If no stairs, plan an evacuation using doors. Use window exits only if necessary.

#### **4.11.2.2 Bomb Threat Received in Flight**

For a bomb threat received in flight, the flight crew should prepare for landing at the nearest suitable airport. When possible, advise ATC of estimated time of arrival and adhere to the following steps:

1. Declare emergency—Transponder Code 7700. Request emergency equipment to standby at intended airport.
2. Request ATC notify FBI/local law authorities at intended airport.
3. Notify ATC about a “bomb on board.” Request ATC to contact FAA bomb expert.
4. Move passengers away from the bomb to a minimum hazard area.
5. Coordinate with FAA bomb expert. Follow his/her instructions on neutralizing the bomb.
6. Notify PNNL Flight Operations (if possible).
7. Turn No Smoking and Seat Belt signs on.

8. Decrease airspeed to lessen stresses on aircraft.
9. Lower landing gear to reduce the possibility of damage.
10. Cabin Pressure Altitude—Maintain at existing cabin altitude, which minimizes the possibility of detonating an altitude-sensitive device.
11. Descend to the same altitude as the cabin. Maintain cabin altitude while decreasing aircraft altitude to establish a zero differential. This process will minimize blast effect.
12. Make an announcement to the effect (follows):

*We have discovered an explosive device on board and are taking all possible precautions. We will be landing at \_\_\_\_\_ airport in approximately \_\_\_\_\_ minutes. After landing, we will evacuate the aircraft. Listen carefully to the flight crew's instructions.*

13. Have the flight crew brief passengers on planned emergency landing.
14. About 250 feet, announce: "Assume the braced position."
15. After landing, proceed to designated or nearest safe area for evacuation.

#### **4.11.2.3 Bomb Threat Procedure Closeout**

Prior to conducting any further flights, qualified personnel must search and clear the aircraft, and PNNL Flight Operations must be notified of the finding.

Information requested by anyone other than the authorities immediately concerned must be cleared through the Director of Flight Operations or Chief Pilot.

## **4.12 Training Operations: Flight Crew and Maintenance Technicians**

Initial and recurrent training for all aviation personnel is an essential element. Safety and efficiency depend on the proper training of all personnel.

Pilots will attend approved refresher training annually. This training will incorporate both simulator and academic training. Where possible, the PIC will simultaneously receive an FAA PIC proficiency check, as necessary. If possible, PNNL pilots will train together to fully develop their Cockpit Resource Management (CRM) skills. Prior to flying in PNNL aircraft, new-hire pilots will receive First Officer initial training.

### **4.12.1 Flight Crew Training**

All aviation personnel will receive the following training every 2 years:

- First aid, including cardiopulmonary resuscitation (CPR) and blood-borne pathogens
- Fire fighting
- Aircraft emergency evacuation techniques.

#### **4.12.1.1 Documentation of Training**

The Chief Pilot and the Director of Maintenance will maintain complete training records for all of their assigned personnel. The Director of Flight Operations will keep the training records for all other personnel.

#### **4.12.1.2 Pilot Initial Training**

The initial training of pilots will be:

- Accomplished prior to assignment as crew member
- Conducted in accordance with FAR 61 standards; a typical syllabus includes aircraft systems, performance, simulator training, or flight training
- Conducted by either Simuflite International or FlightSafety International (FSI).

#### **4.12.1.3 Pilot Recurrent Training**

Recurrent training for pilots will be addressed as follows:

- Accomplished at Simuflite International or FSI as directed by the Director of Flight Operations at 6-month intervals, optimally. However, because of scheduling requirements, refresher training may, at times, be at intervals exceeding 6 months. Under no circumstances will intervals between refresher training exceed 12 months for any pilot.
- Conducted in the simulator, including proficiency checks, by an approved facility according to FAR Part 61 standards and monitored by the Chief Pilot.
- Required to satisfactorily complete the FAR 61 24-month proficiency check in each type aircraft he/she is assigned every 12 months (Captains and Type-Rated First Officers only).
- Required to complete the FAR 61.55 pilot proficiency check from the right seat in each aircraft he/she is assigned every 12 months (Non-Rated First Officers only).
- Provided by the Chief Pilot on an ongoing basis.

### **4.12.2 Maintenance Technician Training**

#### **4.12.2.1 Initial Training**

Aviation Maintenance Technicians shall possess a current FAA A&P certificate and have a minimum 2 years of practical experience working on aircraft, power plants, or accessories. In addition, each technician shall have a minimum 1 year of experience working on turbine-powered aircraft or turbine engines.

Within 6 months of the date of hire, technicians will receive airframe and engine initial training in assigned aircraft from an approved training organization.

#### **4.12.2.2 Recurrent Training**

Technicians assigned to work on PNNL aircraft will receive recurrent training in each assigned aircraft once every 2 years. Manufacturer and vendor workshops will be attended on an as-needed basis as determined by the Director of Maintenance.

### **4.13 Maintenance Operations**

#### **4.13.1 Inspection/Maintenance Program [FAR 91.409f(3)]**

PNNL aircraft shall be maintained in accordance with the FAA-approved manufacturer's recommended maintenance inspection program.

#### **4.13.2 Maintenance and Inspection Documentation**

##### **4.13.2.1 Applicable FAR**

Maintenance, inspection, modification, or any other work performed on PNNL aircraft always will be performed in strict accordance with applicable FAR. In the interest of safety, continuous airworthiness inspections will be performed in compliance with the appropriate FAR and PNNL inspection program(s).

##### **4.13.2.2 Reporting and Recording of Mechanical Irregularities [FAR 135.23(f)]**

Whenever a pilot detects a mechanical irregularity before a flight, the pilot will not allow the aircraft to take off until the Director of Maintenance (or designee) is contacted and a determination made as to the safety of flight with the inoperative piece of equipment. Whenever a pilot detects a mechanical irregularity during or after flight, he or she will record the pertinent information on the PNNL Aircraft Discrepancies Form (see Appendix A, Page A.18). Whether or not the Director of Maintenance was notified previously, all mechanical irregularities discovered during a flight will be brought to the Director of Maintenance's attention after the flight.

##### **4.13.2.3 Previously Deferred and Corrected Mechanical Irregularities [FAR 135.23(g)]**

As part of preflight duties, the assigned PIC will review the previous PNNL Aircraft Discrepancies report in the aircraft to determine whether any write-ups have been deferred or corrected. If the PIC finds a mechanical irregularity that has not been either corrected or properly deferred, the pilot will not take off. Instead, the pilot will contact the Director of Maintenance or, in his/her absence, the Director of Flight Operations for instructions.

##### **4.13.2.4 Obtaining Maintenance Away from Home Base [FAR 135.23(h)]**

If an aircraft sustains structural damage, malfunctions, or defects that affect the aircraft's airworthiness while away from the main base of operation, the designated PIC will contact the Director of

Maintenance or, in his/her absence, the Director of Flight Operations as soon as possible to inform him/her of the problem and obtain whatever help is required. Each pilot will carry a telephone list of current flight operations personnel provided by the Chief Pilot. If the maintenance work needed involves instruments, avionics, or other aircraft equipment that is not required for continuation of a flight (except under special conditions such as IFR, VFR, over-the-top, or night flying), the flight may proceed under VFR day conditions only. In this case, the faulty equipment must be isolated from the other systems to avoid becoming a hazard to the aircraft or occupants. If an appropriately rated, FAA-approved repair station is available at the research site or at an en route waypoint, the PIC may be instructed to get time and cost estimates for repair. These estimates will be considered in deciding whether to contract the repair work or return to the operations base for repairs. The primary deciding factor is related to the type of malfunction and repair requirement. Should the decision be to contract the work, the PIC will determine whether or not the mechanic or repair station is properly certified and competent to perform the required repairs. The PIC will use discretion in selecting the most qualified and competent maintenance facility available to do the work.

#### **4.13.2.5 Logbook Entries**

After maintenance work is completed, the PIC will review the logbook. The PIC is responsible for checking the recorded entry to determine the mechanic has provided a description of the work, the date and place where the work was done, and that a signature and certificate number were obtained from the person who did the work.

Any maintenance work performed by anyone other than PNNL contract maintenance personnel will be inspected by qualified personnel as soon as the aircraft returns to its base of operations.

#### **4.13.2.6 Vendor Selection**

Approval Process—The PIC may authorize maintenance while attempting to contact the approval authority.

Major Work—RFPs

- The Director of Maintenance, in association with the Director of Flight Operations and the Contracts Specialist, shall solicit proposals from qualified vendors.
- Vendors shall be approved FAA repair stations, factory-trained technicians, or factory-authorized service centers.

Evaluation of Proposals—The Director of Maintenance, in association with the Director of Flight Operations and the Contracts Specialist, will evaluate all proposals to make the vendor selection.

## 4.13.3 Mechanical Irregularities

### 4.13.3.1 Defects Reported from Previous Flight

It is the PIC's responsibility to check the discrepancy sheet prior to each flight departing from the flight operations base.

In addition to systems and components listed in the Limitations Section of the Aircraft Flight Operations Manual and those components/items required by FAR, the G-1 standard MEL is the guide that PNNL aviation personnel use to determine airworthiness of PNNL aircraft. The G-1 standard MEL is located in the aircraft.

### 4.13.3.2 Defects Detected During Current Operations

Any malfunction, failure, or discrepancy is to be recorded by the flight crew on the PNNL Aircraft Discrepancies Form located at Flight Operations (Appendix A, Page A.18). The PIC shall initial these discrepancies in the "Noted By" column on the sheet.

Maintenance problems that may affect the continuation of the trip should be coordinated with the Scheduler and Director of Maintenance.

## 4.13.4 Aircraft Maintenance Records

PNNL currently operates a G-1 multi-engine aircraft. PNNL has an FAA-approved, Gulfstream-computerized Maintenance and Inspection Program in accordance with FAR 91.409(f)(3). This current inspection program is the one recommended by the manufacturer.

All maintenance performed will meet or exceed the requirements of FAR Part 91 and, with few exceptions, will comply with the more stringent requirements of FAR Parts 121 and 135 for air-carrier aircraft. This maintenance philosophy is based on sound operating practices, experience, and the safety requirements defined by PNNL Flight Operations.

**Responsibility**—It shall be the Director of Maintenance's responsibility to determine all aircraft log entries are accurate and current.

**Record Entries**—It shall be the responsibility of the FAA repair station, factory-trained technician, or factory-authorized service center, as appropriate, to record all log entries as required by the FAA, aircraft manufacturer, or PNNL company policy.

**Computerized Tracking System**—To assist the Director of Maintenance in tracking aircraft maintenance status, a CAMP will be maintained on each PNNL aircraft.

#### **4.13.5 Aircraft Maintenance Materials**

**Ordering**—When ordered from home base, the Director of Maintenance or his designee (maintenance technician) will work with the PNNL contracts specialist to locate, coordinate, and order all maintenance materials.

**Receiving**—Upon arrival at home base, the Director of Maintenance shall check the condition and quantity of all maintenance materials.

**Inspection**—Upon arrival at home base, the Director of Maintenance will inspect and accept all maintenance materials.

**Inventory Control**—To assure timely usage of parts supplies, all maintenance materials rotate on a first-in, first-out basis.

#### **4.13.6 Maintenance Test Flights**

Certain maintenance actions are considered critical enough to warrant a test flight prior to carrying passengers. The PNNL Chief Pilot will specifically authorize these flights, which will be conducted during VFR weather conditions, preferably during daylight hours. Only necessary and authorized personnel will be carried on any test flight.

### **4.14 Appearance and Conduct**

All full-time PNNL flight crew shall forego all outside interests or work that would interfere with availability for flight assignments or be in conflict with PNNL's best interests. All flight crew members shall maintain a neat, well-groomed appearance while on duty. Uniforms are not required. However, if equipment is to be removed or installed, crew members will wear appropriate safety equipment.

Laxity in the cockpit, inattention to duty in any manner, or other unprofessional conduct cannot be tolerated. In the interest of safety and efficient operation, pilots must observe proper cockpit vigilance and discipline at all times.

Flight crew members should remember they are representatives not only of PNNL and DOE, but also of sponsors and the aviation community. Accordingly, crew members should display the highest degree of professional conduct at all times. They shall rate high in personal habits, character, and deportment.

### **4.15 Punctuality**

Domestic duty time for the flight crew is understood to commence at least 1 hour prior to scheduled takeoff and terminate 30 minutes after final shutdown.

International duty time is defined as commencing 1-1/2 hours prior to scheduled takeoff and terminating 30 minutes after final shutdown for flights that originate or terminate outside the continental United States or Canada.

## 4.16 Aircraft Modifications

PNNL aircraft are extensively modified to accommodate scientific measurement and research equipment. To retain a current airworthiness certificate (whether standard, restricted, or experimental) on this aircraft, all modifications are made in compliance with 14 CFR Parts 21 and 43.

Part 43 of FAA Form 337 covers major repair and alteration modifications (i.e., antennas, internal non-frame changes, air samplers, camera windows) that can be approved by a local FAA field office. Sign-off for these modifications can be performed by an A&P mechanic who holds an FAA Inspection Authorization (IA) certificate.

Part 21.113, Supplemental Type Certificate (STC), covers major changes that affect the airframe requiring aeronautical engineering design and FAA regional office approval. It also includes modifications and installations that may be performed by a licensed A&P mechanic. However, FAA-certified engineering consultants must approve the required designs, while the certified engineer and the FAA regional office perform the final inspection.

## 5.0 Training Curriculum

PNNL training for pilots and the Director of Maintenance, with one exception, is contracted to FSI. The exception is the ASPOC training that will be provided by DOE (described in Section 5.6). The following curriculum is an example of the PNNL and FSI basic introduction, emergency, aircraft-ground, and aircraft flight training.

### 5.1 Ground Training

This section includes:

- a. FAR Part 1—Definitions and Abbreviations
- b. FAR Part 61—Certification: Pilots and Flight Instructors
- c. FAR Part 91—General Operating and Flight Rules
  - Responsibility and authority of the PIC (FAR 91.3)
  - Fuel requirements for flight in IFR conditions (FAR 91.167)
  - VOR equipment check for IFR operations (FAR 91.117)
  - Powered civil aircraft with standard category U.S. airworthiness certificates, and instrument and equipment requirements (FAR 91.203 through 205)
  - Right-of-way rules (FAR 91.113)
  - Aircraft lights (FAR 91.209)
  - Compliance with ATC clearances and instruments (FAR 91.123)
  - Minimum safe altitudes, general (FAR 91.119)
  - Basic VFR weather minimums (FAR 91.155)
  - Special VFR weather minimums (FAR 91.157)
  - Takeoff and landing under IFR, general (FAR 91.175)
  - Minimum altitudes for IFR operations (FAR 91.177)
  - IFR radio communications (FAR 91.183)
  - Inspections (FAR 91.409)
  - Maintenance records (FAR 91.417)
- d. FAR Part 135—Air Taxi and Commercial Operations
  - Rules applicable to operations subject to this part (FAR 135.1 and 135.3)
  - Emergency operations (FAR 135.19)
  - Record-keeping requirements (FAR 135.63)
  - Reporting mechanical irregularities (FAR 135.65)

- Airworthiness check (FAR 135.71)
- Operating information required (FAR 135.83)
- Carriage of persons without compliance with the passenger-carrying provisions of FAR Part 135 (FAR 135.85)
- Pilot requirements: use of oxygen (FAR 135.89)
- Auto Pilot: minimum altitudes for use (FAR 135.93)
- SIC required in IFR conditions (FAR 135.101)
- Exception to SIC requirements: IFR operations (FAR 135.103)
- Exception to SIC requirement: approval for use of Auto Pilot system (FAR 135.105)
- Briefing of passengers before flight (FAR 135.117)
- Prohibition against carriage of weapons (FAR 135.119)
- Equipment requirements: general (FAR 135.149)
- Fire extinguisher: passenger-carrying aircraft (FAR 135.155)
- Oxygen equipment requirements (FAR 135.157)
- Equipment requirements: carrying passengers under VFR at night or under VFR over-the-top conditions (FAR 135.159)
- Radio and navigational equipment: carrying passengers under VFR at night or under VFR over-the-top (FAR 135.161)
- Equipment requirements: airplanes carrying passengers under IFR (FAR 135.163)
- Radio and navigational equipment: extended over water or IFR operations (FAR 135.165)
- Emergency equipment: extended over water operations (FAR 135.167)
- Shoulder harness installation at flight crew member stations (FAR 135.171)
- Inoperable instruments and equipment for multi-engine aircraft (FAR 135.179)
- Performance requirements: aircraft operated over-the-top or in IFR conditions (FAR 135.181)
- Empty weight and center of gravity: currency requirement (FAR 135.185)
- VFR: minimum altitudes (FAR 135.203)
- VFR: visibility requirements (FAR 135.205)
- VFR: fuel supply (FAR 135.209)
- VFR: over-the-top carrying passengers: operating limitations (FAR 135.211)
- Weather reports and forecasts (FAR 135.213)
- IFR: operating limitations (FAR 135.215)
- IFR: takeoff limitations (FAR 135.217)
- IFR: destination airport weather minimums (FAR 135.219)

- IFR: alternate airport weather minimums (FAR 135.221)
- IFR: alternate airport requirements (FAR 135.223)
- IFR: takeoff, approach, and landing minimums (FAR 135.225)
- Icing conditions: operating limitations (FAR 135.227)
- Airport requirements (FAR 135.229)
- Flight crew member requirements (FAR 135, Subpart E)
- Flight crew member flight and duty time limitations (FAR 135, Subpart F)
- Crew member testing requirements (FAR 135, Subpart G)
- Training (FAR 135, Subpart H).

## 5.2 Flight Training

Safe operations will be emphasized during the entire flight-training phase. Each maneuver and procedure shall be performed using good judgment, with safety in mind, and at a safe operations altitude. Flight training will include flight operations and maneuvers necessary to demonstrate the standards in practical skills and techniques set forth in FAR Part 61. In addition, flight training will address the appropriate related advisory circular for the pilot certificate held and for the category, class, and type of aircraft the pilot will operate. The pilot will be required to demonstrate competent performance by operating the aircraft in a manner that indicates obvious mastery of the aircraft with no doubt as to the successful outcome of each procedure.

- a. Aircraft Familiarization
  - Weight and balance and center of gravity
  - V speeds
  - Navigation and communications equipment
  - Research power system.
- b. Basic Piloting Techniques/Contact Maneuvers

Training flight will include normal, abnormal, and emergency maneuvers, procedures, and functions that allow the pilot to demonstrate satisfactorily acceptable standards to meet the testing requirements of FAR 135.293 and 135.299.

1. Checklist: Proper use of the checklist with emphasis on accomplishing both normal and emergency procedures. All items on the checklist will be explained in detail.
2. Preflight Checks: A visual inspection of the interior, cockpit, and exterior of the aircraft, including engines, oil, fuel tanks, propellers, wings, fuselage, landing gear, control surfaces, validity of required certificates, and preparation for starting engines.
3. Starting Engines: Proper starting procedures, with emphasis on possible damage to equipment caused by improper procedures.
4. Taxiing: Acceptable taxi methods; smooth use of power levels; taxiing speed; correct use of controls

when taxiing up, down, or crosswind; knowledge of wind effect in taxiing; and smooth and minimum use of brakes.

5. Pre-Takeoff Check: Recommended procedures to be followed in determining proper operations of the engines, propellers, and accessories, with emphasis on a complete check of the pitch trim system and set up of avionics equipment for departure and en route operations.
6. Takeoff and Climb: Instructions in normal, short field, soft field, and crosswind takeoffs, with emphasis on proper power settings, airspeed control, and aircraft configuration. Airspeed controls should include maintaining best rate of climb or angle of climb speed, as appropriate.
7. Cruise Procedures: Use of power charts and proper power settings.
8. Steep Turns: Turns of 360 degrees with up to a 45-degree bank, emphasizing altitude, bank, and airspeed control.
9. Slow Flight Maneuvering: Slow flight will be practiced at minimum controllable speeds in turns and in straight and level flight with varying aircraft flight configurations.
10. Stalls:
  - Power-on stalls: Straight ahead and in turns of 20 degrees bank in both takeoff and cruise configurations.
  - Power-off stalls: Straight ahead and in turns of 30 degrees bank in both cruise and landing configurations.
  - Emphasis on proper recovery techniques, including use of power.
11. Pitch Control: Emphasis will be given to the proper use of trim systems, the effects of power application at various airspeeds, flap extension and retraction effects at various airspeeds, and emergency procedures, as follows:
  - Loss of trim system: An approach to landing using proper power and flap management will be executed. Go-around in this configuration will emphasize the use of airspeed, power, and flaps to reduce control forces.
  - Non-programmed pitch trim (run-away trim): Instructor pilot will simulate this situation by applying pressure to the control wheel. Emphasis will be placed on the student's immediate response to the change in control pressure by actuating the emergency release switch.
12. Engine Shutdown and Re-Start in Flight (Multi-Engine Aircraft): An engine will be shut down at an altitude to simulate engine failure in cruise flight. The student will practice dead-engine identification, power application with an engine out, checklist procedures for securing the dead engine, and checklist air start procedures. Emphasis will be placed on maintaining heading, altitude, and a safe airspeed while performing these procedures.
13. Engine-Out Maneuvering (Multi-Engine Aircraft): Maneuvering on one engine with emphasis on maintaining altitude, airspeed, and heading. Minimum control speed with the critical engine inoperative ( $V_{MC}$ ) will be demonstrated and practiced with proper recovery techniques.
14. Approach and Landing:
  - Instruction in procedures and techniques recommended for normal, crosswind, short field, and soft field landings

- Go-around from approach configuration with flaps and gear down (in multi-engine, aircraft will be demonstrated normally and with simulated failure of one engine)
- Landings with flaps up.

15. Takeoff and Landing with Simulated Engine Failure (Multi-Engine Aircraft):

- When a safe airspeed has been reached and when practicable before reaching 300 ft, one engine will be throttled to simulate failure after takeoff. Importance of maintaining proper airspeeds and directional control will be emphasized. At least one entire traffic pattern, including climb-out, approach, and landing, will be accomplished with the engine throttled to zero thrust.
- One engine will be throttled to simulate failure before reaching minimum controllable airspeed ( $V_{MC}$ ). Importance of immediately aborting takeoff, maintaining directional control, and proper use of brakes will be emphasized.

16. Pressurized Cabin:

- Normal operations/cabin pressure altitude
- Limitations
- Emergency operations/failure of system
- Oxygen use
- Smoke removal.

17. Emergency Procedures (Operation of Systems): During flight training, the following emergency procedures, in addition to previous emergency procedures, will be reviewed or simulated in flight when possible:

- Engine fire in flight
- Fuselage fire
- Failure of electrical system
- Emergency gear extension
- Gear-up landing
- Rejected takeoff in single-engine aircraft
- Balked landings: Recommended and appropriate go-around procedures will be used. Emphasis will be placed on proper use of power, appropriate air speeds, and gear and flap retraction procedures.

c. Instrument Procedures/Maneuvers

Flights will be conducted in simulated or actual instrument training conditions. Training flights will include normal, abnormal, and emergency maneuvers, procedures, and functions to enable the pilot to satisfactorily demonstrate acceptable standards for the instrument proficiency check required by FAR 135.297 and 135.299. Flights will include takeoff, departure, en route, approach, missed approach, and landing procedures. Emphasis will be placed on proper use of equipment installed in the aircraft. Use of pertinent takeoff, climb, cruise, and landing charts and graphs also will be emphasized. Approach procedures will be conducted to the published minimums for each procedure.

