

# PROJECT SAFETY DOCUMENT

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**PROJECT TITLE:** \_\_\_\_\_MPEX  
**PRINCIPAL INVESTIGATOR:** \_\_\_\_\_M. Weiseman  
**RAF PROJECT LEADER:** \_\_\_\_\_Pavel Romashkin  
**RESEARCH PERIOD:** \_\_\_\_\_05/15/2013-06/15/2013  
**LOCATION:** \_\_\_\_\_KBJC  
**PROJECT SAFETY OFFICER:** \_\_\_\_\_P. Romashkin

## STATEMENT OF RISK

### I. GENERAL FACTORS

- A. Only members of the flight crew or trained observers necessary to complete the scientific mission may be carried on board.
- B. Normal risks involved in working on or near both propeller and jet aircraft. (For example: noise, moving machine parts, blown dust or particles, equipment racks and other floor mounted hardware, etc.)

### II. PROJECT SPECIFIC FACTORS

- A. HAZARDOUS MATERIALS:  
\_\_\_\_\_none
- B. OVER WATER OPERATIONS:  
\_\_\_\_\_none
- C. PENETRATION OF STRONG CONVECTIVE SYSTEMS:  
\_\_\_\_\_no
- D. OPERATION UNDER PROBABLE ICING CONDITIONS:  
\_\_\_\_\_unlikely
- E. HAZARDS ASSOCIATED WITH FOREIGN BASES OF OPERATION:  
\_\_\_\_\_none, operating from home base
- F. MISCELLANEOUS HAZARDS:  
\_\_\_\_\_fatigue from night operations

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## SAFETY PROCEDURES

### I. GENERAL FACTORS

- A. All RAF operations are carried out under applicable OSHA regulations. Any questions regarding general safety procedures should be referred to the RAF Project Manager. OSHA regulations will be made available upon request.
- B. The installations of all user-supplied equipment must be performed in compliance with RAF Bulletin No. 13 and the Design Guide for non-metallic materials. These guidelines set forth the procedures to be followed in the design, fabrication, and RAF approval of user-supplied equipment to be flown on board an NCAR aircraft.
- C. The entire research payload must undergo a complete safety inspection by representatives of the three RAF technical support groups (aeronautical engineering, technicians and mechanics) prior to the first test flight. This inspection must be documented using the RAF "Equipment Installation Form" and be accepted by RAF's Chief Pilot. A copy of this form will be kept on file by the RAF Safety Committee.
- D. Rack documentation package must be completed on each individual installation, documenting the key components within the "rack" and the weight distribution of those components. The layout must comply with the limits established in RAF HIAPER Handbook. Once the formal inspection noted in item C above has been completed, any modification of the installation or any maintenance action that requires a component be unsecured or removed must be documented in the rack book. Prior to the next flight, RAF staff will review the results of these actions to insure that the payload has been returned to an airworthy status.
- E. Open toed shoes may not be worn on the aircraft during project cabin preparation or research flight operations due to the likely presence of various types of floor mounted hardware.**

### II. GROUND SAFETY

- A. All ground operations, including the installation, testing and maintenance of scientific equipment, application of electrical power, aircraft maintenance, loading, fueling and aircraft movements will be conducted by, or under, the supervision of qualified RAF personnel.**
- B. Prior to any flight operations, the project pilot will inspect the aircraft installation with regard to operational safety and emergency egress and will document his acceptance of the installation by signing the Equipment Installation Form.
- ~~C. Prior to departing for the field site, all project personnel will receive a "Climate Briefing" from the assigned project leader on possible local weather hazards. Such items as the~~

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~~frequency of severe storms (hail, tornados, etc.), exposure to extreme cold, or the likelihood of extended intervals with high ambient temperatures will be addressed.~~

- D. There will be no smoking in or within 50 feet of the aircraft.
- E. All personnel working around the aircraft must familiarize themselves with the location of fire extinguishers within the aircraft and in the vicinity of the aircraft.
- F. Aircraft fuses or circuit breakers will be replaced or reset only with the consent of qualified RAF personnel.
- G. At the completion of each day's activities, all liquids, refuse and litter will be removed from the aircraft and ramp areas by the people who produced the refuse.
- H There will be no electrical power left on the aircraft without RAF supervision.
- I. Users are not allowed to operate any of the maintenance lifts at JeffCO or during field deployments. An RAF operator will be required to get access to this equipment.
- J. The RAF has an extensive sheet metal shop on site at JeffCO. Users are only allowed access to this equipment after they have been judged qualified for its use by the RAF Maintenance staff.

### III. FLIGHT PERSONNEL (FLIGHT CREW AND SCIENTIFIC OBSERVERS)

- A. The cabin will normally be pressurized to cabin altitudes below 10,000 feet. Research flight operations with cabin pressures above 12,000 feet will not be conducted unless this requirement has been stated at the time of the OFAP request. Specialized training and more restrictive physical requirements for flight crews and observers are needed for such operations.
- B. The pilot-in-command has the responsibility to ascertain that everyone onboard is familiar with normal and emergency procedures, and the use of the following equipment as pertinent to the flight: oxygen system and masks; the interphone system; emergency exits; and emergency survival equipment.
- C. Supplemental emergency oxygen is available for all persons aboard and must be used when the aircraft is operating at cabin altitudes above 10,000 feet.