18. Instrument Takeoff and Climb Procedures: Normal emphasis on  $V_{MC}$ , appropriate rotation speed, and subsequent climb speeds simulated lower than standard IFR takeoff minimums.
19. Area Departure: Compliance with departure instructions and adherence to ATC clearance is expected. Proper use of radio equipment will be stressed. When applicable, proper use of transition procedures described on Standard Instrument Departure (SID) charts will be used.
20. En Route and Holding Procedures: Continued compliance with ATC clearances, use of cruise power charts, appropriate holding airspeeds, and proper entry into and maintenance of holding patterns will be emphasized.
21. Area Arrivals: Arrivals will be accomplished in accordance with ATC instructions and proper use of transition procedures described on the Standard Terminal Arrival Route (STAR), profile descent, and approach charts (when applicable).
22. Instrument Approach Procedures and Landings:
  - Approach procedures for each instrument approach and compliance with ATC instructions will be stressed. Runway conditions and braking action will be evaluated prior to landing.
  - Visual and Contact Approach: Use of correct approach speeds, minimum altitudes, compliance with approach procedures, and landing techniques will be stressed.
  - ILS Approach: A landing or missed approach out of a straight-in ILS approach will be accomplished. Remaining on the glide slope, localizer (LOC) path, and subsequent landing will be emphasized.
  - VOR and NDB Approaches: These approaches must include straight-in, circling, and missed approach procedures.
  - Other Instrument Approaches: VOR/distance-measuring equipment (DME), LOC of instrument landing system, LOC-back course (BC), and ASR approach procedures will be practiced.
  - Circling and Missed Approaches: Minimum altitudes, proper airspeeds, and correct procedures will be emphasized.
  - Multi-Engine ILS Approach: During at least one ILS approach, one simulated engine failure will be demonstrated throughout the approach and subsequent climb during the missed approach.
23. In-Flight Simulated Instrument Maneuvers: The following maneuvers shall be practiced, with the addition of simulated instrument conditions:
  - Slow-flight maneuvering
  - Stalls
  - Steep turns
  - Power plant failure.
24. Instrument Emergency Procedures:
  - Loss of Radios (communication and navigation)—Appropriate radio-out procedures will be used in compliance with FAR Part 91. FAR 91.127 discusses two-way radio communications failure in IFR operations. One navigation receiver will be used to comply with ATC instructions. If necessary, the ATC will be requested to amend the clearance as appropriate to available

equipment.

- Loss of Gyroscopic Indicator—Operation of the aircraft by partial panel will emphasize the need for proper techniques and interpretation of altimeter, air speed, vertical velocity, turn, bank (or turn coordinator), and magnetic compass instruments.
25. In-Flight Auto Pilot Procedures: Normal use of the auto pilot system will be demonstrated. The auto pilot will be used to maneuver the aircraft about its three axes during normal instrument approach procedures. The auto pilot will be used to the minimum altitudes permitted by FAR 135.93. The pilot will demonstrate the ability (without a First Officer), with and without using the auto pilot, to handle the following:
- Conduct instrument operations competently
  - Properly conduct air-ground communications and comply with complex ATC instructions as proficiently as if an SIC were present
  - Handle simulated auto pilot malfunction during approach conditions.
26. Flight Training for Additional Lower-Than-Standard Takeoffs to 700-ft Runway Visual Range (RVR): The additional lower-than-standard takeoffs require a two-pilot crew, so training emphasis will be placed on the coordination of pilot and copilot responsibilities.
- Pilot responsibilities
  - Copilot responsibilities
  - Restrictions in operations specifications pertaining to additional lower-than-standard takeoffs
  - Simulated lower-than-standard takeoffs with pilot and copilot, practicing crew coordination.
27. Area Navigation (RNAV) Procedures:
- Limitations
  - Emergency procedures: detection of malfunctioning systems
  - Normal procedures
  - System description: theory of operations.

### **5.3 Crew Member Emergency Training**

- a. Emergency training will be provided for each aircraft type, model, and configuration as appropriate for each crew member and each kind of operation conducted.
- b. Emergency training will include at least the following:
  - Instruction in emergency assignments and procedures, including coordination among crew members.
  - Individual instruction in the location, function, and operation of emergency equipment, including:
    - Equipment used in ditching and evacuation
    - First aid equipment and its proper use

- Portable extinguisher, emphasizing the type of extinguisher to be used on different classes of fires.
- Instruction in the handling of emergency situations, including:
  - Rapid decompression, if applicable
  - Fire in flight or on the surface and smoke-control procedures with emphasis on electrical equipment and location of related circuit breakers
  - Ditching and evacuation
  - Illness, injury, or other abnormal situations involving passengers or crew members
  - Hijacking and other unusual situations.
- Review of any previous aircraft accidents, incidents, or actual emergency situations experienced by PNNL Aircraft.
- c. Each crew member must perform or be able to satisfactorily demonstrate the following emergency drills using the proper emergency equipment and procedures:
  - Ditching (if applicable)
  - Emergency evacuation
  - Fire extinguishing and smoke control
  - Operation and use of emergency exits
  - Use of crew and passenger oxygen
  - Removal of life rafts from the aircraft, inflation of the life rafts, use of lifelines, and boarding of passengers and crew (if applicable)
  - Donning and inflation of life vests and the use of other individual flotation devices (if applicable).
- d. Crew members who serve in operations above 25,000-ft MSL will receive instruction in the following:
  - Respiration
  - Hypoxia
  - Duration of consciousness without supplemental oxygen at altitude
  - Gas expansion
  - Gas bubble formation
  - Physical phenomena and incidents of decompression.

Each crew member will be knowledgeable of the section of the company manual that discusses emergencies, emergency evacuation duties, and emergency reporting procedures, as well as FAR 135.19, 135.123, 135.167, and other pertinent FAR. Crew members also will demonstrate good judgment at all times.

## 5.4 Check Airmen and Flight Instructor Qualifications

For each particular aircraft type in the PNNL operation, all flight instructors and check airmen will

- Hold appropriate certificates and ratings to serve as a PIC on operations under FAR Part 135
- Have satisfactorily completed the appropriate training phases for the aircraft, including training required to serve as a PIC in operations under FAR Part 135
- Have satisfactorily completed the appropriate proficiency or competency checks required to serve as PIC in operations under FAR Part 135.

All flight instructors and check airmen will have satisfactorily completed the training requirements of FAR 135.339; hold a Class I or Class II medical certificate; and, in the case of a check airman, been approved by the Director of Flight Operations for the airman duties involved. All initial, transition, upgrade, differences, and recurrent ground and flight training will be administered by FAA-certified flight or ground instructors. The Chief Pilot is responsible for designating such instructors (who satisfactorily meet the appropriate requirements) to perform the required training.

## 5.5 Check Airmen and Flight Instructor Training

The initial and transition ground training for pilot check airmen must include the following:

1. Pilot check airman duties, functions, and responsibilities.
2. Applicable provisions of FAR Part 135 and PNNL policies and procedures as outlined in the Operations Manual and training programs.
3. Appropriate methods, procedures, and techniques for conducting the required checks.
4. Proper evaluation of pilot performance, including the detection of (as follows):
  - Improper and insufficient training
  - Personal characteristics that could adversely affect safety
5. Appropriate corrective action for unsatisfactory checks.
6. Approved methods, procedures, and limitations for performing the required normal, abnormal, and emergency procedures and maneuvers in the aircraft as outlined in the Operations Manual and training programs.

Pilot flight instructors must be valid certified flight instructors.

Initial and transitional flight training for pilot check airmen and pilot flight instructors will include the following:

1. Enough in-flight training and practice in conducting flight checks from the left and right pilot seats in the required normal, abnormal, and emergency maneuvers to determine competence to conduct the pilot flight checks and flight training under FAR Part 135, Subpart H, Training
2. Appropriate safety measures to be taken from either pilot seat for emergency situations that are likely to develop in training

3. Potential results of improper or untimely safety measures during training.

## 5.6 Aviation Safety Point of Contact Training

This section describes the recommended standards for the establishment and maintenance of a training program for the ASPOC at PNNL. Staff members cannot serve in this capacity unless they have successfully completed the initial or recurrent training phase appropriate to the type of aviation operation they will serve. Refer to Section 5.7 for definitions of the three types of training for this position (initial assignment, recurrent, and requalification training).

At the conclusion of any of the three categories of training curriculum, the individual involved should be able to successfully demonstrate his/her knowledge of the regulations, policies, and procedures. The objective of this curriculum is to develop the necessary knowledge and skill to perform the duties and responsibilities of the assigned position to the desired standards. The following table shows the breakdown by number of hours for each segment of initial/requalification training.

**Table 5.1.** Initial and Requalification Aviation Safety Point of Contact Training  
(provided by DOE and PNNL)

Segment	Subject	Hours
1	Overview – DOE Aviation Community	1
2	Applicable Policies/Orders	1
3	Applicable Property Regulations/Reporting Requirements	3
4	Applicable Federal Aviation Regulations	1
5	Accident/Incident Scenarios	2
6	Typical Aviation Organizational Structures/Manuals/Operating Policies	1
7	Charter Operations – Types and Evaluation Techniques	2
8	Implementation Plan – Specific Training	2
9	Mission/Aircraft – Specific Training (as applicable)	2
10	Follow-up Instruction (optional)	4
	Total	19

The next table summarizes the ASPOC recurrent training program.

**Table 5.2.** Recurrent Aviation Safety Point of Contact Training

Segment	Subject	Hours
1	Changes/Updates Applicable to DOE and PNNL Policies/Orders/Regulations Reporting Requirements (training provided by DOE)	15
2	Changes/Updates in Non-PNNL Regulations Applicable to PNNL Aviation Operations	1
3	Accident Prevention Review	1
4	Previous Year Lessons-Learned Forum	1
5	To Be Determined (Alternate Training Subjects Annually)	4
	Total	22

## 5.7 Definitions

### *Initial Training*

Initial training is the training required for crew members who have not qualified and served in the same capacity on an aircraft.

Initial training is for newly hired personnel who have not had previous experience or who have not previously held the position of ASPOC with PNNL. Initial assignment training includes basic indoctrination and specific duty position training and is provided by DOE.

### *Recurrent Training*

Recurrent training is provided for PNNL aviation staff to remain adequately trained and currently proficient for each aircraft position and type of operation in which the member serves. To confirm the crew member can meet the same standards as required by the initial training, each crew member will receive recurrent training appropriate to the type of operation in which the crew member is to serve. No crew member will perform duties as a crew member unless recurrent training has been received within a period since the beginning of the 12th calendar month before that service. Emergency training will be emphasized.

Recurrent ground training for crew members will include, at least:

- A quiz or other review to determine the crew member's knowledge of the aircraft and crew member position involved
- Instruction as necessary to review appropriate subjects required for initial ground training as outlined in this training program, including emergency ground training.
- Annual recurrent training, provided by the DOE, is required for the ASPOC. If recurrent training is not completed within 18 months of the ASPOC's last training period, said individual must complete DOE-provided requalification training to maintain qualification status.

- Recurrent flight training for pilots will include, at least, flight training review in the maneuvers and procedures outlined in this training program. Satisfactory completion of the check required by FAR 135.293 within the preceding 12 calendar months may be substituted for recurrent flight training.

#### *Requalification Training*

This training category is for personnel who have been trained and qualified by PNNL, but have become unqualified to serve in a particular duty position due to no recurrent training or competency check within an 18-month period. In the case of the ASPOC training, this type of training curriculum is identical to the initial assignment training.

#### *Transition Training*

Transition training is the training required for crew members who have qualified and served in the same capacity on another aircraft. Each flight crew member will complete a ground training course appropriate to each aircraft type before beginning transition flight training.

#### *Upgrade Training*

Upgrade training is the training required for crew members who have qualified and served as First Officers on a particular aircraft type before they serve as PIC on that aircraft.

#### *Differences Training*

Differences training is the training required for crew members who have qualified and served on a particular type of aircraft. When the FAA finds differences, training is necessary before a crew member serves in the same capacity on a particular variation of that aircraft.

#### *Aircraft Manufacturer's Training*

Successful completion of the aircraft manufacturer's training program conducted at the manufacturer's training school facilities will be considered satisfactory completion of flight and ground training appropriate to each type of aircraft in which training was given.

#### *Service Training of Maintenance Personnel*

Training of maintenance personnel will be conducted in accordance with the aircraft manufacturer's applicable training program. The Director of Maintenance will determine the quantity and frequency of maintenance personnel participation based on each individual's qualifications and experience.

#### *Other Than Crew Member Training*

Ground crew personnel shall be familiar with the aircraft they will be servicing and loading. The Director of Maintenance will be responsible for training the ground crew personnel in fueling and checking the aircraft. Location of fuel and oil fill caps and the proper grades of oil used will be emphasized. Ground crew personnel should also be familiar with tow limits of the nose gear and location of proper grounding points.

The Director of Maintenance shall determine if any other subject areas must be covered in this training and will conduct all such training.

## 6.0 Hazardous Materials

### 6.1 General

Two kinds of programs apply to the transport of hazardous materials by the G-1 aircraft. The first of these programs is concerned with transportation of hazardous materials in air commerce (Section 6.1.1). The second program applies when the G-1 is transporting hazardous materials when doing business for the U.S. government (Section 6.1.2).

#### 6.1.1 Commercial Transport of Hazardous Materials

This annually reviewed hazardous materials program will be adhered to by all PNNL employees or agents acting for PNNL when they are involved in the acceptance, handling, storage, and transportation of hazardous materials in air commerce. Such hazardous materials are defined in the most recently published Title 49 CFR, Parts 171 through 175 for domestic transport by air. For international transport by air, hazardous materials are defined under the provisions of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air.

This program is intended to ensure that no employees or agents of PNNL perform any assigned duties or have responsibilities involving the acceptance, handling, storage, or transporting of hazardous materials, unless they have satisfactorily completed the PNNL FAA-approved initial or recurrent hazardous materials training program.

A current copy of this program and of the pertinent regulations shall be available at each PNNL office where hazardous materials are accepted, stored, or otherwise prepared for air transportation. PNNL will ensure that hazardous material information warning signs are posted at appropriate locations where the company conducts flight operations or accepts cargo. These signs will advise shippers of the potential hazards and penalties associated with the offering for carriage of such materials aboard an aircraft, if the shipper fails to comply with the appropriate regulations. PNNL will ensure the proper shipping authorities are immediately advised of any incidents or discrepancies that are discovered per 49 CFR Part 175.1.

#### ***§ 175.1 Purpose, scope and applicability.***

*(a) This part prescribes requirements that apply to the transportation of hazardous materials in commerce aboard (including attached to or suspended from) aircraft. The requirements in this part are in addition to other requirements contained in parts 171, 172, 173, 178, and 180 of this subchapter.*

*(b) This part applies to the offering, acceptance, and transportation of hazardous materials in commerce by aircraft to, from, or within the United States, and to any aircraft of United States registry anywhere in air commerce. This subchapter applies to any person who performs, attempts to perform, or is required to perform any function subject to this subchapter, including—(1) Air carriers, indirect air carriers, and freight forwarders and their flight and non-flight employees, agents, subsidiary and contract personnel (including cargo, passenger and baggage acceptance, handling, loading and unloading personnel); and*

*(2) Air passengers that carry any hazardous material on their person or in their carry-on or checked baggage.*

*(c) This part does not apply to aircraft of United States registry under lease to and operated by foreign nationals outside the United States if:*

*(1) Hazardous materials forbidden aboard aircraft by §172.101 of this subchapter are not carried on the aircraft; and*

*(2) Other hazardous materials are carried in accordance with the regulations of the State (nation) of the aircraft operator.*

With regard to the airworthiness of the G-1, refer to Appendix A, Page A.29. This appendix includes the forms used by the FAA to certify the airworthiness of the aircraft.

## **6.1.2 Hazardous Material Transport Exception Allowed for Government Business**

The G-1 aircraft operates in the public aircraft mode when doing business for the U.S. government per the Hazardous Materials sections of FAR 175.8 and FAR 175.10. The Public Aircraft Definition and Exemption Authority (composed of the FAA and U.S. Department of Transportation [DOT] agencies) defines “public aircraft” as follows:

### ***Section 1.1 General definitions.***

*Public aircraft means an aircraft used only for the United States Government, or owned and operated (except for commercial purposes), or exclusively leased for at least 90 continuous days, by a government (except the United States Government), including a State, the District of Columbia, or a territory or possession of the United States, or political subdivision of that government...*

Under the restricted category the aircraft is allowed to carry hazardous materials in the operation of government atmospheric research as follows:

### ***§ 175.8 Exceptions for operator equipment and items of replacement.***

*(a) Operator equipment. This subchapter does not apply to—*

*...(2) Hazardous materials required aboard an aircraft in accordance with the applicable airworthiness requirements and operating regulations. Items of replacement for such materials must be transported in accordance with paragraph (a)(3) of this section.*

*(3) Items of replacement (company material (COMAT)) for hazardous materials described in paragraph (a)(2) of this section must be transported in accordance with this subchapter. When an operator transports its own replacement items described in paragraph (a)(2), the following exceptions apply:*

*(i) In place of required packagings, packagings specifically designed for the items of replacement may be used, provided such packagings provide at least an equivalent level of protection to those that would be required by this subchapter.*

(ii) Aircraft batteries are not subject to quantity limitations such as those provided in §172.101 or §175.75(c) of this subchapter.

**§ 175.10 Exceptions for passengers, crewmembers, and air operators.**

(a) This subchapter does not apply to the following hazardous materials when carried by aircraft passengers or crewmembers provided the requirements of §§171.15 and 171.16 (see paragraph (c) of this section) and the requirements of this section are met:

(1) (i) Non-radioactive medicinal and toilet articles for personal use (including aerosols) carried in carry-on and checked baggage. Release devices on aerosols must be protected by a cap or other suitable means to prevent inadvertent release;

(ii) Other aerosols in Div. 2.2 (nonflammable gas) with no subsidiary risk carried in checked baggage only. Release devices on aerosols must be protected by a cap or other suitable means to prevent inadvertent release; and

(iii) The aggregate quantity of these hazardous materials carried by each person may not exceed 2 kg (70 ounces) by mass or 2 L (68 fluid ounces) by volume and the capacity of each container may not exceed 0.5 kg (18 ounces) by mass or 500 ml (17 fluid ounces) by volume.

(2) One packet of safety matches or a lighter intended for use by an individual when carried on one's person or in carry-on baggage only. Lighter fuel, lighter refills, and lighters containing unabsorbed liquid fuel (other than liquefied gas) are not permitted on one's person or in carry-on or checked baggage.

(3) Implanted medical devices in humans or animals that contain hazardous materials, such as a heart pacemaker containing Class 7 (radioactive) material or lithium batteries; and radiopharmaceuticals that have been injected or ingested.

(4) Alcoholic beverages containing:

(i) Not more than 24% alcohol by volume; or

(ii) More than 24% and not more than 70% alcohol by volume when in unopened retail packagings not exceeding 5 liters (1.3 gallons) carried in carry-on or checked baggage, with a total net quantity per person of 5 liters (1.3 gallons) for such beverages.

(5) Perfumes and colognes purchased through duty-free sales and carried on one's person or in carry-on baggage.

(6) Hair curlers (curling irons) containing a hydrocarbon gas such as butane, no more than one per person, in carry-on or checked baggage. The safety cover must be securely fitted over the heating element. Gas refills for such curlers are not permitted in carry-on or checked baggage.

(7) A small medical or clinical mercury thermometer for personal use, when carried in a protective case in carry-on or checked baggage.

(8) Small arms ammunition for personal use carried by a crewmember or passenger in checked baggage only, if securely packed in boxes or other packagings specifically designed to carry small amounts of

*ammunition. Ammunition clips and magazines must also be securely boxed. This paragraph does not apply to persons traveling under the provisions of 49 CFR 1544.219.*

*(9) One self-defense spray (see §171.8 of this subchapter), not exceeding 118 ml (4 fluid ounces) by volume, that incorporates a positive means to prevent accidental discharge may be carried in checked baggage only.*

*(10) Dry ice (carbon dioxide, solid), with the approval of the operator:*

*(i) Quantities may not exceed 2.5 kg (5.5 pounds) per person when used to pack perishables not subject to the HMR. The package must permit the release of carbon dioxide gas; and*

*(ii) When carried in checked baggage, each package is marked “DRY ICE” or “CARBON DIOXIDE, SOLID,” and marked with the net weight of dry ice or an indication the net weight is 2.5 kg (5.5 pounds) or less.*

*(11) A self-inflating life jacket fitted with no more than two small gas cartridges (containing no hazardous material other than a Div. 2.2 gas) for inflation purposes plus no more than two spare cartridges. The lifejacket and spare cartridges may be carried in carry-on or checked baggage, with the approval of the aircraft operator.*

*(12) Small compressed gas cylinders of Division 2.2 (containing no hazardous material other than a Division 2.2 gas) worn by the passenger for the operation of mechanical limbs and, in carry-on and checked baggage, spare cylinders of a similar size for the same purpose in sufficient quantities to ensure an adequate supply for the duration of the journey.*

*(13) A mercury barometer or thermometer carried as carry-on baggage, by a representative of a government weather bureau or similar official agency, provided that individual advises the operator of the presence of the barometer or thermometer in his baggage. The barometer or thermometer must be packaged in a strong packaging having a sealed inner liner or bag of strong, leak proof and puncture-resistant material impervious to mercury, which will prevent the escape of mercury from the package in any position.*

*(14) Electrically powered heat-producing articles (e.g., battery-operated equipment such as diving lamps and soldering equipment) as carry-on baggage only and with the approval of the operator of the aircraft. The heat-producing component, or the energy source, must be removed to prevent unintentional functioning during transport.*

*(15) A wheelchair or other battery-powered mobility aid equipped with a nonspillable battery, when carried as checked baggage, provided—*

*(i) The battery meets the requirements of §173.159a(d) of this subchapter for non-spillable batteries;*

*(ii) Visual inspection including removal of the battery, where necessary, reveals no obvious defects (removal of the battery from the housing should be performed by qualified airline personnel only);*

*(iii) The battery is disconnected and the battery terminals are protected to prevent short circuits, unless the wheelchair or mobility aid design provides an effective means of preventing unintentional activation, and*

*(iv) The battery is—*

*(A) Securely attached to the wheelchair or mobility aid;*

*(B) Is removed and placed in a strong, rigid packaging marked “NONSPILLABLE BATTERY” (unless fully enclosed in a rigid housing that is properly marked); or*

*(C) Is handled in accordance with paragraph (a)(16)(iv) of this section.*

*(16) A wheelchair or other battery-powered mobility aid equipped with a spillable battery, when carried as checked baggage, provided—*

*(i) Visual inspection including removal of the battery, where necessary, reveals no obvious defects (however, removal of the battery from the housing should be performed by qualified airline personnel only);*

*(ii) The battery is disconnected and terminals are insulated to prevent short circuits;*

*(iii) The pilot-in-command is advised, either orally or in writing, prior to departure, as to the location of the battery aboard the aircraft; and*

*(iv) The wheelchair or mobility aid is loaded, stowed, secured and unloaded in an upright position, or the battery is removed, and carried in a strong, rigid packaging under the following conditions:*

*(A) The packaging must be leak-tight and impervious to battery fluid. An inner liner may be used to satisfy this requirement if there is absorbent material placed inside of the liner and the liner has a leakproof closure;*

*(B) The battery must be protected against short circuits, secured upright in the packaging, and be packaged with enough compatible absorbent material to completely absorb liquid contents in the event of rupture of the battery; and*

*(C) The packaging must be labeled with a CORROSIVE label, marked to indicate proper orientation, and marked with the words “Battery, wet, with wheelchair.”*

*(17) A lithium ion battery-powered wheelchair or other mobility aid as follows:*

*(i) A wheelchair or other mobility aid equipped with a lithium ion battery, when carried as checked baggage, provided—*

*(A) The lithium ion battery must be of a type that successfully passed each test in the UN Manual of Tests and Criteria as specified in §173.185 of this subchapter, unless approved by the Associate Administrator;*

*(B) Visual inspection including removal of the battery, where necessary, reveals no obvious defects (removal of the battery from the housing should be performed by qualified airline personnel only);*

*(C) Battery terminals must be protected from short circuits ( e.g., by being enclosed within a battery container that is securely attached to the mobility aid);*

*(D) The pilot-in-command is advised, either orally or in writing, prior to departure, as to the location of the wheelchair or mobility aid aboard the aircraft; and*

*(E) The wheelchair or mobility aid is loaded, stowed, secured and unloaded in an upright position and in a manner that prevents unintentional activation and protects it from damage.*

*(F) A lithium metal battery is forbidden aboard a passenger-carrying aircraft.*

*(ii) A wheelchair or other mobility aid when carried as checked or carry-on baggage, provided—*

*(A) The wheelchair or other mobility aid is designed and constructed in a manner to allow for stowage in either a cargo compartment or in the passenger cabin;*

*(B) The lithium ion battery is removed; and*

*(C) The lithium ion battery and any spare batteries are carried in the same manner as spare batteries in paragraph (a)(18) of this section.*

*(18) Except as provided in §173.21 of this subchapter, portable electronic devices (for example, watches, calculating machines, cameras, cellular phones, lap-top and notebook computers, camcorders, etc.) containing cells or batteries (including lithium cells or batteries) and spare batteries and cells for these devices, when carried by passengers or crew members for personal use. Each spare battery must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g., by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch) and carried in carry-on baggage only. In addition, each installed or spare battery must not exceed the following:*

*(i) For a lithium metal battery, a lithium content of not more than 2 grams per battery; or*

*(ii) For a lithium-ion battery, an aggregate equivalent lithium content of not more than 8 grams per battery, except that up to two batteries with an aggregate equivalent lithium content of more than 8 grams but not more than 25 grams may be carried.*

*(19) Portable electronic devices ( e.g., cellular phones, laptop computers, and camcorders) powered by fuel cell systems, and not more than two spare fuel cell cartridges per passenger or crew member, when transported in carry-on baggage for personal use under the following conditions:*

*(i) Fuel cell cartridges may contain only Division 2.1 liquefied flammable gas, or hydrogen in a metal hydride, Class 3 flammable liquids (including methanol), Division 4.3 water reactive substances, or Class 8 corrosive materials;*

*(ii) The maximum water capacity of a fuel cell cartridge for hydrogen in a metal hydride may not exceed 120 mL (4 fluid ounces). The maximum quantity of fuel in all other fuel cell cartridge types may not exceed:*

*(A) 200 mL (6.76 ounces) for liquids;*

*(B) 120 mL (4 fluid ounces) for liquefied gases in non-metallic fuel cell cartridges, or 200 mL (6.76 ounces) for liquefied gases in metal fuel cell cartridges; or*

*(C) 200 g (7 ounces) for solids.*

*(iii) No more than two spare fuel cell cartridges may be carried by a passenger;*

*(iv) Fuel cells containing fuel are permitted in carry-on baggage only;*

*(v) Fuel cell cartridges containing hydrogen in a metal hydride must meet the requirements in §173.230(d);*

*(vi) Fuel cell cartridges may not be refillable by the user. Refueling of fuel cell systems is not permitted except that the installation of a spare cartridge is allowed. Fuel cell cartridges that are used to refill fuel cell systems but that are not designed or intended to remain installed (fuel cell refills) in a portable electronic device are not permitted;*

*(vii) Fuel cell systems and fuel cell cartridges must conform to IEC/PAS 62282–6–1 (IBR; see §171.7 of this subchapter);*

*(viii) Interaction between fuel cells and integrated batteries in a device must conform to IEC/PAS 62282–6–1 (IBR, see §171.7 of this subchapter). Fuel cell systems for which the sole function is to charge a battery in the device are not permitted;*

*(ix) Fuel cell systems must be of a type that will not charge batteries when the consumer electronic device is not in use; and*

*(x) Each fuel cell cartridge and system that conforms to the requirements in this paragraph (a)(18) must be durably marked by the manufacturer with the wording: “APPROVED FOR CARRIAGE IN AIRCRAFT CABIN ONLY” to certify that the fuel cell cartridge or system meets the specifications in IEC/PAS 62282–6–1 (IBR, see §171.7 of this subchapter) and with the maximum quantity and type of fuel contained in the cartridge or system.*

*(xi) Spare fuel cell cartridges containing a flammable liquid (Class 3) or corrosive material (Class 8) may be transported in checked baggage.*

*(xii) Spare fuel cell cartridges containing liquefied flammable gas (Division 2.1), hydrogen in a metal hydride (Division 2.1) or water reactive material (Division 4.3) may only be transported in carry-on baggage.*

*(b) The exceptions provided in paragraph (a) of this section also apply to aircraft operators when transporting passenger or crewmember baggage that has been separated from the passenger or crewmember, including transfer to another carrier for transport to its final destination.*

*(c) The requirements to submit incident reports as required under §§171.15 and 171.16 of this subchapter apply to the air carrier.*

With regard to work for others, or for non-government-funded projects, the G-1 operates under the restricted category certificate for atmospheric research. Because of the restricted category exceptions, the G-1 is allowed to carry hazardous materials under FAR 175.8 and FAR 175.10.

## **6.2 Staff Responsibilities**

No employee or agent of PNNL (unless trained and tested in this function) may accept hazardous material for shipment unless the material is:

- Properly described on the shipping papers
- Required certifications are on the shipping papers
- Authorized package is marked and labeled, as required

- Shipment is authorized for transportation by air.

If the shipment is offered in accordance with the ICAO regulations, the accepting employee or agent must assure the shipper has complied with all applicable U.S. variations to the ICAO regulations.

No employee or agent of PNNL (unless trained and tested in this function) may load or transport aboard this company's aircraft any hazardous material unless the:

- Shipment has met acceptance requirements and package integrity immediately prior to the loading procedures
- PIC has received complete materials safety data sheets for each material along with a statement on the quantity of material and procedure for on-board use or storage
- Shipment is stored and loaded in accordance with the applicable regulations and the stated procedures of PNNL.

No employee or agent of PNNL, unless trained and tested in this function, may prepare hazardous material for shipment including company material (COMAT). Prior to loading hazardous materials onboard a PNNL aircraft, the required compatibility and separation distances relative to other cargo will be determined for the material. This information will be obtained from 49 CFR Part 175.

### **6.3 Training Requirements for Carriage of Hazardous Cargo**

PNNL uses the aircraft on a limited basis for the carriage of hazardous material in support of Lab research programs. The training program is, therefore, limited to those portions of the PNNL policy on transport of hazardous material that relate to the specific materials that are carried in the company aircraft. The Hazardous Material Transportation Officer, PNNL Laboratory Safety Department, is responsible for the initial training and retraining of staff members involved in the transport of hazardous material.

Prior to transport of a specific hazardous material, training shall be given to staff members in the requirements of 49 CFR and, for international shipments, the requirements of the ICAO and the International Air Transport Association (IATA) Dangerous Goods Regulations. The training will be of sufficient scope and depth to ensure that personnel who successfully complete this course of training will be able to perform their duties in relation to hazardous materials in a safe and efficient manner.

The lesson plan outlining the specific requirements for the material to be transported will include, as applicable, the following:

1. Applicable regulations
2. General transportation requirements
3. Use of Title 49 CFR, ICAO, and IATA regulations
4. Definitions used in air transport of hazardous materials

5. Hazardous material classification and definition
6. Purpose and use of the Hazardous Materials Table (HMT)
7. Shipping paper requirements, including
  - a. Description of hazardous material
  - b. Shipper's certification
  - c. Types of documents required.
8. Marking and labeling requirements
9. Pilot notification
10. Specific packaging for the material to be transported
11. Acceptance procedures and requirements for the material
12. Storage and replacement of hazardous material labels
13. Quantity limitations of the material on the aircraft
14. Stowage compatibility
15. Orientation, securing, and location of packages
16. Damaged shipments
17. Special requirements:
  - a. Poisons, etiologic agents, asbestos
  - b. Radioactive materials.
18. Hazardous materials discrepancy/incident reporting
19. Emergency regulations and notifications
20. Enforcement
21. Compliance orders (DOE Order 440.2C)
22. Use of preflight checklists.

## **6.4 Acceptance of Hazardous Materials**

Any package containing hazardous materials that is damaged or leaking will be refused without further processing. If the package integrity is satisfactory, the acceptance process may continue.

Domestic shipments may be offered/accepted under either Title 49 CFR or ICAO regulations. Whichever regulation is chosen, it must be complied with in its entirety. All international shipments must comply with ICAO requirements and the pertinent U.S. variations. Note: ICAO requires a compliance checklist.

PNNL shall maintain a supply of labels at each facility where hazardous materials are accepted, stored, or otherwise prepared for transportation by air. Only an employee or agent of PNNL who is trained and tested in the acceptance procedures may replace a lost or detached label and only in accordance with the information presented by the shipper on the shipping papers. If, for any reason, the acceptance checklist cannot be completed at the time (for instance, a qualified/trained agent is not available or the volume of work prevents immediate acceptance), the uncompleted checklist must be attached to the shipment. The shipment must be placed in an area designated for conditional acceptance until the checklist is completed. When all the items have been checked off and the person who completed the inspection has signed the checklist, the shipment may be moved to the cargo staging area.

The Hazardous Material Transportation Officer, Laboratory Safety Department at PNNL, resolves any questions regarding the handling or acceptance of cargo consigned to PNNL.

## **6.5 Assistance to Shippers**

Whenever possible, PNNL may assist its customers to ensure their shipment is prepared in accordance with Title 49 CFR or ICAO. Such support may consist of informing the shipper of information stated in the regulations and by providing the shipper with the required forms, such as shipper's declaration, labels, and airway bills. PNNL may assist the shipper with regard to the order in which the information is required on the packages and forms. This task can be accomplished orally or by showing the customer an example of a properly completed form. Such assistance shall in no way relieve the shipper of responsibility. Before any action to assist the customer can be taken, the person who has been delegated this responsibility by PNNL must give final approval.

## **6.6 Exemptions**

When PNNL accepts or transports a hazardous material under the authority of an exemption granted by the Associate Director, Office of Hazardous Materials Regulation, DOT, all provisions of that exemption shall be complied with. For more information, refer to 49 CFR Part 107, Subpart B.

## **6.7 Records**

When PNNL is the originating carrier, a copy of the hazardous material shipping papers will be retained for a period of 90 days after the date of completion of the shipment.

A copy of the PNNL Hazardous Material Training and Testing Records for an employee will be retained for 90 days after the employee's date of termination of employment.

A copy of all documents relating to a shipment of hazardous materials on PNNL aircraft will be retained for 90 days after the completion of the shipment. These records will be maintained at the PNNL Flight Operations Office and will be made available to the FAA.

## **6.8 Acceptance**

### **6.8.1 Shipping Papers**

Per 49 CFR Part 172, ensure the following:

1. The shipping name listed on the shipping paper is one authorized by Column 2 of the HMT (49 CFR 172.101).
2. The hazard class listed on the shipping paper is the same as shown in Column 3 of the HMT for the entry.
3. The identification number shown on the shipping paper is the same as that shown in Column 3A of the HMT for the entry and is in proper sequence.
4. The list includes the total quantity, by weight or volume, of the material covered by the description.
5. The additional entry requirements follow the same basic description.
6. The certification is affixed and signed.
7. Per ICAO, three sequences are required.
  - a. The first sequence is the basic description [proper shipping name, hazard class, and identification (ID) number] as listed in Columns 1, 2, 3, and (if applicable) 4 of the ICAO Dangerous Goods List (DGL).
  - b. The second sequence designates the quantity and type of packing.
  - c. The third sequence indicates the packing instructions used and is taken from DGL Columns 9 or 11 and 8. Additional entry requirements follow the appropriate sequence.
8. Two copies of the shipping papers must be offered with the shipment. One copy must accompany each shipment, and the originating operator must retain a copy on file for 90 days.

### **6.8.2 Marking**

Per 49 CFR Part 172, ensure the following.

1. The proper shipping name and identification numbers that appear on the shipping paper are also marked on the outside of the package, outside container, or overpack.
2. The name and address of either the consignee or consignor must also be marked on each package.
3. Orientation arrows must be marked on two vertical sides, if the package has inside packaging containing liquid hazardous materials.
4. Any additional marking requirements specified in Title 49 CFR for the package or material being shipped (such as specification package marking or overpack marking) must be met.

### **6.8.3 Labeling**

Per 49 CFR Part 172, verify the following.

1. The outside of the package is labeled with the appropriate label(s) from Column 4 of the HMT.
2. Additional labels are in place when required and ascertainable by inspection of the shipping paper.
3. The *Cargo Aircraft Only* label is attached for those packages containing a quantity of hazardous materials that may be shipped only on cargo aircraft. This label also applies to packages that are forbidden for carriage on a passenger aircraft, but are permitted for carriage on cargo-only aircraft per Columns 6a and 6b of the HMT.

Per ICAO Column 5, the requirements are basically the same as for Title 49 CFR. Major differences are as follows.

1. The United Nations (UN) class number (and in some cases division numbers) must be entered in the lower corner of the label for primary risk labels.
2. Subsidiary risk labels must not display the UN class or division numbers.
3. Requirements for infectious substances and poisonous materials (packing Group III) labels differ from those in Title 49 CFR.
4. Orientation labels are required for liquid dangerous goods; labels on two opposite vertical sides are required for any package with liquid hazardous materials.

Replacement Labels: lost or destroyed labels must be replaced in accordance with information provided on the shipping papers.

### **6.8.4 Placard Placement**

Unit load device (ULD) and freight containers over 640 cubic ft that contains hazardous materials must carry placards. ULD and freight containers less than 640-cubic-ft capacity, containing hazardous

material, must carry either a placard or a label. This rule is a carrier requirement when packages are consolidated for easier handling. Shippers may not offer a carrier hazardous materials in a freight container without proper identification.

### **6.8.5 Storage/Handling/Loading Procedures**

Packages, outside containers, or overpacks containing hazardous materials shall be stored or loaded aboard the aircraft in accordance with the table contained in 49 CFR Part 175.

1. *Poisons*. Packages bearing the poison or etiological agent/infectious substance label may not be carried in the same compartment of an aircraft as material known to be foodstuffs, feed, or any other edible material intended for consumption by humans or animals, with one exception. Such packages may be carried, if loaded in separate ULDs that are not adjacent to each other.
2. *Radioactive Materials (RAM)*. While in storage, no more than 50.0 Transport Index (TI) of RAM may be stored in any one group of packages. Any group of packages containing 50.0 TI must be separated by 20 ft from any other package or group of packages containing RAM. No such package (or group of packages) may be in a position continuously occupied by people (or animals or undeveloped film) that is closer than the distances on the charts in 49 CFR Part 175.

### **6.8.6 Pre-Board Inspection**

No PNNL employee or agent may load any package, outside container, or overpack containing hazardous material (HM) aboard an aircraft or into a freight container or onto a pallet prior to loading it aboard an aircraft unless it has been inspected. Immediately prior to loading, the PNNL employee or agent must inspect the exterior of the packages, outside container, or overpack and determine that it has no holes, leakage, or other obvious indications that integrity has been compromised.

The pre-loading inspection is not required for shipments of dry ice (carbon dioxide solid), magnetized materials, or freight containers of Other Regulated Materials-Domestic-Air (ORM-D-AIR) materials packaged by and offered by a single shipper. A ULD may not be loaded until it has been inspected and found to be free from any evidence of leakage or of damage to any package containing hazardous materials.

### **6.8.7 Passenger Carrier Quantity Limitations**

Except for radioactive material, irritating materials, etiologic agents, and Poison B liquids and solids not bearing a flammable liquid or flammable solid label, a PNNL passenger-carrying aircraft has weight limitations on certain materials. No more than 50 pounds net weight of hazardous materials, or 150 pounds of nonflammable compressed gas that is acceptable for carriage on passenger-carrying aircraft, may be carried in the following locations:

- Each inaccessible cargo compartment

- Each freight container within an accessible cargo compartment
- An inaccessible position, within an accessible cargo compartment on a cargo-only aircraft.

Amounts exceeding 50 pounds net weight of hazardous materials or 150 pounds of nonflammable compressed gas, acceptable for carriage on passenger-carrying aircraft, must be carried in a location that is accessible to a crew member during flight.

### 6.8.8 Passenger Carrier Radioactive Materials Limitations

On a passenger-carrying aircraft when separation distances can be satisfied, up to 50.0 TI total may be carried. For cargo-only aircraft, this 50.0-TI limit usually will apply also. However, when the size of the aircraft permits groups of packages, per 49 CFR Part 175, up to 200.0 TI may be carried, if separation distances are satisfied.

Radioactive Materials: Each package containing labeled RAM must be inspected to ensure the security seal is not broken. This requirement does not apply to packages of RAM that are in overpacks.

- a. Passenger Aircraft: In addition to any other requirement, packages requiring a radioactive yellow II or III label must meet the following loading requirements.
  - The radioactive material must be intended for use in (or incident to) research or medical diagnosis or treatment, as indicated by the shipper's certification.
  - No single package carried on a passenger-carrying aircraft may exceed the TI indicated for the category of label listed:

Radioactive Yellow II Label: 1.0 TI

Radioactive Yellow III Label: 3.0 TI

- Each package must be carried on the floor of the cargo compartment.
  - Each package must be loaded and carried on the aircraft in accordance with the separation distance specified on the tables in 49 CFR Part 175 and each must be suitably safeguarded and secured so as to prevent its becoming a hazard by shifting or moving.
- b. Cargo-Only Aircraft: In addition to any other requirement, packages requiring a radioactive yellow II or III label must meet the following loading requirements:

- No single package carried on a cargo-only aircraft may exceed the TI indicated for the category of label listed:

Radioactive Yellow II: 1.0 TI

Radioactive Yellow III: 10.0 TI

- The total TI of all of the packages loaded on the aircraft must not exceed 50.0. Each package must be loaded on the aircraft in accordance with the separation distance or pre-designated area, as noted in 49 CFR Part 175. Each package must be suitably safeguarded and secured, so as to prevent its becoming a hazard by shifting or movement.
- If the total TI for all of the packages exceeds 50.0, and the size of the aircraft permits use of groups of packages, the following criteria must be met:
  - The separation distance between the surfaces of the RAM packages and the surfaces bounding the space occupied by persons or animals is at least 30 ft.
  - The TI for any group of packages does not exceed 50.0 and each group is separated by at least 20 ft from any other (as measured from the outer surface of each group).
  - For purposes of this paragraph, the term *group of packages* means packages that are separated from each other in an aircraft by a distance of 20 ft or less.
  - The total TI for all packages containing fissile RAM does not exceed 50.0.
- c. Aircraft used routinely for the carriage of radioactive materials shall be periodically checked for radioactive contamination. If contamination equals or exceeds 0.5 millirem per hour, the aircraft must be taken out of service until it is decontaminated.

### **6.8.9 Pilot Notification**

- a. After the aircraft is loaded and prior to departure, the PIC must be given written notification advising the basic description, additional description, total packages, and quantity of each hazardous material location aboard the aircraft and the confirmation that no damaged or leaking packages have been loaded. For radioactive material, the number of packages, category, and TI must also be given.
- b. If the PIC loads the aircraft, the pre-loading inspection is a required duty. If someone other than the PIC loads the aircraft and conducts the inspection, that person shall furnish the PIC with the written pilot notification.
- c. A copy of the PIC notification must be readily available to the PIC during flight.

### **6.8.10 Offloading Shipments**

Packages, overpacks, and ULDs containing hazardous materials must be inspected for damage or leakage after being unloaded from an aircraft. Any evidence of leakage or damage requires further inspection of aircraft where material was stored and of the abutting packages.

### **6.8.11 Special Flights**

- a. The transportation of flammable liquid fuel in small passenger-carrying aircraft is authorized only when the provisions of Title 49 CFR are met.

- b. Air transportation of hazardous materials is authorized when cargo-only aircraft is the only means of transportation available. In addition, compliance with all other conditions of 49 CFR Part 175 is required.
- c. Flights made under the provisions of a DOT exemption must comply with the conditions specified in the exemption.

### **6.8.12 Required Reports**

#### a. Incident Reporting

1. In the event any of the following incidents occur as a direct result of transporting a hazardous material, the appointed PNNL employee will make a telephone report containing the required information to the FAA Civil Aviation Security Office (the PNNL Emergency number should also be contacted; see Appendix D) as soon as possible:
  - A person is killed.
  - A person receives injuries requiring hospitalization.
  - Property damage is estimated at \$50,000 or more.
  - Fire, breakage, spillage, or suspected contamination is present from a shipment of RAM or etiologic agents.
2. Radioactive Materials: In addition to the notification to FAA, the shipper of any RAM involved in an incident must be notified by telephone.
3. Etiologic Agents: In addition to the notification to the FAA, the Centers for Disease Control and Prevention (CDC) in Atlanta and the shipper are notified of any etiologic materials involved in an incident.
4. The Chemtrek information number is available for help/advice on spills.
5. Incident reports made by telephone shall contain the following information:
  - Name of employee or agent making report
  - Company name and address of flight operations
  - Phone number where person making the report can be reached
  - Date, time, and location of incident, accident, or discharge
  - The extent of injuries, if any
  - The proper shipping name, hazard class, DOT ID number, and quantity of the material involved in the incident

- Whether or not a continuing danger to life exists at the scene, if the information can be reasonably ascertained.

#### 6. Written Reports (DOT Form 5800-1)

- A written report will be submitted in duplicate on a DOT Form 5800.1 to the Materials Transportation Bureau with a copy forwarded to the FAA Civil Aviation Security Office within 15 days following the discovery of
  - a. An incident requiring an immediate telephonic notification
  - b. An unintentional release of any amount of a regulated material from a package.

(It is the responsibility of the employee or agent at the scene of the incident, accident, or discharge to complete the DOT Form 5800.1 as soon as practicable.)

- c. Report of Discrepancies: Each person who discovers a discrepancy relative to the shipment of an hazardous material, following its acceptance for transportation aboard an aircraft shall, as soon as practicable, notify the FAA Civil Aviation Security Office by telephone, and provide the following information:
  - Name and telephone number of the person reporting the discrepancy
  - Name of the aircraft operator
  - Specific location of the shipment concerned
  - Name of the shipper
  - Nature of the discrepancy.

#### **6.8.13 Orientation and Securing of Hazardous Material (HM) Packages**

As required by 49 CFR Part 175, a package containing HM marked or labeled to indicate proper orientation will be loaded and secured in accordance with such marking or labels. Liquid HM without such markings will be loaded and secured with closures up. Hazardous material packages will be secured to prevent any movement in flight that would result in damage to or change in orientation of the package.

### **6.9 Emergency (Damaged Shipments or Incidents)**

The PIC, or other persons designated and trained by PNNL, shall remove from the aircraft any package or hazardous material that appears to be damaged or leaking. These packages shall be placed in the designated isolation area and the shipper notified. PNNL emergency notification procedures shall be followed. (Note: See Section 6.11.)

The designated PNNL employee shall make required notification of incidents and subsequent reports in compliance with 49 CFR Parts 171 and 175. This notice does not preempt any other required

notification. The PNNL Laboratory Safety Department will identify the appropriate action and provide forms.

## **6.10 Emergency Notification**

The contact numbers are as follows:

All emergencies and unusual conditions PNNL Single-Point Contact (509) 375-2400

U.S. Department of Transportation (800) 424-8802

Emergencies involving etiologic agents; CDC (800) 232-0124

Notice involving shipments transported by aircraft must be given to the nearest FAA Civil Aviation Security Office by telephone at the earliest practical moment after an incident. See also the incident/accident/off-normal event operations checklist on pages A.22 and A.26 of Appendix A.

## **Appendix A Forms List**



# Appendix A

## Forms List

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# PNNL BOMB THREAT CHECKLIST

INSTRUCTIONS: BE CALM, BE COURTEOUS, LISTEN, DO NOT INTERRUPT THE CALLER

NAME OF OPERATOR: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

CALLERS IDENTITY: Male \_\_\_\_\_ Female \_\_\_\_\_ Adult \_\_\_\_\_ Juvenile \_\_\_\_\_ Approx. Age \_\_\_\_\_

ORIGIN OF CALL: Local \_\_\_\_\_ Long Distance \_\_\_\_\_ Booth \_\_\_\_\_ Internal (in complex)

- |                                      |                                    |                                    |                                    |
|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Voice Characteristics                | Speech                             | Language                           | Accent                             |
| <input type="checkbox"/> Loud        | <input type="checkbox"/> Fast      | <input type="checkbox"/> Excellent | <input type="checkbox"/> Local     |
| <input type="checkbox"/> High Pitch  | <input type="checkbox"/> Distinct  | <input type="checkbox"/> Fair      | <input type="checkbox"/> Foreign   |
| <input type="checkbox"/> Raspy       | <input type="checkbox"/> Stutter   | <input type="checkbox"/> Foul      | <input type="checkbox"/> Not Local |
| <input type="checkbox"/> Intoxicated | <input type="checkbox"/> Slurred   | <input type="checkbox"/> Good      | <input type="checkbox"/> Race      |
| <input type="checkbox"/> Soft        | <input type="checkbox"/> Slow      | <input type="checkbox"/> Poor      | <input type="checkbox"/> Religion  |
| <input type="checkbox"/> Deep        | <input type="checkbox"/> Distorted | <input type="checkbox"/> Other     |                                    |
| <input type="checkbox"/> Pleasant    | <input type="checkbox"/> Lisp      |                                    |                                    |
| <input type="checkbox"/> Other       | <input type="checkbox"/> Other     |                                    |                                    |

- |                                     |   |   |
|-------------------------------------|---|---|
| Manner                              | Background Noise                          | Additional Info                                   |
| <input type="checkbox"/> Calm       | <input type="checkbox"/> Factory Machines | <input type="checkbox"/> Aircraft ID              |
| <input type="checkbox"/> Radical    | <input type="checkbox"/> Bedlam           | <input type="checkbox"/> Baggage ID               |
| <input type="checkbox"/> Coherent   | <input type="checkbox"/> Music            | <input type="checkbox"/> Mail ID                  |
| <input type="checkbox"/> Angry      | <input type="checkbox"/> Office Machines  | <input type="checkbox"/> Crew Names               |
| <input type="checkbox"/> Incoherent | <input type="checkbox"/> Street Traffic   | <input type="checkbox"/> Unique Specific Info     |
| <input type="checkbox"/> Deliberate | <input type="checkbox"/> Mixed Noise      | <input type="checkbox"/> Industry Terminology     |
| <input type="checkbox"/> Righteous  | <input type="checkbox"/> Train            | <input type="checkbox"/> Flight Itinerary         |
| <input type="checkbox"/> Emotional  | <input type="checkbox"/> Animal           | <input type="checkbox"/> Departure Time           |
| <input type="checkbox"/> Laughing   | <input type="checkbox"/> Voice            | <input type="checkbox"/> Actual Aircraft Location |
|                                     | <input type="checkbox"/> Quiet            | <input type="checkbox"/> FBO and/or Facility      |
|                                     | <input type="checkbox"/> Airplane         |   |
|                                     | <input type="checkbox"/> Other            |   |

### BOMB FACTS

PRETEND DIFFICULTY WITH HEARING - KEEP CALLER TALKING - DOES CALLER SEEM AGREEABLE TO FURTHER CONVERSATION, ASK QUESTIONS LIKE:

When will it go off?	Certain hour?	Time remaining?
Where is it located?	Building/Aircraft?	Area?
What kind of bomb?	Type?	Why are you doing this?
What is your name?	First/Last Name?	What do you want?
Where are you?	Address/Location?	Do you know anyone on board?

NOTE: WHEN THE CALLER HANGS UP, DO NOT HANG UP THE PHONE. ON ANOTHER PHONE LINE, NOTIFY PHONE COMPANY TO TRACE CALL.

# PNNL Gulfstream G-1

## Non-Flight Crewmember Training

This training will familiarize you with the safety features and procedures onboard the G-1. If you have any questions during deployment, please ask the flight crew.

You are not considered a passenger but a required crewmember onboard this aircraft. This training is required prior to flight.

Seatbelts are required for takeoff and landing. To fasten your seatbelt, push the flat metal tab into the metal buckle and pull the strap until snug. Release by lifting the top of the buckle.

Smoking is not allowed onboard, or within 50' of the aircraft.

Below or near your seat is a pack that contains safety equipment. Each pack contains an oxygen mask, a smoke mask, life vest (if required), and a flashlight.

- **Oxygen Mask:** Plug the oxygen hose into the receptacle next to the vent, near your seat. Place the mask over your mouth and nose and breathe normally.
- **Smoke Mask:** Open the pouch. Place the hood over your head and place the cup over your nose and mouth. Pull both red straps on the right side of the mask. It should fit securely when in place. Slide the synch ball to your neck to seal. Do not remove until safely away from the aircraft.
- **Life Vest:** Open the container, place the vest over your head, and attach the strap around your waist. Once outside the aircraft, inflate the vest by pulling the red tab. Additional flotation is available by blowing into the tubes.

There are six emergency exits in addition to a ditch hatch in the roof. Some exits may not be usable due to research equipment.

- **Entry Door:** Open by lifting the small red knob and then raising the large red lever. Push the door open.
- **Second and Third Windows:** These are exits located on either side of the aircraft. Pull off the covering located near the window, pull the exposed lever, and then pull the window inward.
- **Rear Baggage Compartment Door:** Open by lifting up on the red and white striped handle, then lift the lower red handle. Push the door outward. The ditch hatch is opened by pulling the latches in the roof. Use caution as the hatch opens inward and may be heavy.

Life raft(s), if required, are located in the cabin. Place the life raft outside the aircraft and hold onto the red lanyard. Pulling the lanyard will inflate the raft.

Fire extinguishers are located throughout the cabin. To operate, pull the pin, aim at the base of the fire, and squeeze the trigger. Use small bursts as necessary. One water fire extinguisher is onboard for non-electrical fires. To operate, aim at the base of the fire and twist the handle.

Immediately report smoke or the smell of smoke to the flight crew.



# PNNL GULFSTREAM G-1 PASSENGER BRIEFING FORM

Welcome Aboard!

Federal Aviation Regulations require that we point out some of this Gulfstream aircraft's many safety features.

To fasten your seatbelt, simply push the smaller metal tab into the end of the metal buckle, and pull on the belt end to tighten. If your seat is equipped with a shoulder strap, extend the shoulder strap and fasten it to the top of the metal buckle. The belt may be released by lifting the top of the buckle.

Should oxygen be required, the flight crew will ask you to don an oxygen mask.

## NO SMOKING ALLOWED

All smoking material must be extinguished before using the oxygen. The masks are located in the rear compartment drawer and must be removed from their containers. You will need to plug the oxygen hose into the receptacle located next to the vent above your seat. Place the mask over your nose and mouth and breathe normally.

Please note the six exits. The entry door may be opened by lifting the small lever on the door, and while holding it up, raise the large lever, then push on the lever to open the door. Also, the second and third windows on each side of the cabin are exits. If you pull down the lever above these windows, having removed any plastic lever covers, and pull on the handles beside the windows, the entire window will pull inward and may be set aside. You may then step through and onto the wing. In addition, if you pass into the rear baggage compartment, you will find an exit on the side of the compartment to your left. To open, lift the upper red and white striped handle, then lift the lower red handle and push outward on the door.

Life vests are located beneath the seats. If you put on a vest, and pull the attached cord, the vest will self inflate. Please do not inflate the vest until you are outside of the aircraft.

You will find additional information, such as fire extinguisher location, on the passenger briefing card near your seat. Please take a moment to review it.

For your added comfort and safety, please observe the "NO SMOKING" and "SEAT BELT" signs. Thank you for your attention, and have a pleasant flight.

## PRE-LANDING BRIEFING

We will be landing shortly! Please make certain your seatback is in the upright position, the tables have been stowed away, your seatbelt is fastened, and that you observe the "NO SMOKING" signs.

Thank you for your cooperation, and we hope that you had a pleasant flight.

-----  
I have read, understood, and will adhere to the above stated instructions.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

# PNNL CUSTOMER SATISFACTION SURVEY

It is the goal of PNNL to offer you, our customer, safe, efficient, and timely air transportation. In an effort to meet this goal, we have developed this survey so that you can provide valuable feedback and help us direct future efforts. At your convenience, complete applicable sections of the survey and leave it in the aircraft or fold and mail to: M. Hubbell, Chief Pilot, MS K9-24, P.O. Box 999, Battelle Blvd., Richland, Washington 99352. Thank you for your assistance.

Please rate the following:

	Low		High		
	1	2	3	4	5
1. Quality of passenger safety briefing	<input type="checkbox"/>				
2. Crew appearance	<input type="checkbox"/>				
3. Crew helpfulness	<input type="checkbox"/>				
4. Crew courtesy and professionalism	<input type="checkbox"/>				
5. Flight conducted in a safe manner	<input type="checkbox"/>				
6. Airplane cleanliness and condition	<input type="checkbox"/>				
7. On-time arrivals/departures	<input type="checkbox"/>				
8. Overall smoothness of flight	<input type="checkbox"/>				
9. Quality of ground services	<input type="checkbox"/>				

Comments:

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Name (optional):

Phone (optional):

---

Mr. Michael Hubbell, Director of Operations  
MS K9-24  
Pasco Airport  
3804 Stearman Avenue  
Pasco, Washington 99301

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# PNNL PASSENGER TRANSPORT REQUEST

## Requester

(Fill out spaces in box below and then obtain your ALD LD approval)

Requester:		Phone No.
Destination(s):		Account No.(s):
Date(s) of Travel Departure: Return:	Travel Time Departure: Return:	Purpose of Trip:
Passengers*:		
Contact Phone No.(s) (Hotel/Office):		

## Laboratory Director Approval

Laboratory Director Approval:
Laboratory Director Office:

## Checklist to be completed by the Flight Schedule Coordinator

Activity	Date	Comments
Obtain by e-mail approval from Laboratory Director		
Enter tentative flight on Schedule (print daily)		
Check availability of aircraft from the Director of Flight Operations • Phone: 509-372-6176		
Submit request to the Laboratory Director's Office by e-mail after above information and appropriate approval has been obtained		
After approval, call the Director of Flight Operations to • Obtain departure times and airports involved • Obtain airport and hotel phone numbers to contact PIC		
Change status of flight on Schedule to no longer tentative		
Prepare a Confirmation with the following information: • Date of trip • Destination		

<ul style="list-style-type: none"> <li>• Departure and arriving airports</li> <li>• Times of departure and arrival</li> <li>• List of passengers</li> <li>• Hotel phone numbers and other contact phone numbers for passengers</li> </ul>		
<p>Distribute Confirmation</p> <ul style="list-style-type: none"> <li>• e-mail to Passengers</li> <li>• Fax &amp; e-mail to the Director of Flight Operations (Fax 509-372-6168)</li> </ul>		

\*No more than 12 passengers. PNNL policy does not allow elected state/local officials to fly. Federal elected officers are not permitted to travel unless they present us with a first-class airfare upon boarding the plane.

\*\*Staff will be charged coach unrestricted fare. Government employees will be charged FTR rates and must reimburse Battelle.

# PNNL PASSENGER TRANSPORT TRIP SHEET

<b>Pacific Northwest National Laboratory</b>	<b>TRIP SHEET 000nn Page 01</b>
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**Trip Dates**  
**Aircraft ID**  
**Type**

**Description**  
**Requester**  
**Contact Phone ( ) -**

	Pax		Local	Zulu	Miles	ETE		
<b>Leg 01</b>								
<b>Leg 02</b>								
<b>Leg 03</b>								
<b>Leg 04</b>								
<b>CREW PILOT PILOT IN COMMAND PILOT</b>			<b>ADDL CREW</b>					
<b>AIRPORT NOTES</b>								
<b>OUTBOUND INSTRUCTIONS</b>								
<b>NBR PASSENGER NAME</b>				<b>Leg: 01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>Contact</b>
				<b>Phone</b>				
1.				EB				
2.				EB				
3.				EB				
4.				EB				
5.				EB				
6.				EB				
7.				EB				
8.				EB				
9.				EB				
10.				EB				
11.				EB				
12.				EB				

# PNNL PASSENGER TRANSPORT MANIFEST

Departure Flight				
Date	Departure Time	Airport	Arrival Time	Airport
Passengers: Pilot: Bob Hannigan				
Contact Phone No.(s): Office: (509) 372-6176 Hotel: ( )				
Account No.:				
Stop-Over Flight				
Date	Departure Time	Airport	Arrival Time	Airport
Passengers: Pilot:				
Contact Phone No.(s): Office: (509) 372-6176 Hotel: ( )				
Account No.:				
Return Flight				
Date	Departure Time	Airport	Arrival Time	Airport
Passengers: Pilot:				
Contact Phone No.(s): Office: (509) 372-6176 Hotel: ( )				
Account No.:				

# PNNL PASSENGER TRANSPORT PREFLIGHT SECURITY CHECKLIST

**Date of Flight:** \_\_\_\_\_

**Pilot:** \_\_\_\_\_ **Phone Number:** \_\_\_\_\_

**Procedure:** If any of the following questions are answered in the in the negative, notify Security (509) 375-2400.

	Yes	No	NA
1. If passengers or crew are transporting classified materials, who is carrying the material?			
Full Name:			
Payroll #:			
Org. Code:			
Classification:			
Is the transporter or courier meeting applicable federal requirements?	<input type="checkbox"/>	<input type="checkbox"/>	
2. If carrying classified or Business Sensitive material, is the material packaged to meet applicable federal/state or PNNL regulations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If hazardous or radiological materials are being carried, are applicable federal/state regulations being met?	<input type="checkbox"/>	<input type="checkbox"/>	
4. Are controlled substances, covered by federal and/or state law being carried?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, are applicable federal and/or state laws being met?	<input type="checkbox"/>	<input type="checkbox"/>	
5. If non-PNNL passengers are being carried, do they meet applicable federal and/or state regulations for hazardous toxic, radiological and/or classified material?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are packages and cargo marked to identify shipper and receiver?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. If firearms or ammunition are being carried, are they stored in the cargo area?	<input type="checkbox"/>	<input type="checkbox"/>	
8. If passengers from DOE, DoD, or other federal agencies are being carried, does the aircraft meet applicable DOE policies or regulations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# PROTOCOL FOR PNNL FLIGHT OPERATIONS

The Pacific Northwest National Laboratory (PNNL) project/technical manager shall prepare a statement of work (SOW) describing the proposed flight operation and a justification for the use of aircraft/helicopter to accomplish mission needs. The SOW shall include, but not be limited to, the following information:

- U.S. Department of Energy (DOE) Task Order for which the work will be performed
- Name and phone number of project/technical manager
- Specification for the reason such work requires aviation activity
- Estimated start and end dates of the flight operation
- Area to be flown (that is, Hanford, United States, Canada)
- Estimated total flight hours and operations budget
- Type of aircraft/helicopter requested
- Minimum/maximum altitude required of the aircraft to complete mission
- Flight conditions (Visual Flight Rules or Instrument Flight Rules; day or night)
- Required unusual flight maneuvers
- Number of PNNL staff in the aircraft and justification for their participation
- Proposed route of flight plan (location, altitude, pattern, maneuvers, and duration of flight).

The PNNL Aviation Safety Point of Contact (ASPOC) shall review the SOW and make a determination as to whether the proposed operation is a normal or above normal risk flight operation. If the ASPOC decides the operation is above normal risk, as determined by the DOE Richland Operations Office (DOE-RL) Aviation Manual (Appendix 5, Safety Plan), the DOE-RL Aviation Safety Committee (ASC) must approve the operation prior to the start of flight operations. If the ASPOC considers the operation to be normal, the ASPOC can approve the operation and must notify the DOE-RL Aviation Safety Office of the flight details prior to the start of operations. The notification to the DOE-RL Aviation Safety Office must include:

- Description of flight
- Proposed date of flight
- Purpose of flight
- Statement indicating the flight operation meets the requirements of the DOE Aviation Operation
- Checklist for Charter Aircraft that follows this Protocol Statement
- Name of technical contact for the operation
- Approval of PNNL ASPOC.

When the PNNL ASPOC determines an operation is above normal risk, the ASPOC must submit the Aviation Safety Plan/Risk Assessment document to the DOE-RL ASC for approval. The document must be submitted to the ASC at least 30 days in advance of the date of the proposed flight operation. The DOE-RL Aviation Manual defines above normal risk flight operation as:

- Flights below 500 feet above ground level (AGL) for fixed- or rotary-wing aircraft
- Night flights that are conducted in single-engine aircraft with a single pilot and in helicopters without radar altimeters
- Fixed-wing aircraft operating at air speeds that are within 10 knots of published stall speeds for all flight regimes; flights that require maneuvering that involves abrupt changes in attitude,

abnormal acceleration, or any flight configuration that is not considered within normal flight parameters

- Operations conducted in close proximity (500 feet horizontally) to power lines and other structures requiring high clearance, such as stacks and towers
- Flights that require 14 CFR Part 91.119 altitude waivers
- Helicopter operations that require hovering for 10 minutes or more at altitudes of 100 ft or higher AGL
- Flights that carry or dispense hazardous chemicals/material or transport radioactive materials
- Any other unusual flight activities; such as a hostile political situation and wildlife herding or darting.

The PNNL ASPOC must prepare an Aviation Risk Assessment/Safety Plan prior to performing any flight operations. This document must include the ASC-approved DOE Aviation Operations Checklist for Charter Aircraft. This checklist confirms that both the aviation operation and the contractor performing the flight operation are in compliance with DOE Order 440.2.

A minimum of 2 days prior to the planned overflight of the Hanford Site, the ASPOC shall notify Safeguards and Securities Services at PNNL. The PNNL ASPOC shall notify Hanford Patrol of the aircraft type, registration number, color, and the estimated flight times and locations.

Prior to the operation, the PNNL ASPOC shall conduct a safety or training meeting. All persons involved in the operation shall be in attendance or on conference call. Prior to each flight, the preflight checklist shall be completed to document weather conditions, estimated departure and landing times, crew members, flight locating procedures, and training for personnel involved with the aviation operation.

In the event of an aircraft incident/accident, PNNL shall immediately notify the DOE-RL ASO, the National Transportation Safety Board, and the Federal Aviation Administration, as required.

An aircraft incident/accident could include:

- A fatality or fatalities
- Lost workday injuries to crew members, groundcrew, or other personnel assigned to aviation operations
- Injuries to passengers or the general public
- Downtime for aircraft
- An explosion or fire involving an aircraft
- Substantial damage to property, and to classified, radioactive, high-explosive, or other hazardous cargo.

# PNNL TAKE-OFF & LANDING DATA CARDS

FROM

TO

\_\_\_\_\_  
S/UP

\_\_\_\_\_  
S/DN

\_\_\_\_\_  
T. O.

\_\_\_\_\_  
LAND

\_\_\_\_\_  
DATE

\_\_\_\_\_  
T. T.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## TAKEOFF DATA

TAKEOFF G/W

V<sub>1</sub>

\_\_\_\_\_

V<sub>R</sub>

\_\_\_\_\_

V<sub>2</sub>

\_\_\_\_\_

V<sub>FS</sub>

\_\_\_\_\_

V<sub>REF</sub>

\_\_\_\_\_

ATIS INFO ( )

WEATHER:

DEPARTURE RNWY:

NOTAMS:

T/O DISTANCE

WET OR DRY

FUEL TRIM

C Limit

TORK

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

L

\_\_\_\_\_

E Route

\_\_\_\_\_

A

\_\_\_\_\_

R

\_\_\_\_\_

A Dep. Inst.

\_\_\_\_\_

N Altitude

\_\_\_\_\_

C Freq.

\_\_\_\_\_

E Transponder Code

## LANDING DATA

LANDING WT

V<sub>REF</sub>

V<sub>2</sub>

ATIS INFOR {      }

WEATHER:

APPROACH:

LANDING:

NOTAMS:  
WET OR DRY  
FUEL TRIM

\_\_\_\_\_ %

TAKEOFF

WEIGHT & BALANCE

	WEIGHT	INDEX
1. Basic Op Wt.	_____	_____
2. Pax ( )	_____	_____
3. Extra F Bag	_____	_____
4. Extra A Bag	_____	_____
0 FUEL WT.	_____	_____
5. FUEL	_____	_____
6. Water Meth.	_____	_____
TAKEOFF WT.	_____	_____
7. Revised GW	_____	_____

LANDING

WEIGHT & BALANCE

	WEIGHT	INDEX
	_____	_____
8. Burnoff	_____	_____
LANDING WT.	_____	_____







# PNNL AIRCRAFT DISCREPANCY CARRY-OVER LOG

REGISTRATION NO	MAKE:	MODEL:	S/N:	APU CLOCK HR:	AIRFRAME IIR:	AIRFRAME LDGS:	PAGE	OF
N701BN	GAC	159	074				DATE OPENED:	DATE CLOSED:
ITEM NO.	DISCREPANCY							
ENTERED BY								
DATE	CORRECTIVE ACTION:							
	ACFT HOURS:							
	ACFT LANDINGS:							
	DATE:							
	STATION:							
ITEM NO.	DISCREPANCY							
ENTERED BY								
DATE	CORRECTIVE ACTION:							
	ACFT HOURS:							
	ACFT LANDINGS:							
	DATE:							
	STATION:							
ITEM NO.	DISCREPANCY							
ENTERED BY								
DATE	CORRECTIVE ACTION:							
	ACFT HOURS:							
	ACFT LANDINGS:							
	DATE:							
	STATION:							
ITEM NO.	DISCREPANCY							
ENTERED BY								
DATE	CORRECTIVE ACTION:							
	ACFT HOURS:							
	ACFT LANDINGS:							
	DATE:							
	STATION:							
ITEM NO.	DISCREPANCY							
ENTERED BY								
DATE	CORRECTIVE ACTION:							
	ACFT HOURS:							
	ACFT LANDINGS:							
	DATE:							
	STATION:							

<b>PNNL AVIATION SAFETY HAZARD REPORT</b>	
<b>LOCATION OF HAZARD</b>	<b>DATE</b>
<b>SUBMITTED BY (Optional)</b>	<b>PHONE</b>
<b>DESCRIPTION OF HAZARD</b>	
<b>SUGGESTED CORRECTIVE ACTION</b>	
<b>INSTRUCTIONS: Fill out using additional sheets, if necessary. Fold, staple, and place on the Director of Flight Operations desk. Thank you for your interest in our Aviation Safety Program</b>	

## PNNL's AVIATION OPERATIONS CHECKLIST CHARTER AIRCRAFT

Charter/Lease Operator: \_\_\_\_\_

Date: \_\_\_\_\_ Location: \_\_\_\_\_

Certified to Operate Under 14 CFR Part: \_\_\_\_\_

This checklist is to assure that the planned use of charter/lease aircraft meets the requirements of DOE Order 440.2A, Aviation, and RLIP 440.2, Aviation Safety. If there are any responses marked no or NA (for not applicable), justification must be attached.

Such a response may require the review and approval of the DOE-RL aviation safety committee.

	Yes	No	NA
1) The aviation services contractor or subcontractors shall hold Air Carrier, Commercial Operator, or other appropriate certificates under 14 CFR Parts 91, 121, 125, operations being conducted. The specifications and ownership of Parts 129, 133, 135, 137, and 145 as applicable for the types of prospective aircraft shall be listed on the Operating Specification.	[ ]	[ ]	[ ]
Verification document(s) attached	[ ]		
2) Multi-engine modern aircraft shall be utilized unless project-specific requirements call for single-engine aircraft.	[ ]	[ ]	[ ]
Multi-engine	[ ]		
Single-engine	[ ]		
3) Flight crews shall include a minimum of two qualified pilots on multi-engine aircraft.	[ ]	[ ]	[ ]
4) Minimum pilot in command (PIC) qualifications are:			
FAA Commercial Pilot Certificate (Airline Transport Pilot Rating [ATP] desired) with appropriate category and class rating.			
Commercial:	[ ]		
ATP:	[ ]		
A second-class medical certificate is required.			
First Class:	[ ]		
Second Class:	[ ]		

<b>PNNL's AVIATION OPERATIONS CHECKLIST CHARTER AIRCRAFT</b>
--

	Yes	No	N/A
5) Minimum flight experience is:			
1200 hours in category	[ ]	[ ]	
100 hours in class	[ ]	[ ]	
100 hours PIC in category during the previous 12 months	[ ]	[ ]	
25 hours PIC in make and model of aircraft, 10 hours of which shall have been within the preceding 6 months	[ ]	[ ]	
Pilots should be named in the operating specifications of the aviation services contractor and certified for the specific types of operations to be conducted.			
6) Pilots shall be full-time employees or listed on the aviation operator's operations specifications	[ ]	[ ]	
Verification document(s) attached	[ ]	[ ]	
7) The co-pilot, when one is required, shall be instrument rated	[ ]	[ ]	[ ]
8) The charter operator and pilots shall be fully certified for types of aircraft to be used.	[ ]	[ ]	[ ]
Verification documents/attached	[ ]	[ ]	
9) All aircraft shall be certified for instrument flight and equipped in accordance with applicable FAA regulations. Manufacturer and FAA minimum equipment lists will be used as required.	[ ]	[ ]	[ ]
Verification documents/attached	[ ]	[ ]	
10) All aircraft, except military aircraft, shall be certified by FAA.	[ ]	[ ]	[ ]
Verification documents/attached	[ ]	[ ]	
11) Operator-owned aircraft, not leased aircraft, shall be used whenever possible.	[ ]	[ ]	[ ]
Verification documents/attached	[ ]	[ ]	
12) If research-oriented flying or an FAA waiver is required, the flight crew, to the extent possible, must have logged 5 hours within the preceding 30 days in the make and model of aircraft to be flown. At least 2 of the 5 hours will be project-specific type of flying.	[ ]	[ ]	[ ]

## PNNL's AVIATION OPERATIONS CHECKLIST CHARTER AIRCRAFT

		Yes	No	NA
13)	When the installation of any additional equipment is required, the aviation operator shall have the appropriate exemptions or permits from the FAA.	[]	[]	[]
14)	The charter operator shall have full control over the aircraft maintenance and all aircraft shall be maintained in accordance with applicable FAA regulations.	[]	[]	[]
	Verification documents/attached.	[]	[]	
15)	Training programs shall meet, to the extent possible, the requirements of 14 CFR Part 121 or 135 for both flight and ground personnel.	[]	[]	
16)	The charter operator shall provide a suitable flight and ground crew training program for the safe handling of the types of materials and cargo to be transported.	[]	[]	[]
17)	Contract provisions require that, prior to research-oriented flying, there shall be a safety meeting held that will include the project leader, the charter operator's flight crew, Safety, and all personnel associated with the flight, including ground personnel. Documentation to be provided to file.	[]	[]	[]
18)	Contract provisions require the charter pilot and technical administrator to document each flight using the aircraft preflight checklist and safety meeting documentation. Documentation is to be provided to file.	[]	[]	[]
19)	Certain special safety requirements may be necessary for air shipments of radioactive cargo and other special cargo.	[]	[]	[]
20)	The aviation operator shall have a survival kit (when required) suitable for the season of the year, the terrain that flight is to be conducted over, and other environmental conditions. Also there shall be a first aid kit of adequate capacity and a suitable fire extinguisher on board the aircraft.	[]	[]	
21)	On research flights, the charter operator shall, to the extent possible, provide shoulder-harness-type seat belts.	[]	[]	[]

<b>PNNL's AVIATION OPERATIONS CHECKLIST CHARTER AIRCRAFT</b>
--

- |   | Yes                      | No                       | N/A                      |
|---|--------------------------|--------------------------|--------------------------|
| 22) On research flights, PNNL line management will be notified of each flight and track location and expected takeoff and landing times. If the aircraft crew has not notified line management within one hour after the expected landing time, emergency procedures will be implemented. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23) When research-oriented flying is conducted below 2000 feet AGL, the charter operator shall maintain obstacle maps that are updated prior to each flight. The maps indicate the height AGL of all existing obstacles to flight in the area where the operations are being conducted.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24) Insurance requirements for charter operations (a certificate evidencing this insurance is required; if the charter is for more than 30 days, special permission is required).   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

For Contract 1831 Charters:

- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
| -Aircraft and Passenger Liability: \$5,000,000 combined single limit if 4 or fewer passenger seats; \$7,500,000 if 5 or more passenger seats (if more than 15 passenger seats, special permission is required); \$100,000 per person minimum passenger liability. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

For Contract 1830 Charters:

- |  |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|
| -Bodily Injury and Passenger Liability: at least \$200,000 per person and \$500,000 per occurrence for bodily injury, other than passenger liability, and \$200,000 multiplied by the number of seats or the number of passengers, whichever is greater. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Property Damage Liability: at least \$200,000 per occurrence.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

# PNNL AVIATION SAFETY INCIDENT/ ACCIDENT OR OFF-NORMAL EVENT OPERATIONS CHECKLIST

1. DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

2. Location of emergency: \_\_\_\_\_

3. Aircraft type and number: \_\_\_\_\_

4. Crew names: \_\_\_\_\_

Captain: \_\_\_\_\_

First Officer: \_\_\_\_\_

Other: \_\_\_\_\_

5. Number of persons involved (attach list): \_\_\_\_\_

6. Weather conditions: \_\_\_\_\_

7. Point of departure: \_\_\_\_\_

8. Aircraft malfunctions (if any): \_\_\_\_\_

9. Crew members will secure the scene to allow accurate documentation of conditions associated with the even and provide a written narrative of all pertinent facts relating to and describing the incident/accident or off-normal event . Whenever possible photograph the scene (with reference objects, e.g., pencil for dimensional perspective).

10. Follow-up notifications:

A. PNNL Emergency #: 509-375-2400

B. Research Aircraft Facility Manager:

Beat Schmid

Office: 509-375-2996

C. Scheduler:

Jennifer Comstock

Home: 509-375-3040

Office: 509-372-4244

D. Agencies (as required):

FAA: 614-237-1039

NTSB: 614-237-1039

Police: 911 or 509-943-7340

# PNNL EMERGENCY NOTIFICATION CHART

X = Notify immediately  
 O = Notify within 24 hours  
 N = Notification not required

	PNNL Emergency	Director of Flight Operations	Level II (delegate)	Scheduler	FAA	NTSB	Police	DOE- RL	BCO
Aircraft Accident	X	X	X	X	X	X	X	X	X
Aircraft Overdue or Believed Involved in Accident	X	X	X	X	X	X	X	X	X
Fatal Injury	X	X	X	X	X	X	X	X	X
Serious Injury	X	X	X	X	X	X	X	X	X
Flight Crew Member Injury or Illness on Duty	N	X	X	X	O	O	N	N	N
Substantial Damage	N	X	X	X	X	X	X	X	X
In-Flight Fire	N	X	X	X	X	X	N	X	X
Engine or Flight Control Failure	N	X	X	X	X	X	N	X	X
Bomb Threat or Hijacking	X	X	X	X	X	X	X	X	X
Aircraft Ground Damage	N	X	X	X	X	N	N	N	X
Engine Shutdown	N	X	X	X	O	N	N	N	X
Substantial System Malfunction	N	X	X	X	O	N	N	N	N
Diversion	N	O	X	X	N	N	N	N	N

PNNL Emergency  
509-375-2400

Agencies:  
 FAA: 614-237-1039  
 NTSB: 614-237-1039  
 Police: 911 or 509-943-7340

Director of Flight Operations  
 Mike Hubbell  
 Home: 509-943-1777  
 Office: 509-372-6176

DOE-RL/A&E:  
 Aviation Safety Officer  
 Roger Gordon  
 509-372-2139

Scheduler  
 Jennifer Comstock  
 Home: 509-375-3040  
 Office: 509-372-4244

Director of Emergency Management & Business  
 Continuity  
 Gene B. Roe  
 Battelle Columbus Operations  
 505 King Ave.  
 Columbus Ohio 43201-2696  
 (614) 424-4344

# PNNL AIRCRAFT MAINTENANCE STATUS

Type of Aircraft Utilized: \_\_\_\_\_ Date: \_\_\_\_\_

Aircraft Registration No.: \_\_\_\_\_

A. The maintenance status of the above named aircraft is as follows:

Inspections: Total Time of Airframe \_\_\_\_\_  
Aircraft Landings \_\_\_\_\_

Total Time on Engine (LE)	SMOH _____	TBO _____
Total Time on Engine (RE)	SMOH _____	TBO _____
Total Time on Left Prop	SMOH _____	TBO _____
Total Time on Right Prop	SMOH _____	TBO _____
Computerized Maintenance		
Program Completed through	Calendar _____	Hourly _____
ELT Battery	Last C/W Date _____	Next Due _____
Altimeter FAR 91.411 Check	Last C/W Date _____	Next Due _____
Static System Check	Last C/W Date _____	Next Due _____
Transponder Check	Last C/W Date _____	Next Due _____
Encoder Check	Last C/W Date _____	Next Due _____
Total Time on Engine (LE)	SMOH _____	TBO _____
Total Time on Engine (RE)	SMOH _____	TBO _____
Total Time on Left Prop	SMOH _____	TBO _____
Total Time on Right Prop	SMOH _____	TBO _____
Computerized Maintenance		
Program Completed through	Calendar _____	Hourly _____
ELT Battery	Last C/W Date _____	Next Due _____
Altimeter FAR 91.411 Check	Last C/W Date _____	Next Due _____
Static System Check	Last C/W Date _____	Next Due _____
Transponder Check	Last C/W Date _____	Next Due _____
Encoder Check	Last C/W Date _____	Next Due _____
Fire Exting. Check Due	Last Date _____	Next Due _____

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION  
**STANDARD AIRWORTHINESS CERTIFICATE**

1 NATIONALITY AND REGISTRATION MARKS <b>N-701BN</b>	2 MANUFACTURER AND MODEL <b>GRUMMAN / G-159</b>	3 AIRCRAFT SERIAL NUMBER <b>74</b>	4 CATEGORY <b>TRANSPORT</b>
--	--	---------------------------------------	--------------------------------

5 AUTHORITY AND BASIS FOR ISSUANCE

This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate thereof to be in condition for safe operation and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex B to the Convention on International Civil Aviation except as noted herein  
Exceptions

NONE

6 TERMS AND CONDITIONS

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States

DATE OF ISSUANCE <b>2-21-92</b>	FAA REPRESENTATIVE   <b>FLOYD W. GASTON</b>	DESIGNATION NUMBER <b>ANM-02</b>
------------------------------------	--	-------------------------------------

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1000 or imprisonment not exceeding 3 years or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS

FAA Form 8100-2 (8-82)

\*U.S. GPO: 1989-662-87

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION  
**SPECIAL AIRWORTHINESS CERTIFICATE**

A	CATEGORY/DESIGNATION	RESTRICTED	
	PURPOSE	ATMOSPHERIC RESEARCH	
B	MANUFACTURER	NAME	N/A
		ADDRESS	N/A
C	FLIGHT	FROM	N/A
		TO	N/A
D	N-701BN	SERIAL NO. 74	
	BUILDER GRUMMAN	MODEL	G-159
E	DATE OF ISSUANCE	2-21-92	EXPIRE UNLIMITED
	OPERATING LIMITATIONS DATED	2-21-92	ARE A PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE	DESIGNATION OR OFFICE NO.	
	 <b>FLOYD W. GASTON</b>		ANM-02

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA FORM 8130-7 (10/82)

SEE REVERSE SIDE

## **Operations Limitations—Aircraft Multiple Airworthiness**

As shown in the airworthiness certificate example in Appendix A, the G-1 has been certified in both the standard and the restricted categories under the multiple certification provisions of FAR Part 21.187. While in the restricted classification of airworthiness, the aircraft will be operated for atmospheric research with the following rules applied.

1. Operations involving this aircraft in any other use are prohibited unless the airworthiness certificate and these operations are amended in accordance with the provisions of FAR Part 21.
2. This aircraft shall not be operated in any manner that will endanger public life and property. The operator shall adjust the takeoff weight to provide a safe margin of performance for the existing operation conditions, considering the takeoff area, altitude, temperature, and terrain.
3. Aerobatic maneuvers are not permitted.
4. Unless the Administrator (FAA) finds it in the public interest to authorize aerobatic maneuvers, these operations shall not be conducted over densely populated areas, in congested air lanes, or in the vicinity of busy airports where passenger transport operations are being conducted.
5. Persons and cargo shall not be carried for compensation or hire.
6. Persons other than the minimum crew necessary for the operations shall not be carried during these operations (MAXIMUM 7 PERSONS).
7. The RESTRICTED placard must be displayed conspicuously at the cockpit entrance (using minimum 2-inch letters).
8. When operations are conducted in the standard category, the operations limitations specified in the FAA-approved airplane flight manual shall be observed. The limitations listed here apply to the aircraft when it is in the restricted category configurations being used for special purpose operations.
9. This aircraft may be converted from the restricted to the standard category of airworthiness and vice versa by a certificated mechanic without further inspection or an approval of the FAA. Prior to the carriage of passengers or students for hire, the aircraft must be converted to the standard category of airworthiness, inspected, and found airworthy in accordance with FAA policies established in FAR Part 21.187. This aircraft must be converted from standard to restricted classification or vice versa in accordance with the conversion instructions as outlined on the major repair and alteration FAA Form 337 covering installation of the equipment on the aircraft.

## REGISTRATION NOT TRANSFERABLE

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION CERTIFICATE OF AIRCRAFT REGISTRATION		This certificate must be in the aircraft when operated.
NATIONALITY AND REGISTRATION MARKS <b>N 701BN</b>	AIRCRAFT SERIAL NO. <b>74</b>	
MANUFACTURER AND MANUFACTURER'S DESIGNATION OF AIRCRAFT <b>GRUMMAN 6-159</b>		
I S S U E D T O	<b>BATTELLE PACIFIC NW LABORATORIES</b> <b>PO BOX 999</b> <b>RICHLAND WA 99352</b>	
	<b>CORPORATION</b>	
It is certified that the above described aircraft has been entered on the register of the Federal Aviation Administration, United States of America, in accordance with the Convention on International Civil Aviation dated December 7, 1944, and with the Federal Aviation Act of 1958, and regulations issued thereunder.		 <b>U.S. Department of Transportation</b>
DATE OF ISSUE <b>OCT. 29, 1987</b>	 <i>Donald D. Engen</i> Administrator	

AC Form 8050-3 (1-85)

**FLIGHT OPERATIONS REQUEST**

**DOE Task Order Number for which work is to be performed:** \_\_\_\_\_ **Date Submitted:** \_\_\_\_\_

**Project Manager:** \_\_\_\_\_ **Telephone #:** \_\_\_\_\_ **Approved:** \_\_\_\_\_

**Technical Manager:** \_\_\_\_\_ **Telephone #:** \_\_\_\_\_

**Project Dates**

**From:** \_\_\_\_\_ **To:** \_\_\_\_\_

**Estimated Total Flight Hours:**

**Estimated Flight Operations Budget**

**Justification for Aircraft Use**

**Describe why flight operations are required:**

\_\_\_\_\_

**Identify any of the following above-normal risk operations that will be required:**

- Flight less than 500 feet above ground level for either fixed wing or rotary wing aircraft.
- Night flights that are conducted in single engine, single pilot aircraft, or in helicopters without radar altimeters or ground proximity warning equipment.
- Fixed wing aircraft operating at airspeeds that are within 10 knots of published stall speeds and flights that require maneuvering that involves abrupt changes in altitude, abnormal acceleration or any flight configuration that is not considered within normal flight parameters.
- Operations to be conducted in close proximity (500 feet horizontally) of power lines and other highclearance-required structures.
- Low flights over populated areas (require 14 CFR 91.119 altitude waivers from FAA).
- Helicopter operations that require hovering for 10 minutes or more, at altitudes of 100 feet Above Ground Level or above.
- Flights that carry or dispense hazardous chemicals/material or transport radioactive materials.
- Any other unusual flight activities, e.g. hostile political situation, wildlife herding or darting.

If yes, please explain:

**Description of Flight Operations**

**Purpose of Flight:**

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**Flight date(s):** \_\_\_\_\_  
**Tot. Flight time:** \_\_\_\_\_

**Preferred Operator:**

Type: \_\_\_\_\_ Gulfstream-1  
(e.g. 14 CFR 91, 135 public)

**Flight Condition:**

Visual Flight Rule  
 Instrument Flight Rule  
 Night

**Aircraft Type:**

Multi Engine  
 Fixed Wing  
  
 Single Engine  
 Helicopter

**Will aircraft need to be modified?**

Yes  No

**Flight Plan:** \_\_\_\_\_

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**Number of people in aircraft:**

Battelle \_\_\_\_\_ Others \_\_\_\_\_

**Justification:**

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**Pacific Northwest National Laboratory  
INITIAL AIRCRAFT SUPPORT REQUEST  
DOE Research Aircraft Facility**

MAIL, FAX, OR E-MAIL  
COMPLETED FORM TO:

**DOE Research Aircraft Facility, MSIN K9-30**  
COMPLETED FORM TO: **Pacific Northwest National Laboratory**  
**P.O. Box 999, Richland, WA 99352**  
Fax: 509-372-6168, Phone: 509-372-4244  
[jennifer.comstock@pnl.gov](mailto:jennifer.comstock@pnl.gov)

**1. PROJECT NAME (OR BRIEF DESCRIPTION OF MISSION)**

**2. DOE PROGRAM FUNDING THE ACTIVITY (SELECT ONE  UNKNOWN  NON-DOE: \_\_\_\_\_**  
 **ATMOS. RAD.MEAS. (ARM)  OTHER: \_\_\_\_\_**

**3. REQUESTED PROJECT DATES (INCLUDE INSTRUMENT UP/DOWN LOAD)**

**4. TOTAL NUMBER OF PROJECT DAYS (INCLUDE INSTRUMENT UP/DOWN LOAD)**

**5. REQUESTED FLIGHT HOURS**

**6. TYPE OF AIRCRAFT REQUESTED**

GULFSTREAM 159 (G-1)  OTHER: \_\_\_\_\_

**7. PROJECT AREA (STAGING AREA AND AREA OF OPERATION)**

**8. BRIEF DESCRIPTION OF PROGRAM OR PROJECT**

**9. FLIGHT SCHEDULE PROFILE(S) (I.E., REQUIRED WEATHER, TIME OF DAY, DURATION, ALTITUDE, SPEED)**

**FINAL REQUEST FOR AIRCRAFT SUPPORT FORM IS COMPLETED COLLABORATIVELY BY THE PI AND THE RAF.  
MORE INFORMATION ON INSTRUMENTATION AND AIRCRAFT MODIFICATIONS WILL BE NEEDED THEN.**

**10. IF THE DOE RAF AIRCRAFT IS UNAVAILABLE OR NOT ECONOMICAL, DO YOU REQUEST ASSISTANCE IN LOCATING A SUITABLE AIRCRAFT TO SUPPORT YOUR PROJECT/MISSION? (SELECT ONE**

YES  NO

**11. FUNDING SOURCE: (SELECT ONE  UNKNOWN  DOE FUNDS  OTHER: \_\_\_\_\_**

**12. PRINCIPLE INVESTIGATOR/PRIMARY POINT OF CONTACT (Complete address, phone, fax, Email)**

Signature/Date

**13. FUNDING AGENCY/SPONSOR AUTHORIZED TO SIGN THE FINANCIAL OPERATING PLAN (FOP) (Complete address, phone, fax, Email)**

Signature/Date

# RESEARCH AIRCRAFT DEPLOYMENT DOCUMENT

PNNL Gulfstream G-1 Aircraft  
Pacific Northwest National Laboratory  
P.O. Box 999, MSIN K9-30  
Richland, WA 99352  
Jennifer Comstock (509) 372-4244

<b>A. PROJECT IDENTIFICATION</b>		
1. Requestor's Name:	2. Title:	3. Organization:
4. Address:		5. Phone:
		6. Date:
7. Title that describes this activity:		
8. Abstract of proposed aircraft use:		
9. Previous airborne research experience of requesting scientist:		
10. Other personnel who will participate in this activity and their responsibilities:		
11. Educational Activities: Anticipated involvement of students or other university personnel?		

12. After flight operations are complete, how much time will be required for data analysis?	
13. Where and when do you expect the results of the airborne observations to be published?	
<b>B. RESEARCH SPONSOR</b>	
1. Name of sponsor:	2. Contract officer name/telephone:
3. Address:	
4. Funding:	
Approved                      Pending	
5. Title of research project:	
6. Principal Investigator(s):	
<b>C. OTHER AVIATION FACILITIES</b>	
1. Will other aircraft participate in the proposed measurement program?	
2. Identify aircraft and aircraft contact person:	
3. How will aircraft be used in proposed measurement program? Describe operations relative to the PNNL aircraft.	
<b>D. FLIGHT OPERATIONS</b>	
1. Proposed flight period	
From:	To:
2. Number of flights required:	3. Number of flights/hours per day
	Number of consecutive flying days:

4. Estimated duration of each flight:	5. Will you require over water operations?
6. Proposed base of operations:	7. Alternate base of operations:
8. Average flight radius from base:	9. Desired flight altitudes:
10. Typical takeoff time (local time): Length of duty day:	11. Expected number of flight days within proposed program:
12. Sketch or describe desired flight patterns, state priorities, and estimate number of flights for each (use additional sheets if needed):  Pattern No. 1:	
Pattern No. 2:	
13. How many scientific observers will you require on each flight?	

**E. SUPPLEMENTAL INFORMATION FOR COMPLIANCE WITH DOE 440.2**

**The aircraft is operated by PNNL for the Department of Energy in accordance with DOE Order 440.2.**

1. Names, titles, and duties of personnel onboard the aircraft (do not include PNNL pilots or PNNL scientific crew):

2. Analysis of hazards associated with proposed mission(s) (e.g., unusual maneuvers, meteorological conditions, terrain, heavy air traffic areas, chemicals, voltages, heat, lasers, hazardous chemicals, radioactive materials)

3. Actions taken to mitigate associated hazards:

4. Expected flight conditions (e.g., visual flight rules, instrument flight rules, night flight, meteorological conditions):

5. Proposed deviations from Federal Aviation Regulations and justification (e.g., flights below 500 feet):

**F. SCIENTIFIC PAYLOAD**

1. List Details of Required Measurements Using Research Aircraft Facility Instruments and Systems:

Measurement	Instrument	Data Output Rate	Priority	Remarks
<b>Cloud Instruments</b>				
Particle Size Distribution 10 to 3,000 $\mu\text{m}$	2-Dimensional Stereo Probe (2D-S)			
Cloud/aerosol particle size distributions 0.5 $\mu\text{m}$ to 1,550 $\mu\text{m}$ and liquid water content	Cloud Aerosol and Precipitation Spectrometer (CAPS)			
Cloud particles size distribution 2 to 50 $\mu\text{m}$	Cloud Droplet Probe (CDP)			
Cloud extinction and asymmetry parameter	Cloud Integrating Nephelometer (CIN)			
High resolution images of ice crystals	Cloud Particle Imager (CPI)			
Total condensed atmospheric water content	Cloud Spectrometer and Impactor (CSI)			

Sampling of cloud droplet residuals	Counterflow Virtual Impactor (CVI)			
Cloud particles size distribution 2 to 50 $\mu\text{m}$	Fast-Cloud Droplet Probe (F-CDP)			
Cloud particles size distribution 2.0 to 47.0 $\mu\text{m}$	Fast-Forward Scattering Spectrometer Probe (F-FSSP)			
Cloud particles size distribution 400 to 50,000 $\mu\text{m}$	High Volume Precipitation Spectrometer Version 3 (HVPS-3)			
Liquid water content, total water content, and ice water content derived	Multi-Element Water Content System (WCM-2000)			
<b>Aerosol Instruments</b>				
Concentration of cloud condensation nuclei at a specified supersaturation	Dual-Column Cloud Condensation Nuclei Counter (CCNc)			
Aerosol scattering coefficient as a function of relative humidity	Humidigraph			
Particle ionic composition	Particle in Liquid System (PILS)			
Light absorption and scattering	Photo-Acoustic Soot Spectrometer, 3 wavelength (PASS-3)			
Aerosol properties size distribution 0.015 to 0.450 $\mu\text{m}$	Scanning Mobility Particle Sizer (SMPS)			
Soot spectrometry	Single Particle Soot Photometer (SP2)			
Aerosol size distribution 0.060 to 1 $\mu\text{m}$	Ultra-High Sensitivity Aerosol Spectrometer (UHSAS)			
Ultra-fine particle concentration $>2.5$ nm	Ultra-fine CPC (TSI 3025)			
Particle concentration $>12$ nm	CPC (TSI 3010)			
Particle size distribution (0.1-10 $\mu\text{m}$ )	Passive Cavity Aerosol Spectrometer (PCASP)			

Light absorption coefficient	3-wavelength Particle Soot Absorption Photometer (PSAP)			
Light scattering coefficient	3-wavelength Nephelometer			
<b>Radiometric Measurements</b>				
Infrared brightness temperature (zen/nadir)	IRT			
Spectral irradiance (zen/nadir)	Multifilter Radiometer (MFR) with a 1.6 $\mu\text{m}$ channel			
Shortwave total irradiance (zen/nadir)	SPN1 global pyranometer			
Longwave irradiance (zen/nadir)	Eppley pyrgeometer			
Shortwave direct/diffuse irradiance (zen/nadir)	SPN1 total/diffuse pyranometer			
<b>Gases</b>				
Concentration of SO <sub>2</sub> , CO, O <sub>3</sub> , NO, NO <sub>2</sub> , and NO <sub>y</sub>	Trace Gases			
CO	TECO 48			
Ozone	TECO 49			
Concentration of CO <sub>2</sub> , CH <sub>4</sub> , and H <sub>2</sub> O	Cavity Ring Down (CRD) System			
<b>Meteorological State Variables</b>				
true air, speed, altitude, angle-of-attack, side-slip, temperature, and relative humidity, 3-Dimensional wind vector	Aircraft Integrated Meteorological Measurement System (AIMMS) - 20			
3-Dimensional wind vector	Gust Probe			
Dewpoint	Chilled mirror hygrometer – GE-1011B			
Dewpoint	Buck CR2			
Temperature	Rosemount 102			
Dewpoint	Rosemount 1201F1			
Static Pressure	Rosemount 1221F1			
<b>Aircraft Variables</b>				
Position/velocity	Trimble DSM			
Pitch/roll/azimuth	Trimble TANS			

Position/Velocity/pitch / roll/heading	Accelerometer (C-MIGITS II/III)				
<b>G. USER-SUPPLIED SCIENTIFIC PAYLOAD</b>					
1. List requirements of user-supplied equipment (attach drawings/photos)					
Instrument	Weight (kg)	Size (19" panel or other)	Power Required (watts, amps)	Type of power (volts DC, AC, Hz)	External Sensor/Probe Requirements
2. List details of data recording requirements of user-supplied instrumentation					
Instrument	Voltage Range	Signal (analog or digital)	Resolution	Sample Rate	Remarks
3. Describe special or unusual installation requirements:					
4. Describe hazardous materials required for user-supplied instrumentation (toxic gases or liquids, flammable materials, radioactive sources, other):					
Material	MSDS Provided	Amount On Board (kg, liters)	On Board Usage		
5. Describe hazardous wastes produced or emitted by user-supplied instruments:					
Material	Amount Generated (kg, liters)	Physical Form (liquid, solid, gas)	Where Generated (ground, plane)	Provision for Management and Disposition	

<b>H. GROUND SUPPORT FACILITIES</b>				
1. Describe any field site data access/processing requirements (floppy disk, tape, network, software compatibility, etc.):				
2. Describe ground support needs for user-supplied instrumentation:				
<p>On flight days:</p> <p>A. Preflight needs (prior to takeoff):</p> <p>Access hrs.</p> <p>Power hrs</p> <p>B. Postflight needs (after landing):</p> <p>Access hrs</p> <p>Power hrs</p> <p>C. Any special support needs:</p> <p>On nonflight days</p> <p>A. Routine maintenance/calibration:</p> <p>Access hrs</p> <p>Power hrs</p> <p>B. Any special support needs:</p>				
3. Describe office, technical work area, storage, logistics requirements (telephones, desks, etc.):				

4. Other information/remarks:

Requestor	I. APPROVALS			
	Name (print)	Signatures		Date
		Approve	Disapprove	
1. PNNL Lab Safety:	T. Criscuolo			
2. PNNL Environmental Compliance Representative:	J.L. Akers			
3. PNNL Aviation Safety Point of Contact:	R.V. Hannigan			
4. Research Aircraft Facility Manager:	B. Schmid			

cc: PNNL Field Services Representative  
 PNNL Hazardous Materials Transportation



PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
<b>GENERAL</b>						
		Does operator have an approved operations manual?				
		Are there any FAA approved deviations to this requirement?				
		Is the manual furnished to flight crews?				
		Do flight crews keep manual updated with changes and additions?				
		Is the manual carried on each aircraft?				
		Does the manual have the following required sections:				
		Name of management personnel, responsibilities, and duties (135.37(a)(c)) and (135.77): Director of Operations: Chief Pilot: Director of Maintenance:				
		Procedures for ensuring compliance with aircraft weight and balance limitations.				
		Operations specifications information: Category and class of aircraft authorized: Crew complements: Types of operations authorized:				
		Procedures for compliance with accident notification.				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		PIC's knowledge of airworthiness inspections completed and having been properly returned to service.				
		Procedures for reporting mechanical irregularities.				
		System for PIC to ensure discrepancies have been fixed.				
		Procedures for maintenance away from home base.				
		Inoperative equipment procedures (135.179).				
		Procedures for fueling aircraft.				
		Procedures for briefing passengers (135.117).				
		Flight locating procedures.				
		Procedures for compliance with emergency procedures under 135.123.				
		Approved aircraft inspection program, when applicable.				
		Procedures for recognizing hazardous materials (Title 49 CFR).				
		Procedures for handling hazardous materials (Title 49 CFR).				
		Procedures for evacuation of persons who may need assistance of another person.				
		Does the aircraft have a current airworthiness certificate?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
<b>FLIGHT OPERATIONS</b>						
		Does the operator keep at its principal business office the following records?				
		Operations specifications.				
		A current list of aircraft.				
		Individual record of each pilot.				
		Full name of each pilot.				
		Pilot certificate (type and number) and ratings.				
		Pilot qualifications.				
		Pilots current duties and date assigned to those duties.				
		Date and class of medical certificate.				
		Date and result of each initial and recurrent competency tests, proficiency check.				
		Compliance with flight time limitations.				
		Check pilot authorization.				
		If multi-engined aircraft, is load manifest used?				
		Is a copy of the load manifest carried in the aircraft and kept at base of operations for at least 30 days?				
		Is there an aircraft maintenance log on board each aircraft for recording or deferring mechanical irregularities?				
		Is there a procedure in the operations manual for keeping copies of the aircraft maintenance log?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Is there a procedure where pilot signs when the aircraft meets the airworthiness inspection requirements in accordance with 91.409 F3 or 135.419, whichever is applicable?				
		Who is authorized to exercise operational control?				
		Does operator have a flight locating procedure when a FAA flight plan is not filed?				
		Does operator have the following current publications:				
		Airman's Information Manual.				
		FAR Parts 91 and 135.				
		Aircraft equipment manuals and aircraft flight manual or equivalent.				
		Does the operator have the following items in current and appropriate form, and are they accessible to the pilot station:				
		Cockpit checklist--are the following sections included: before starting engine, before takeoff, cruise, before landing, after landing, stopping engine.				
		Multi-engined aircraft emergency checklist--are the following sections included: fuel, hydraulics, electrical, mechanical systems, instruments and controls, engine out and other emergency items for safety.				
		Pertinent aeronautical charts.				
		IFR, navigation, enroute and let down charts.				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Multi-engined aircraft with one engine inoperative climb performance data for compliance with 135.181(a)(2).				
		Does operator have a procedure for use of oxygen by crew and passengers?				
		Does operator have aircraft and facilities to maintain and demonstrate pilots ability to conduct all operations for which he is authorized?				
		Does operator meet composition of flight crew requirements?				
		Are flight crew duties defined in the operations specifications?				
		Do operations specifications address SIC requirements?				
		Are PIC designations made for each flight?				
		Does the passenger briefing procedure contain the required information?				
		Does the operator have a procedure that addresses crewmember emergency and emergency evacuation duties?				
<b>AIRCRAFT AND EQUIPMENT</b>						
		Does aircraft meet the following equipment requirements?				
		Transponder.				
		Duel controls.				
		General equipment.				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Public address and crew intercom systems.				
		Cockpit voice recorder.				
		Flight recorder.				
		Ground proximity warning systems.				
		Fire extinguishers.				
		Oxygen equipment.				
		Pilot heat indication system.				
		Extended over-water operations IFR and emergency.				
		Shoulder harness for crewmembers.				
		Airborne thunderstorm detection.				
		Airborne weather radar.				
		Inoperable instruments and equipment. Minimum equipment list (MEL).				
		Performance requirements, IFR or over-the-top.				
		Performance requirements, land aircraft over water.				
		Empty weight and center of gravity, currency requirements. (Actual weighing.)				
<b>VFR/IFR OPERATING LIMITATIONS AND WEATHER REQUIREMENTS</b>						
		Does the operator have the following procedures to comply with VFR/IFR operating limitations and weather requirements?				
		VFR: Minimum altitudes.				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		VFR: Visibility requirements.				
		VFR: Fuel supply.				
		Weather reports and forecasts.				
		IFR: Operating limitations.				
		IFR: Takeoff limitations.				
		IFR: Destination airport weather.				
		IFR: Alternate airport weather.				
		IFR: Alternate airport requirements.				
		IFR: Takeoff approach and landing.				
		Icing: Operation limitations.				
		Airport requirements.				
<b>FLIGHT CREWMEMBER REQUIREMENTS</b>						
		Do the pilots meet the following qualifications:				
		Age 21.				
		U.S. Citizen or appropriate documents; applicant must be able to read, write, and fluently speak and understand the English language.				
		Certificates: Helicopter pilot--commercial pilot certificate and a current second-class medical certificate.				
		Certificates: Multi-engine airplane pilot--airline transport pilot (ATP), certificate and a current second-class medical certificate.				
		Ratings: Airplane multi-engine land for multi-engine airplane pilots.				



PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Performance and operating limitations      Date:				
		Standard and emergency operating procedures      Date:				
		Aircraft Flight Manual      Date:				
		Weight and balance limitations of each aircraft      Date:				
		Navigation (NAV) and NAV aids including instrument approaches      Date:				
		ATC procedures      Date:				
		Meteorology      Date:				
		Severe weather      Date:				
		Pilot competency check      Date:				
		PIC instrument proficiency check      Date:				
<b>TRAINING</b>						
		Does operator have a FAA approved training program as defined below:				
		Written training program curriculum for each type of aircraft.				
		Crewmember training.				
		Crewmember emergency training.				
		Hazardous materials.				
		Recognition training.				
		Handling and carriage training.				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Approved aircraft simulators and other training devices.				
		Initial and transition training for check airmen and flight instructors.				
		Pilot training program.				
		Pilot initial, transition, and upgrade ground training.				
		Pilot initial, transition, upgrade, and differences flight training.				
		Recurrent training.				
<b>AIRPLANE PERFORMANCE OPERATING LIMITATIONS</b>						
		Does aircraft meet the performance operating limitations of this subpart?				
<b>PRODUCTION CONTROL</b>						
		Does the Director of Maintenance emphasize accident avoidance measures in maintenance operations?				
		Is there a safety (aviation and/or ground) bulletin board in the maintenance area?				
		Is there a program in effect to encourage the reporting of hazards, near accidents, unsafe shop practices, etc.?				
		Does the Director of Maintenance ensure that he has qualified maintenance test pilots?				
		Are qualified personnel appointed and on hand for the following functions:				
		a. Test pilots?				
		b. Fire marshal?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		c. Calibration technician?				
		Are weight and balance records completed, current, and properly maintained?				
		Are aircraft weighed at periodic intervals?				
		The installation of additional equipment is accomplished in accordance with the FAR?				
<b>QUALITY CONTROL</b>						
		Are sufficient and qualified authorized inspectors available?				
		Are aircraft publication files completed, posted, and up-to-date?				
		Are required publications used by personnel performing maintenance?				
		Are standard forms available and used to perform scheduled inspections and maintenance?				
		Are aircraft being inspected in accordance with established aircraft maintenance practices and not flown beyond inspection intervals?				
		Are airworthiness directives and service bulletins on file, and is compliance recorded?				
		Is there active participation in the FAA Malfunction and Defect Reports (MDR) program?				
		When an unsafe condition is discovered which may affect other similar aircraft, are the aircraft grounded and the FAA notified?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Are all required aircraft logbook forms being maintained?				
		Are daily inspections being conducted?				
		Are all write-ups clear and proper classification symbol entered on maintenance forms?				
		Are fuel and oil servicing being recorded properly?				
		Are all parts removed from aircraft recorded and tagged immediately?				
		Are all aircraft airworthiness grounding items properly inspected and signed off by qualified personnel?				
		Are all inspection times recorded properly?				
		Are all aircraft fire extinguishers tagged and inspected every 12 months? Are periodic fire drills held?				
		Are monitoring procedures established for aircraft time between overhaul (TBO) components?				
		Are aircraft adequately preflighted by a test pilot prior to maintenance test flights or operational checks?				
		Are test flights conducted with minimum required flight crew?				
		Are all aircraft logbook maintenance records checked during preflight?				
<b>MAINTENANCE SHOP AREA</b>						
		Do shop supervisors emphasize accident avoidance measures in maintenance operations?				
		Are safety posters displayed?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Are 4-inch fire lanes painted yellow in hangars and kept clean?				
		Are signs posted?				
		a. "No Smoking Within 50 Feet of Hangars, Parked Aircraft, or Flammable Liquid Storage Points"				
		b. "No Smoking Past This Point" at all entrances to hangars?				
		Are fire extinguishers in the hangar an approved type and conspicuously marked?				
		Are fire extinguishers weight-checked and inspected, with tags signed and dated?				
		Are all flammable liquid containers of an approved type and properly marked?				
		Are rubbish cans fire-resistant and covered?				
		Are oily rags stored in approved self-closing metal containers?				
		Do aircraft and equipment maintenance areas appear adequate in size and location for safe ground operation?				
		Are hangars kept clean and free of accumulated grease and oil on floors?				
		Are drip pans used under aircraft in hangar?				
		Is all equipment not in use kept clear of the maintenance area?				
		Are grounding wires installed in the hangar?				
		Are static ground points tested?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Are all aircraft in hangar grounded during defueling?				
		Is shop electrical equipment properly grounded?				
		When personnel use power tools (e.g., drills, grinders, lathes), do they use safety goggles or face shields?				
		When aircraft are on jacks, are the following safety practices used:				
		a. Are signs "Aircraft on Jacks" or "Caution" displayed?				
		b. Is the space around the jacked aircraft designated a restricted area and roped off?				
		c. Are jacks serviceable and general safety precautions observed?				
		d. Does each jack show maximum lifting capacity in tons?				
		e. Is a secondary support source available?				
		f. Are lifting/hoisting devices available, properly inspected, tested, and marked?				
		Are the following safety practices being used in the maintenance area:				
		a. Is horseplay prevented?				
		b. Are all personnel familiar with and using required special clothing and equipment? Is the clothing and equipment inspected periodically for serviceability?				
		c. Is jewelry removed prior to operating machinery?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		d. If special equipment is installed in aircraft, are trained specialists available to maintain it?				
		e. Are aircraft and ground fire extinguishers checked as required?				
		f. Is adequate lighting provided for maintenance shops and hangars?				
		g. Are hydraulic, fuel, and oil lines protected from dirt while disconnected?				
		h. After a can of hydraulic fluid or turbine oil is opened, are the unused contents properly secured or destroyed?				
		i. Are engine, hydraulic, prop and rotor, technical supply, and other work areas kept clean and well arranged?				
		j. Are grease fittings cleaned before they are used?				
		k. Are grease guns tagged with type grease?				
<b>TOOL ROOM</b>						
		Are mission-essential tools and equipment on hand?				
		Are tools left in elevated positions from which they can fall or be knocked off?				
		Are electrical tools connected to a low resistance ground when in use?				
		Are unsafe tools removed from service (e.g., broken handles, frayed cords)?				
		Are tools requiring calibration calibrated?				
		Is a label attached indicating date calibrated?				

PNNL-MA-530	FAR OR OSHA REF.	QUESTION	YES	NO	N/A	OBSERVATIONS/COMMENTS/ FINDINGS/CONCERNS
		Are all calibration actions recorded?				
		Is equipment properly stored? Are torque wrenches zeroed and stored?				
		Is there an accountability system to ensure tools are returned and accounted for?				
<b>SUPPLY</b>						
		Are repair part stocks properly preserved and stocks rotated (last in-last out), when applicable?				
		Are parts located in accordance with stock records?				
		Are excess repair parts on hand?				
		Is a physical inventory of all stock conducted at least annually?				
		Is prompt follow-up action taken on requisitions not filled?				
		Are reconciliations of outstanding requisitions made with supply sources?				

## **Appendix B**

### **References**



## Appendix B References

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## **Appendix C**

### **Definitions and Acronyms**



## Appendix C

# Definitions and Acronyms

### Definitions

*Accident Prevention*—Taking advance measures to keep possible adverse events from happening.

*Aircraft Accident*—An occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, where any person suffers death or serious injury, or the aircraft received substantial damage.

*Causes*—Any act or condition that starts or sustains the accident sequence or the acts, events, conditions, or failures that caused the accident. A direct relationship exists between that event and the resulting damage. Causes are the consequences of hazards.

*Chop*—Refers to a light or moderate climatic condition of washboard-type fluctuations occurring at rapid and frequent intervals.

*Clear Ice*—Hard, clear, solid ice that is very heavy.

*Hazard*—Any event, condition, or policy that could cause an accident.

*Heavy Ice*—De-icing/anti-icing equipment cannot handle the accumulation.

*Incidents*—Damage to landing gear, wheels, flaps, engine accessories, brakes, or wing tips are considered as incidents, and not as accidents, for the purpose of reporting to the NTSB or the FAA, if the damage is not considered substantial.

*Incident/Accident or Off-Normal Event*—Unplanned event or unforeseen event that causes loss or injury.

*Initial Training*—See Training, Initial.

*Light Ice*—A type of icing condition that de-icing/anti-icing equipment can handle safely and that permits the aircraft to be flown indefinitely.

*Light turbulence*—An airborne condition where the aircraft is subjected to irregular perturbations of small magnitude from smooth slight and occupants may be required to use seat belts, but objects in the aircraft remain at rest.

*Maintenance Personnel Training*—Training of maintenance personnel will be conducted in accordance with the aircraft manufacturer's applicable training program. Based on each individual's qualifications, experience, and job assignment, the Director of Maintenance will determine the quantity and frequency of training to be participated in by the maintenance personnel.

*Mixed Ice*—A combination of rime and clear ice.

*Moderate Ice*—Icing condition that de-icing/anti-icing equipment can handle safely, but is an indication to the PIC to alter course or altitude to avoid this condition.

*Moderate Turbulence*—An airborne condition where the aircraft is subjected to irregular perturbations of uncomfortable magnitude from smooth flight and the occupants are required to use seat belts and are occasionally thrown against the belt; unsecured objects in the aircraft may move about. This condition requires the constant attention of an experienced pilot for safe flight.

*Off-Normal Event*—Something that deviates noticeably from normal operation.

*Proximate Cause (also known as Probable Cause)*—The most likely event or condition to have caused accident or incident.

*Recurrent Training*—See Training, Recurrent.

*Related Cause*—Conditions or characteristics that may not have directly caused the accident, but increased the likelihood that one would eventually occur. These causes can involve deficiencies in training, inspection, policy, or certification, for instance.

*Rime Ice*—Hard, porous, white, opaque ice consisting of small grains, air space, and frost-like crystals.

*Safety*—Freedom from harm or risk.

*Severe Turbulence*—An airborne condition where the aircraft is subjected to irregular perturbations of high magnitude from smooth flight and may be at the limits of control boundaries. Occupants can be expected to be thrown violently against the seat belt and objects not secured are tossed about.

*Special Emergency*—Condition of air piracy or other hostile act by a person(s) aboard an aircraft that threatens the safety of the aircraft or its passengers.

*Substantial Damage*—Damage adversely affecting the structural strength, performance, or flight characteristics of the aircraft that would normally require major repair or replacement of the affected components. Also includes damage limited to the engine and caused by the engine failure, such as bent fairing, cowlings, and skin punctures.

*Trace of Ice*—Accumulation of no consequence that does not affect the performance characteristics of the aircraft.

*Training, Initial*—That phase of efficiency enhancement required for crew members who have not previously qualified and served in a given capacity on an aircraft.

*Training, Recurrent*—That phase of efficiency enhancement necessary for crew members to remain adequately trained and currently proficient for each aircraft crew member position and type of operation in which the crew member serves.

*Transition Training*—That training required for crew members that have qualified and served in the same capacity on another aircraft. Each flight crew member will complete a ground training course appropriate to each type aircraft before beginning transition flight training.

*Upgrade Training*—That training required for crew members that have qualified and served as second in command on a particular aircraft type, before they serve as PIC on that aircraft.

### **Acronyms**

A&P	Airframe & Power Plant
AGL	above ground level
AIM	airman's information manual
AIRMETS	Airman's Meteorological Information
APU	auxiliary power unit
ARINC	Aeronautical Radio, Inc.
ARMC	Aviation Risk Management Committee
ASO	Aviation Safety Officer
ASPOC	Aviation Safety Point of Contact
ASR	Airport Surveillance Radar
ATC	air traffic control
ATCO	air traffic control organization
ATD	air traffic delays
ATIS	Airport Traffic Information System
ATP	Airline Transport Pilot
BC	back course
CAMP	Computerized Aircraft Maintenance Program
CAT	clear air turbulence
CDI	course deviation indicator
CFR	Code of Federal Regulations
COMAT	company material
CPR	cardiopulmonary resuscitation
CRM	cockpit resource management
CS/T	combined station/tower
CTAF	Common Traffic Advisory Frequency
db	decibel(s)
DGL	Dangerous Goods List
DH	decision height
DME	distance-measuring equipment
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE-PNSO	U.S. Department of Energy, Pacific Northwest Site Office

DOE-RL	U.S. Department of Energy, Richland Operations Office
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
EHS&S	Environment, Health, Safety and Security
ETA	estimated time of arrival
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBI	Federal Bureau of Investigation
FBO	Fixed Base Operators (also, Fixed Base Operations)
FL	flight level
FPM	feet per minute
FSI	Flight Safety International
FSS	Flight Service Station
ft	feet
G-1	Gulfstream 159
GPS	Global Positioning System
HDI	How do I?
HM	hazardous material
HMR	Hazardous Materials Regulations
HMT	Hazardous Material Table
HQ	Headquarters
IA	Inspection Authorization (FAA)
IAF	Initial Approach Fix
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ID	identification
IFR	instrument flight rules
ILS	Instrument Landing System
LOC	localizer (instrument landing system)
LOC-BC	LOC-back course
MDA	minimum descent altitude
MEL	minimum equipment list
MIR	mechanical irregularity report
MSA	minimum safe altitude
MSL	mean sea level
NAVAID	navigation aids
NDB	non-directional beacon
NOTAMS	notices to airmen

NTSB	National Transportation Safety Board
NWSO	National Weather Service Office
OAT	outside air temperature
ORM-D-Air	Other Regulated Material-Domestic-Air (material that may be of limited hazard during transport due to form, quantity, or packaging)
OSHA	Occupational Safety and Health Administration
PAR	Precision Approach Radar
PIC	pilot in command
PIREP	Pilot Reporting System
PNF	pilot not flying
PNNL	Pacific Northwest National Laboratory
POC	point of contact
PR	purchase requisition
RAM	radioactive materials
RFP	Request for Proposal
RMI	radio magnetic indicator
RNAV	area navigation
RVR	runway visual range
SEC	Sectional Aeronautical Charts
SEP	Source Selection Panel
SET	Source Selection Team
SIC	Second in Command
SID	standard instrument departure
SIGMETS	Significant Meteorological Information
SOW	Statement of Work
SSJ	sole source justification
STAR	Standard Airport Arrival procedure
STC	Supplemental Type Certificate (FAA)
TA	Technical Administrator
TBO	time before overhaul
TI	transport index
TWEB	Transcribed Weather Broadcast
ULD	unit load device
UN	United Nations
V1	critical engine failure recognition speed
V2	takeoff safety speed
VDP	Visual Descent Point
VFR	visual flight rules

VMC	minimum control speed
VOR	very high frequency omnidirectional radio range
VOR/DME	very high frequency omnidirectional radio range/distance measuring equipment
VR	rotation speed
VREF	landing approach speed
WAC	World Aeronautical Chart

**Appendix D**  
**Telephone Numbers**



## Appendix D Telephone Numbers

All accidents involving Hanford-associated aircraft shall be reported promptly to the DOE-RL Manager/Aviation Manager/ASO, the HQ Senior Aviation Management official, the National Traffic Safety Board, and the Federal Aviation Administration, as required.

**Table D.1.** Telephone Numbers

<b>PNNL and BMI:</b>	<b>Director of Maintenance</b>
PNNL Emergency Number: (509) 375-2400 BMI Emergency Number: (614) 424-4444	Edward W. Svancara Office: (509) 376-6707
<b>Director of Flight Operations</b>	<b>DOE-HQ Senior Aviation Policy Officer</b>
Michael R. Hubbell Office: (509) 376-6707	David Lopez Office: (202) 586-6177
<b>Scheduler</b>	<b>BCO Corporate Director of Emergency, Management and Business Continuity</b>
Jennifer M. Comstock Office: (509) 372-4244	Gene B. Roe Office: (614) 424-4344
<b>PNNL Aviation Safety Point of Contact</b>	<b>Agencies:</b>
Robert V. Hannigan Home: (509) 943-1777 Office: (509) 372-6176  <b>Level II Manager Delegate, Atmospheric Sciences and Global Change Division</b>  Beat Schmid Office: (509) 375-2996	FAA: (614) 237-1039 NTSB: (614) 237-1039 Police: 911 or (509) 943-7340  DOE-RL/OPE Manager, Lloyd L. Piper – (509) 376-6278  DOE-RL/A&E Aviation Safety Officer, Roger M. Gordon – (509) 372-2139



**Appendix E**  
**NTSB Accident/Incident Reports**



# Appendix E

## NTSB Accident/Incident Reports

Source:

**Appendix A - National Transportation Safety Board  
Part 830 - Rules Pertaining to the Notification and Reporting of  
Aircraft Accidents or Incidents and Overdue Aircraft, and  
Preservation of Aircraft Wreckage, Mail, Cargo, and Records  
Revised 6 September 1995**

### Subpart A – General

#### 830.1 Applicability

This part contains rules pertaining to:

(a) Initial notification and later reporting of aircraft incidents and accidents and certain other occurrences

in the operation of aircraft, wherever they occur, when they involve civil aircraft of the United States; when they involve certain public aircraft, as specified in this part, wherever they occur; and when they involve foreign civil aircraft where the events occur in the United States, its territories, or its possessions.

(b) Preservation of aircraft wreckage, mail, cargo, and records involving all civil and certain public aircraft accident, as specified in this part, in the United States and its territories or possession.

#### 830.2 Definitions

As used in this part the following words or phrases are defined as follows:

“Aircraft Accident” means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.

“Civil aircraft” means any aircraft other than a public aircraft.

“Fatal injury” means any injury which results in death within 30 days of the accident.

“Incident” means an occurrence other than an accident, associated with operation of an aircraft, which affects or could affect the safety of operations.

“Operator” means any person who causes or authorizes the operation of an aircraft such as the owner, lessee, or bailee of an aircraft.

“Public aircraft” means an aircraft used only for the United States Government, or an aircraft owned and operated (except for commercial purposes) or exclusively leased for at least 90 continuous days by a government other than the United States Government, including a State, the District of Columbia, a territory or possession of the United States, or a political subdivision of that government. “Public aircraft” does not include a government-owned aircraft transporting property for commercial purposes and does not include a government-owned aircraft transporting passengers other than transporting (for other than commercial purposes) crewmembers or other persons aboard the aircraft whose presence is required to perform, or is associated with the performance of, a governmental function such as firefighting, search and rescue, law enforcement, aeronautical research, or biological or geological resource management; or transporting (for other than commercial purposes) persons aboard the aircraft if the aircraft is operated by the Armed Forces or an intelligence agency of the United States. Notwithstanding any limitation relating to use of the aircraft for commercial purposes, an aircraft shall be considered to be a public aircraft without regard to whether it is operated by a unit of government on behalf of another unit of government pursuant to a cost reimbursement agreement, if the unit of government on whose behalf the operations conducted certifies to the administrator of the Federal Aviation Administration that the operation was necessary to respond to a significant and imminent threat to life or property (including natural resources) and that no service by a private operator was reasonably available to meet the threat.

“Serious injury” means any injury which: (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

“Substantial damage” means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes or wingtips are not considered “substantial damage” for the purpose of this part.

## **Subpart B - Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft**

### **830.5 Immediate Notification**

Operator of any civil aircraft, or any public aircraft not operated by the Armed Forces or an intelligence agency of the United States, or any foreign aircraft shall immediately, and by the most expeditious means available, notify the nearest National Transportation Safety Board (Board) field office<sup>1</sup> when:

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<sup>1</sup>The Board field offices are listed under U.S. Government in the telephone directories of the following cities: Anchorage, AK; Atlanta, GA; West Chicago, IL; Denver, CO; Arlington, TX; Gardena (Los Angeles), CA; Miami, FL; Parsippany, NJ (metropolitan New York, NY); Seattle, WA; and Washington, D.C.

- (a) An aircraft accident or any of the following listed occur:
  - (1) Flight control system malfunction or failure;
  - (2) Inability of any required flight crewmember to perform his normal flight duties as a result of injury or illness;
  - (3) Failure of structural components of a turbine engine excluding compressor and turbine blades and vanes;
  - (4) In-flight fire; or
  - (5) Aircraft collide in flight.
  - (6) Damage to property, other than the aircraft, estimated to exceed \$25,000 for repair
  - (7) For large multiengine aircraft (more than 12,500 pounds maximum certificated takeoff weight);
    - (i) In-flight failure of electrical systems which requires the sustained use of an emergency bus powered by a back-up source such as a battery, auxiliary power unit, or air-driven generator to retain flight control or essential instruments;
    - (ii) In-flight failure of hydraulic systems that results in sustained reliance on the sole remaining hydraulic or mechanical system for movement of flight control surfaces;
    - (iii) Sustained loss of the power or thrust produced by two or more engines; and
    - (iv) An evacuation of an aircraft in which an emergency egress system is utilized.
- (b) An aircraft is overdue and is believed to have been involved in an accident.

### **830.6 Information to be Given in Notification**

The notification required in §830.5 shall contain the following information, if available:

- (a) Type, nationality, and registration marks of the aircraft,
- (b) Name of owner, and operator of the aircraft,
- (c) Name of pilot, the pilot-in-command,
- (d) Date and time of the accident,
- (e) Last point of departure and point of intended landing of the aircraft,
- (f) Position of the aircraft with reference to some easily defined geographical point,
- (g) Number of persons aboard, number killed, and number seriously injured,
- (h) Nature of the accident, the weather and the extent of damage to the aircraft, so far as is known,
- (i) A description of any explosives, radioactive materials, or other dangerous articles carried.

## **Subpart C - Preservation of Aircraft Wreckage, Mail, Cargo, and Records**

### **830.10 reservation of Aircraft Wreckage, Mail, Cargo, and Records**

- (a) The operator of an aircraft involved in an accident or incident for which notification must be given is responsible for preserving, to the extent possible, any aircraft wreckage, cargo, and mail aboard the aircraft, and all records, including all recording medium of flight, maintenance, and voice recorders, pertaining to the operation and maintenance of the aircraft and to the airmen until the Board takes custody thereof or a release is granted pursuant to §831.12(b).
- (b) Prior to the time the Board or its authorized representative takes custody of aircraft wreckage, mail, or cargo, such wreckage, mail, or cargo may not be disturbed or moved except to the extent necessary:
  - (1) To remove persons injured or trapped,
  - (2) To protect the wreckage from further damage, or

- (3) To protect the public from injury,
- (c) Where it is necessary to move aircraft wreckage, mail, or cargo, sketches, descriptive notes, and photographs shall be made, if possible, of the original position and condition of the wreckage and any significant impact marks.
- (d) The operator of an aircraft involved in an accident or incident shall retain all records, reports, internal documents and memoranda dealing with the accident or incident, until authorized by the Board to the contrary.

## **Subpart D - Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft**

### **830.15 Reports and Statements to be Filed**

- (a) *Reports.* The operator of a civil public (as specified in §830.5), or foreign aircraft shall file a report on Board Form 6120.1/2 (OMB) No. 3147-0001).<sup>2</sup>
- (b) *Crewmember statement.* Each crewmember, if physically able at the time the report is submitted, shall attach a statement setting forth the facts, conditions, and circumstances relating to the accident or incident as they appear to him. If the crewmember is incapacitated, he shall submit the statement as soon as he is physically able.
- (c) *Where to file the reports.* The operator of an aircraft shall file any report with the field office to the Board nearest the accident or incident.

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<sup>2</sup>Forms are available from the Board field offices (see footnote 1), from headquarters in Washington, D.C., and from the Federal Aviation Administration Flight Standards District Offices.

**Appendix F**  
**Duty Time Limitations**



# Appendix F

## Duty Time Limitations



Looking back 24 hours from the ending of each flight segment, the required rest depends upon the amount of flight time scheduled.

**Figure F.1.** 8-Hour Flight Between Required Rest Periods – Two Pilots



(24 hour look back from end of each flight segment)

**Figure F.2.** 10 hr Flight Time in 24 hr Requires 11 hr Rest. Rest reduced to 9 hr with 12 hr compensatory rest beginning within 24 hr of starting of reduced rest.



**Appendix G**  
**Low-Altitude G-159 Operations Manual**



# Appendix G

## Low-Altitude G-159 Operations Manual

### Company Organization

Pacific Northwest National Laboratory  
P.O. Box 999, K9-30  
Richland, WA 99352  
Phone: (509) 372-6176  
Fax: (509) 372-6168

### Pilots

The operator shall establish and specify the minimum pilot requirements. Minimum requirements should meet or exceed the following:

1. A current commercial pilot certificate with ratings appropriate to the category and class aircraft to be used under the terms of the waiver;
2. At least 500 hours as pilot-in-command (PIC) logged;
3. A minimum of 100 hours in the category and class of aircraft to be used; and
4. A minimum of 5 hours in the make and model aircraft to be used under the waiver.

Michael R. Hubbell

Certificate No. 34319041

Grade Class: ATP Typed G159

Johnathan D. Hone

Certificate No. 1567469

Grade Class: ATP Typed G159

Edward W. Svancara

Certificate No. 519725675

Grade Class: Commercial

### Operations Manual Distribution and Revision

Manual distributed to all PNNL flight personnel.

A manual distribution list and a revision page are at the front of this manual.

### Area of Operations

1. Continental United States
  - a. If it is necessary to conduct research flights below 2000 feet above ground level (AGL), the Pilot in Command (PIC) shall maintain obstacle maps that are updated prior to each flight. The maps indicate the height AGL of all existing obstacles to flight in the area of operation. If the use of a

waiver or permission to operate in a *Prohibited or Restricted Area* is required (Attachment A-1), it will be noted in the *Remarks* section of the flight plan.

2. Multi-engine Aircraft

- b. If the aircraft is operated at heights that will allow it to climb with the critical engine inoperative and consistent with terrain, but not less than 50 feet per minute, specific routes and altitudes need not be required. FAA waivers may authorize day and night VFR.

**Low-level Flight Operations Procedures**

1. No person may be carried in the aircraft unless that person is necessary to accomplish the work activity.
2. Rule 1 does not apply to flights to and from the work area. All such flights shall be made in accordance with all provisions of the Federal Aviation Regulations.
3. Intentional flight at less than 500 feet directly over persons on the surface is prohibited. In addition, the aircraft may not be flown on a path that would require excessive maneuvering to avoid persons on the surface in the event of an emergency.
4. No flight is permitted closer than 500 feet to any vessel, vehicle, or building on the surface, unless the pilot takes reasonable action to determine these locations are not occupied at the time of operation. No area will be over flown at less than 1000 feet over the congested areas of a city, town, or settlement or any open-air assembly of persons.
5. Pilots shall familiarize themselves with obstructions or hazards in the immediate area of operation with particular reference to approaches and departures to or from adjacent airports.
6. Prior to conducting operations within 5 miles of any airport, the pilot shall comply with the following:
  - a. Tower controlled airport—Obtain Air Traffic Controller (ATC) clearance from the appropriate air traffic control tower.
  - b. Any other airport—Announce arrival/departure on appropriate Common Traffic Advisory Frequency (CTAF) as outlined in AC90-42F, and continuously monitor the CTAF.
  - c. All airports—Obtain permission from the air traffic control tower or an authorized official of the airport for any deviation from the normal traffic patterns.
7. Operations will be conducted only during daylight hours except as provided in procedure 11.
8. Operations will be conducted only during VFR conditions; however, at no time are operations conducted with less than three miles flight visibility.
9. It is prohibited to harass, or molest any domestic fowl, migratory waterfowl, domestic animal, or wildlife.
10. PNNL shall establish and maintain at the home base a current list of pilots and aircraft authorized under the terms of this certificate, including a statement signed by each pilot indicating an understanding of the operations authorized in this waiver and all its special provisions.

11. In the case of night operations over an area designated as mountainous in FAR Part 95, the minimum altitude is 1000 feet above the highest obstacle within a horizontal distance of 5 statute miles from the course to be flown.
12. Initial Pilot Checkout. The manual must provide that each pilot is qualified for low-level procedures and have a logbook endorsement of such by the chief pilot. Although the endorsement must be by the Chief Pilot, another qualified pilot may conduct the initial checkout. In addition to low-level procedure qualification, each pilot must satisfactorily demonstrate knowledge in the following:
  - a. Low-level flying procedure familiarization
  - b. Aircraft performance and limitations
  - c. Emergency preparedness
  - d. Operations Manual
  - e. Terms and conditions of the FAA waiver
13. Accident Notification. See Flight Operations



**Appendix H**  
**DOE ORDER 440.2C**

**SUBJECT: AVIATION MANAGEMENT AND SAFETY**

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PURPOSE. To establish a policy framework that will ensure safety, efficiency and effectiveness of government or contractor aviation operations.

CANCELLATIONS. DOE O 440.2B, Chg. 1, *Aviation Management and Safety*, dated 11-27-02. Cancellation of a directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the directive. Contractor Requirements Documents (CRDs) incorporated into contracts remain in effect throughout the term of the contract unless and until the contract or regulatory commitment is modified to either eliminate requirements no longer applicable or substitute a new set of requirements.

**APPLICABILITY**

1. Departmental Applicability. This Order applies to (1) any DOE element that manages, operates, and/or maintains Federal aircraft, or oversees related services, and to (2) DOE elements that obtain commercial aviation services (CAS) including:
  - a. Bonneville Power Administration except where Public Law No. 75-329, H.R. 7642, the Bonneville Project Act, or other Federal agencies provide exemptions or equivalent requirements.
  - b. National Nuclear Security Administration except where contravened by public law (PL) 106-65, Title XXXII.
2. Exemptions/Equivalencies. Requests for equivalencies or exemptions to this Order must be sent in memorandum form from the affected Program Office to the Director, Office of Aviation Management (OAM). The memorandum must reference the offices, or localities, and requirements for which the equivalency/exemption is sought. The Director, OAM, must approve the requests in writing for those DOE Offices. Equivalency or exemption requests which involve NNSA organizations shall be made available to the Director, OAM, for review and comment. The Director, OAM, may make recommendations to the Administrator, NNSA, via the submitting organization. Decisions, on the part of NNSA aviation elements, to proceed contrary to the recommendations of the OAM, shall be made in writing to the Director, OAM by the submitting organization
3. DOE Contractors. The Contractor Requirements Document (CRD), [Attachment 1](#), sets forth requirements that apply to contracts that include the CRD. The CRD must be included in all contracts for the management and operation (M&O) of DOE-owned or leased facilities and in site/facility management contracts (i.e., those contracts that include the clause at 48 CFR (DEAR) 970.5204-2, Laws, regulations and DOE

directives) that require contractor management, operation, and/or maintenance of Federal aircraft or require Commercial Aviation Services (CAS) to support programmatic needs. This includes aviation activities that may take place outside the physical boundaries of a DOE facility. For all other contracts that require contractor management, operation, and/or maintenance of Federal aircraft or require CAS to support programmatic needs, the statement of work must include the applicable requirements set forth in the CRD.

## REQUIREMENTS

1. DOE Government Aircraft. DOE/NNSA Public-Aircraft missions are not subject to Federal Aviation Administration (FAA) oversight nor required to comply with FAA regulations, except for certain general operating rules (including those applicable to all aircraft in the National Airspace System (P.L. 85-726, Federal Aviation Act of 1958, Title 49 U.S.C., Subtitle VII). Therefore, DOE must self-regulate public missions, as defined in Public Law 106-181—April 5, 2000, Section 40125 (a) and (b). However, the FAA retains oversight of the airworthiness of any aircraft for which it has issued a Certificate of Airworthiness (C of A), which includes DOE/NNSA aircraft. Therefore, whether performing public or civil missions, DOE/NNSA aircraft shall comply with applicable FAA airworthiness rules. The FAA oversees all civil aircraft operations; specifically, all flight operations not defined as public operations. When an organization determines these regulations or policies would adversely impact its public mission, it must document and develop controls to mitigate risk to an acceptable level as defined by its organization. When an organization determines that the above regulations would adversely impact its civil mission, it must seek relief from the appropriate authority, document and develop controls to mitigate risk to an acceptable level as required by the responsible authorities.
2. Hiring CAS. DOE/NNSA elements that contract or utilize CAS operations must select an operator from the “Accepted Operator List” located on the OAM web site. OAM will accept operators approved by appropriately trained DOE/NNSA personnel, DoD, and consider, on a case-by-case basis, the addition of CAS operators already approved by other Executive Agencies.
3. Flight Program Standards/Aviation Implementation Documents (AID). Federal Management Regulations Title 41 CFR Section 102-33.140 thru Title 41 CFR Section 102-33.195 requires agencies to write, publish (as appropriate), implement, and comply with detailed, agency-specific standards that meet or exceed applicable civil or military rules. Each DOE/NNSA program or field element with management responsibility for assigned Federal aircraft, and/or uses CAS, must develop and publish an AID detailing the standards and/or procedures implemented to manage, operate, conduct airworthiness and maintenance programs, training and minimum experience standards for aircrew members, reporting requirements and safety systems of its planned or on-going aviation operations. As a minimum, the AID will address all applicable requirements of this Order and other related requirements established by DOE/NNSA policy, Department of Transportation (DOT), National Transportation Safety Board (NTSB), Federal Aviation

Regulations, and Federal Management Regulations, applicable to the scope and size of aircraft operations.

- a. Each DOE program must submit its AID to the Director, OAM. The OAM Director will approve the AID submitted by DOE elements that use Government aircraft not part of NNSA. For other than NNSA organizations, AIDs will be effective when approved by the Director, OAM. For AIDs submitted by NNSA elements, the Director, OAM, will be provided with an opportunity to review, comment and make recommendations to the Administer, NNSA, via the submitting office. For NNSA elements, the NNSA Administrator retains final authority.
  - b. Each DOE/NNSA program must review and update its AID annually to determine if significant changes in management, operations, or maintenance standards require revision and subsequent approval. NNSA annual AID reviews will be conducted by each Aviation Program Office. If significant changes are required, the Director, OAM, will be provided with an opportunity to review, comment, and make recommendations to the Administer, NNSA, via the submitting office. For NNSA elements, the NNSA Administrator retains final authority.
4. Management/Administration of DOE/NNSA Aviation Programs. Any field element that manages and oversees DOE/NNSA Federal aircraft must develop a management structure, appropriate in size and scope, which is responsible for the administration, operation, safety, training, maintenance, security and financial needs of DOE/NNSA owned aircraft operations. The management structure must meet the standards of 41 CFR 102-33 and the applicable parts of Title 14 CFR.

Minimum requirements are;

- a. Federal Aviation Managers (AvMs) and/or Aviation Safety Officers (ASOs) that meet the qualifications established in the “*Departmental Aviation Manager and ASO Functional Qualification Standards*” (DOE-STD-1164 and DOE-STD-1165) within 18 months of assignment;
- b. Clearly defined roles, responsibilities, and authorities of assigned managers, pilots, maintenance personnel, flight crewmembers, flight safety personnel, and dispatchers, as applicable;
- c. Procedures to track and record flight crewmember duty time, flight time, and training;
- d. Procedures to track and record applicable personnel duty time and training; and cost accounting systems that record the costs of operations, utilization, and maintenance [see General Services Administration (GSA) Cost Accounting Guide; OMB Circulars A-11, Exhibit 300; A-76; Federal Management Regulation or successor regulation promulgated by GSA.

5. Operation Standards for DOE/NNSA Aviation Programs. DOE/NNSA Government aircraft, including CAS and unmanned aircraft systems (UAS), in service to DOE/NNSA must be operated and maintained in accordance with the applicable parts of Title 14 CFR appropriate for the mission, size and scope of the operation, type of aircraft in service, and will comply with Title 41 CFR Part 102-33 and applicable laws.

At a minimum, field elements must establish;

- a. Basic qualifications and currency requirements for pilots, crewmembers, maintenance personnel, and other mission-related personnel, meeting FAA regulations and documented in that element's approved AID:
  - b. A risk-based fatigue-management system, which includes education on fatigue awareness, and mitigation, for all aviation personnel.
  - c. Methods or processes for proving compliance with manufacturer safety-of-flight notices and operational bulletins.
  - d. Validated procedures, that include at the core of the procedures, the Federal AvM and ASO, timely notification of applicable management personnel, and immediate initiation of search and rescue operations in case of a lost or downed aircraft.
  - e. A process to provide passenger safety briefings for civil flight operations equivalent to those required by FAA regulations and a process to inform personnel of their rights established in the National Transportation Safety Board (NTSB) document, "Federal Plan for Aviation Accidents Involving Aircraft Operated by or Chartered by Federal Agencies," Appendix F (NTSB/SPC-99-04).
  - f. Appropriate and validated emergency procedures and emergency equipment training, including evacuation procedures.
  - g. A program that ensures proper inspection of aviation life support equipment, if required for a specific mission.
  - h. Written policies and procedures for the type of aircraft operations conducted.
  - i. An overall management tracking system appropriate to the size, scope of the operations and type of aircraft operated.
  - j. Policies to operate and maintain Federal aircraft in accordance with the applicable parts of Title 14 CFR Chapter I, 49 CFR Chapter XII, 49 CFR Subchapter C or DOE/NNSA and/or DOT Special Permit(s) and exemptions, and/or equivalent international standards appropriate for the size and scope of the operations and type of aircraft in service.
6. Incidental and Supplemental Pilots. If a field element intends to use incidental or supplemental pilots, the pilots must meet all standards and training requirements for full

time pilots. The AID or equivalent will outline who is authorized to fly, such as the Director of Operations, Aviation Manager, ASO or an incidental/supplemental pilot. Additionally, a supplemental pilot may provide a cost-effective alternative to meet specific unfulfilled flight crewmember requirements. The field element's AID, and the contractor's aviation procedures or operations manual, if applicable, must clearly define the qualifications and processes for using either incidental or supplemental pilots. Supplemental and incidental pilots must meet the following minimum criteria:

- a. Hold appropriate medical, and pilot ratings for the operation conducted and if a type rating is required for the aircraft both the PIC and SIC must be type rated;
  - b. Have a minimum of 1500 hours total time, and meet all other minimum eligibility requirements for the type of aircraft flown and pilot functions as defined in the Office of Personnel Management (OPM) Aircraft Operations Series 2181.
7. Maintenance Standards for DOE/NNSA Aviation Programs. The field element must establish aircraft maintenance and inspection programs that comply with the requirements listed in Title 41 CFR 102-33 and Title 14 CFR appropriate for the operation and type of aircraft in service.

At a minimum, field elements must establish, as applicable to size and scope of operations and type of aircraft operated:

- a. Aircraft maintenance and inspection programs to ensure the safety of flights in accordance with either the applicable manufacturer's programs, FAA-approved inspection programs, or continuous maintenance programs (see Title 14 CFR applicable regulations);
- b. Tool-control programs to mitigate potential foreign object damage;
- c. Incoming parts and receiving programs to mitigate risk associated with unapproved parts entering into the supply system;
- d. Quality processes for the purchase and acquisition of replacement parts and ensuring parts purchased or acquired have the necessary documentation to determine airworthiness;
- e. Procedures or processes to ensure the integrity and quality control of maintenance actions by ensuring that maintenance performed by one qualified individual on critical areas of an aircraft are checked and documented by another qualified individual who did not perform the work. As applicable critical areas must include as a minimum the following:
  1. Removal, rigging, or installation of a component or part of a flight control;
  2. Removal or installation of any component or part of a main drive or tail rotor drive system;

3. Removal or installation of a component or part of a main or tail rotor hub assembly;
  4. Removal, disassembly, reassembly or installation of a power turbine, compressor, gearbox, combustion section or a removal and installation of a complete power-plant assembly;
  5. Removal or installation of a fuel control or governor of a power-plant;
  6. Removal or installation of a propeller governor or reduction gearbox;
  7. Removal or installation of a component or part of a fuel system;
  8. Removal or installation of a propeller assembly or blade;
  9. Removal, rigging, or installation of any component or part associated with the landing gear of a fixed-wing aircraft;
  10. Removal or installation of internal or external mission equipment by technicians or scientists who do not hold an Airframe and power-plant certificate (see 14 CFR, Part 65); and
  11. Procedures for the maintenance of any of the identified critical systems when an aircraft is away from home base.
- f. The field element must comply with FAA airworthiness directives, and mandatory manufacturers' bulletins applicable to the types of aircraft, engine(s), propeller(s), and appliances in their aircraft operations.
- g. The field element must implement a maintenance management tracking system appropriate to the size and scope of operations and type of aircraft operated.
- h. The field element must report to the FAA, within 72 hours, after discovering any serious defect in, or other recurring non-airworthy condition of, an aircraft, power-plant, or propeller, or any component of any of them. The field element must file the report using the Web-based, Internet-accessible FAA Service Difficulty Reporting System or the FAA accepted Helicopter Association International's Maintenance Malfunction Information Report System for helicopters. The report must describe the defect or malfunction completely without withholding any relevant information. If the defect or malfunction could result in an imminent hazard to flight, the field element must use the most expeditious method it can to inform the FAA and the DOE/NNSA AvM or ASO.
8. Training Standards for DOE/NNSA Aviation Programs. Flight crewmembers and maintenance personnel will comply with the training requirements as stated in Title 41 CFR 102-33, applicable parts of Title 14 CFR, and manufacturers' recommendations. At a minimum, field elements must establish standards and procedures in their AID or FAA approved manuals for:

- a. Initial and recurrent training appropriate for their responsibilities and relevant to the type aircraft, operations, and missions conducted by the field element in accordance with Title 14 CFR where applicable;
  - b. Mandatory Crew Resource Management (CRM) training is for all flight crew personnel, and such training will be recorded and evaluated by the organization on an annual basis;
  - c. Processes to correct identified deficiencies;
  - d. Processes to document compliance with field element's AID in order to satisfy DOE/NNSA departmental oversight;
  - e. Demonstration of proficiency for applicable tasks relevant to the types of aircraft and operations/missions conducted not covered by Title 14 CFR;
  - f. A record keeping process in accordance with Title 14 CFR; and
  - g. Flight followers and cabin safety personnel, if required, must complete initial/recurrent training appropriate to the type of aircraft and operations/missions conducted by the field element.
9. Aviation Safety Management Systems for DOE/NNSA Aviation Programs. Field element managers responsible for the management, oversight, operation, safety and/or maintenance of federally-owned aircraft and related services, or who hire CAS aircraft must establish comprehensive, integrated aviation safety management systems based on the five Core Functions of DOE P 450.4, *Safety Management System Policy*, (10-15-96). If the organization has an approved FAA Safety Management System (SMS), IS-BAO Safety Program or ISO-9001 Aviation Safety Program, gap analysis will be accomplished to ensure all aspects of the DOE Integrated Safety Management System have been addressed.
10. Aviation Safety Documentation. Field elements ASO along with the AvM must review approved flight operations, and assign appropriate risk levels for each mission. This review shall take place prior to initiation of new operations, and on an annual basis. For those missions identified by the field elements ASO and/or AvM as a risks not normally accepted by the public, the AvM will convene a flight readiness review board (FRRB) and conduct an Aviation Safety Review (ASR) using the safety management program elements in DOE P 450.4, *Safety Management System Policy*, (10-15-96) (Risks not normally accepted by the public are defined as aircraft operations not regulated or not in compliance with the applicable parts of 14 CFR Chapter I, FAA Federal Aviation Regulations or 49 CFR Subchapter C, Hazardous Material Regulations). Countermeasures to mitigate risks will be identified, applied, and reviewed for effectiveness on a regular basis but not less than annually. The documents produced in the ASR make up the Aviation Safety Documentation (ASD) required for these missions. The field element Federal AvM or ASO may elect to conduct an ASR and record an ASD

for any aircraft operation they deem necessary as part of the field element's Safety Management System (SMS). The Aviation Manager must brief the field element's appropriate administrator, who has the overall responsibility of the organization's aviation program, regarding the contents of the ASD. That official must accept or reject the risks associated with the mission. The Aviation Manager or ASO should review all ASDs on a periodic basis, not less than annually, to determine their relevancy to current operational conditions. Additional ASD information is available on the OAM website at <http://management.energy.gov/aviation.htm>

11. Reporting Requirements. Each field element operating, using, or sponsoring the use of Government (Federal or CAS) aircraft must comply with the reporting requirements of: Title 41 CFR Section 102-33.190, and Title 41 CFR Section 102-33.380 thru Title 41 CFR Section 102-33.440 or its successor; GSA Federal Travel Regulations Title 41 CFR Chapter 300 and Title 41 CFR Chapter 301 or its successor; Senior Federal Officials and non-Federal travelers who travel on Government aircraft as stated in GSA Federal Travel Regulations Title 41 CFR Section 301-70.905 thru Title 41 CFR Section 301-70.908 or its successor; and establish the continuing need for government-owned aircraft as stated in OMB Circular A-11, Part 7, for Capital Asset Plan Reports. Additional information on Capital Asset Plan is available on OAM website at <http://management.energy.gov/aviation.htm>
12. Special Procedures That Apply to Official Travel. All travel by Senior Federal travelers or non-Federal travelers, as defined in Title 41 CFR Part 300-3 FTR, aboard Government aircraft must be approved by the appropriate travel approving official (OMB Circular 126-A, 11, a.) and by the DOE General Counsel (GC) or his/her principal deputy or primary designee. DOE employees planning foreign travel must comply with the processes and requirements found in DOE O 551.1C, *Official Foreign Travel*, dated 06-24-2008.

## RESPONSIBILITIES

1. Director, Office of Aviation Management. Designated as the Senior Aviation Management Official (SAMO) for the Department of Energy in accordance with the requirements of Title 41 CFR Part 102-33.

For DOE elements the Director of OAM:

- a. Represents the DOE Secretary in a broad spectrum of aviation activities including management and policy functions involving the acquisition, use, and disposal of aircraft and aviation services by the department and its contractors.
- b. Implements a program that provides aviation support to the Department of Energy with the highest standards of safety, efficiency, and effectiveness. Additionally, the Director will provide expertise, recommendations, and support to field office Senior Managers in the approval process for fleet aircraft acquisitions and disposals, and the planning of timely replacement of aging aircraft. Additionally,

the Director will provide assistance with aviation budget preparation, program charter and contract aircraft activities, the conduct of appropriate studies and reviews, and the assurance of timely and accurate reporting.

- c. Approves any deviations from, or waivers to, the requirements of this Order for DOE Field elements.

For NNSA elements:

- a. The NNSA Aviation Program Manager will conduct the above actions for their particular Aviation Operations. However, the Director of OAM will be provided the opportunity to review and comment on issues that affect DOE/NNSA via the submitting NNSA organization. Decisions, on the part of NNSA aviation elements, to proceed contrary to the recommendations of OAM, shall be made in writing to the Director, OAM.
  - b. The Director, OAM, is the approving authority for any deviations from, or waivers to, the requirements of this Order for non-NNSA elements of DOE. For all NNSA elements, final authority rests with the Administrator, NNSA. However, the Director, OAM, will be provided the opportunity to review and make recommendation via the submitting NNSA organization. Decisions, on the part of NNSA aviation elements, to proceed contrary to the recommendations of OAM, shall be made in writing to the Director, OAM.
2. DONE/NNSA Aviation Board of Directors. Comprised of representatives from each field element, specifically aviation managers and safety officers who recommend broad policy and procedures for the operations and safety of Federal aircraft and aviation services to the Chair of the Aviation Board. The Board of Directors' major function is to review, deliberate, and process policy change recommendations before they are submitted for implementation.
  3. Heads of DOE/NNSA Elements that oversee, manage, operate, or maintain DOE/NNSA-owned aircraft or acquire CAS aircraft within their programs must:
    - a. Develop and implement effective aviation operations, airworthiness, security and safety programs that meet the requirements of this Order;
    - b. Identify the contracts to which the CRD applies and notifies the contracting officers to incorporate the CRD into the affected contracts via the laws, regulations, and DOE/NNSA directives clauses included in those contracts. In the case of contracts requiring contractor performance of activities set forth in the CRD, but which do not contain the Laws, regulations, and DOE/NNSA directives clause, notify the contracting officers of these requirements; and

- c. Appoint a Federal Aviation Manager or Federal ASO or both, depending upon the size and scope of operations, number of aviation operations conducted or aircraft assigned and appoints a person to the DOE/NNSA Aviation Board of Directors.

4. Aviation Manager (AvM).

- a. Establishes goals for the field aviation program based on the anticipated requirements as applicable to DOE/NNSA, the field element, and other DOE/NNSA organizations that may require aviation services.
- b. Implements DOE/NNSA aviation management and safety policy and establishes the field element's standards for the aviation program that will ensure an effective, safe, secure and cost-efficient operation in accordance with this Order.
- c. Develops the organization's Aviation Implementation Documents (AID) and annually reviews the AID to ensure that it is current.
- d. Provides direction to DOE/NNSA contractors performing aviation-related services, via the appropriate designated representative in accordance with the contract statement of work and/or the CRD included in the contract. This includes the types of missions that are required and the regulations, policies, and standards that contractors are to follow. Provides revised AID to contracting officer or designated representative as necessary to ensure revisions to contractor written aviation programs as required by the statement of work and/or CRD.
- e. Reviews, evaluates, and monitors cost, performance, and technical competency of aviation contractors as authorized by the contracting officer or his designated representative.
- f. May be appointed, or has collateral duties, as an ASO for the field element aviation program or provides direction to the ASO based on the needs of the program.
- g. Provides required reports and information as applicable to the DOE/NNSA regarding field element aviation activities, including reports required by OMB Circulars A-11 Section 300, Preparation, Submission and Execution of the Budget; A-76, Performance of Commercial Activities (if necessary); OMB Circular A-126, Improving the Management and Use of Government Aircraft; and reports required by paragraph 11 in the Requirements section of this Order.
- h. Complies with all applicable Laws, Regulations and Policy requirements concerning aviation activities.
- i. Serves as a voting member of DOE/NNSA Aviation Board of Directors.

- j. Develops and implements an integrated safety management system as provided by DOE P 450.4., *Safety Management System Policy*, dated 10-15-96, and as required by paragraph 8 of this Order, appropriate to the scope of operations.
  - k. As needed, will appoint and coordinate, or assign a designee who will appoint and coordinate, a *Flight Readiness Review Board* of subject matter experts and ensure that all Board deliverables come through the field element's ASO. As a minimum the Board will consist of a Board Chair and two members.
  - l. Has authority to perform assessments of CAS providers and/or aviation support services to ensure the safety of aircraft operations. Assessment reports of CAS operators will be forwarded to OAM for inclusion to, or removal from, the Accepted Operator List.
5. Aviation Safety Officer (ASO).
- a. Gathers, trends, and analyzes aviation safety performance data to ensure the safety of the field aviation program.
  - b. Conducts periodic assessments of aviation activities to ensure that requirements, policies, and procedures are implemented and followed and prepares reports documenting assessment findings, concerns, and recommendations and tracks corrective actions to help prevent similar occurrences.
  - c. Participates as directed in aviation accident or incident investigations and provides assistance to accident investigation boards during their investigations.
  - d. Identifies and reports safety concerns to the AvM when he/she believes that the field element manager's intervention is required and works to eliminate potential hazards.
  - e. Develops ASR and/or ASD as required by paragraph 10 of this Order, or in the case of a contractor operated aviation element, reviews and concurs on ASRs and ASDs. ASDs will address potential hazards associated with the activity and methods to mitigate these hazards.
  - f. Ensures that aviation personnel report mishaps, hazards, and concerns to the Occurrence Reporting and Processing System (ORPS) or the Aircraft Accident Incident Reporting System (AAIRS).
  - g. Participates in the Aviation Safety Awards Programs to ensure that organizations and personnel are recognized for their contributions toward providing the Department with a safe aviation program.

6. Flight Readiness Review Board (FRRB). The purpose of a Board is to evaluate the safety, design, operational planning, and functional adequacy of the aircraft operations that are not already regulated by other Federal regulations, or those that may deviate from this Order or other DOE/NNSA standards. Prior to the initiation of flight operations, conduct an independent review of the total project to assure that adequate planning and preparation have been accomplished to achieve the desired results under acceptable safety conditions.

DEFINITIONS. Definitions that pertain to Federal Management Regulation, Part 102-33 Management of Government Aircraft are available in Title 41 CFR Section 102-33.20. Definitions that pertain to Federal Travel Regulations, Use of Government Aircraft are available in Title 41 CFR Section 300-3.1. Definitions in both regulations are available on the OAM website at <http://management.energy.gov/aviation.htm>.

CONTACT. Questions concerning this Order should be addressed to the Director, Office of Aviation Management at 202-586-5532.

BY ORDER OF THE SECRETARY OF ENERGY:



DANIEL B. PONEMAN  
Deputy Secretary

**CONTRACTOR REQUIREMENTS DOCUMENT  
DOE O 440.2C, AVIATION MANAGEMENT AND SAFETY**

1. This Contractor Requirements Document (CRD) must be incorporated into any Department of Energy (DOE) contract for management, operation, or maintenance of DOE Government aircraft. Regardless of the performer of the work, the contractor is responsible for complying with the requirements of this CRD. The contractor is responsible for flowing down the requirements of this CRD to subcontractors at any tier to the extent necessary to ensure the contractor's compliance with the requirements.
2. Contractors that hire, manage, oversee or use Commercial Aviation Services (CAS) in support of programmatic needs must develop and follow a written program that includes and implements the requirements set forth in the associated field element's Aviation Implementation Documents (AID), and has been reviewed and accepted by the local Federal Aviation Manager or Aviation Safety Officer (ASO). Contractors must ensure that any changes to the field element's AID that impacts the contractor's written program are reflected in a revised program. When necessary, contractors shall submit a revised written aviation program to the DOE field element's AM or ASO for acceptance within 60 days of receipt of a revised DOE AID.

In addition to the above, the contractor's program must establish contracts or other acceptable procurement documents that require the CAS provider or subcontractors that provide CAS to comply with the civil standards of Federal Aviation Administration (FAA) Title 14 CFR, Chapter I, Department of Transportation (DOT) 49 CFR Chapter I, Subchapter C, and Department of Homeland Security 49 CFR Chapter XII, conducted while in service to DOE/NNSA or its contractor, and any other laws and regulations that pertain to the type of operation conducted.

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