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## IV. FLIGHT OPERATIONS

- A. All flight operations will be conducted in accordance with Federal Aviation Administration Regulations Part 91 Subpart B.
- B. The pilot-in-command is responsible for the safe conduct of all flight operations.**
- C. The RAF ADS operator will serve as the direct representative of the pilot-in-command in the research cabin. Any directions or limits on activities in the research cabin given by the ADS operator carry the authority of the pilot-in-command.**
- D. Any malfunction in scientific equipment, mechanical or electrical, will be immediately reported to the pilot-in-command. No in-flight repairs will be permitted without permission from the RAF flight crew.
- ~~E. No in-flight handling of toxic chemicals or gases, or other hazardous materials, will take place.~~
- F. Safety belts will be worn by all onboard observers during taxi, takeoff and landing and at such times as instructed by the flight crew.
- G. Research flight profiles often call for low altitude flying. RAF flight operations conform to the minimum altitudes established in the appropriate FAR's. When FAR's are not restrictive or when the restrictions have been waived for specific flights, RAF operations will be permitted to use the following guidelines:  

Daylight, visual flight rule (VFR) conditions / level legs:	100 feet AGL
Daylight, visual flight rule (VFR) conditions / turning:	300 feet AGL
Nighttime, visual flight rule (VFR) conditions:	500 feet AGL
- H. There will be no smoking on any NCAR aircraft. Smoking is only permitted in designated areas. No smoking is permitted within 50 feet of parked aircraft, or flammable liquid storage points.
- I. In the event of fire, the crewmember observing the fire will warn the other crew members by shouting, "FIRE-FIRE" and reporting the location of the fire. If smoke, fumes or fire are present within the personnel compartment, all occupants regardless of altitude will don pressure demand oxygen masks that will deploy automatically. All available means will be used to extinguish the fire.
- J. Adequate rest for onboard personnel, both flight crew and scientific observers, is essential to the safe and efficient operations of NCAR aircraft in support of research programs. RAF has established specific crew duty limits as follows:**

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**Maximum Crew Duty Period: 14 hours**  
**Any 24-hour period: 10 flight hours**  
**Any consecutive 7 day period: 35 flight hours**  
**Any 30 day period: 110 flight hours**  
**Consecutive working days: 6 days**  
**Minimum crew rest period: 12 hours**

All scientific observers are strongly encouraged to comply with these limits. Any onboard observers who are deemed to be too tired and unfit for flight at the time of the pre-flight briefing will be barred from participating in that particular flight.

**MPEX flights will be conducted at night. All project crews will be on a night schedule with general daily schedule as outlined below:**

FLIGHT DAY SCHEDULE

	Daily planning meeting											Crew rested	Flight plan finalized	
LOCAL	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
UTC	18:00	19:00	20:00	21:00	22:00	23:00	0:00	1:00	2:00	3:00	4:00	5:00		
		Make flight plan	File flight plan	GV roll out	Take-off					Landing	Crew leaves for rest			
LOCAL		0:30	1:00	1:45	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00
UTC		6:30	7:00	7:45	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00

MAINTENANCE DAY SCHEDULE

	Daily planning meeting											Start maint.	Altern. start maint.	
LOCAL	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
UTC	18:00	19:00	20:00	21:00	22:00	23:00	0:00	1:00	2:00	3:00	4:00	5:00		
						End maint.	Altern. end maint.							
LOCAL	0:00	1:00	1:45	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	
UTC	6:00	7:00	7:45	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	

- K. Emergency equipment and protective clothing will be carried on all NCAR aircraft, as required.
- L. Research electrical power will normally be available at all times. All power changes will be coordinated between the scientific observer and flight crew. Any fuse replacement or circuit breaker reset in the primary power supply system will

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be performed only with the consent of the pilot-in-command.

- M. Whenever an engine or the Auxiliary Power Unit is operation, hearing protection will be worn near the aircraft. Hearing protection will also be required within the GV aircraft.
- N. It will be the duty of the scientific crew aboard to properly adjust or secure research and related equipment prior to takeoff and landing. However, it is the responsibility of the pilot-in-command or his designated representative to specifically check and ascertain that such duties have been satisfactorily completed.
- O. The operation of user-supplied research equipment onboard the aircraft will only be permitted under the supervision of, or with the approval of the RAF and the scientist concerned.
- V. **HAZARDOUS MATERIALS, ENERGIES AND TOXIC GASES**
- A. Hazardous materials, non-eye safe lasers, compressed inert gases or toxic gases will not be carried aboard NCAR aircraft without review and permission from the RAF Safety Committee. Applicable Federal and OSHA regulations regarding both onboard and ground support activities will be adhered to in each case. Provisions for dealing with said materials or gases will be defined by the RAF Safety Committee in coordination with the NCAR Safety Office and applicable regulations. All hazards will be declared and listed by each participant on the

RAF's Hazardous Materials and Devices Form. (See appendix B). This form includes a section on special "handling" procedures to be followed in order to limit the dangers associated with the various hazards. A copy of each HMD form will be submitted to the NCAR Office of Safety. The appropriate Material Safety Data Sheets (MSDS) for each chemical hazard will be carried aboard the aircraft.

## EMERGENCY EQUIPMENT AND PROTECTIVE CLOTHING

### I. GENERAL

Emergency equipment and protective clothing will be carried aboard NCAR aircraft for the following purposes:

- To cope with air and ground emergencies.
- To sustain crew members' lives in case of forced landings.

### II. AIRBORNE EMERGENCY EQUIPMENT

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Emergency equipment is divided into two categories as listed below. Emergency equipment is considered a part of the aircraft and will not be carried by individual crew members. Scientific crew may carry tools necessary for airborne maintenance and specialized research equipment. Crew judgment is the paramount factor deciding emergency equipment needs.

## A. CATEGORY I EQUIPMENT

Category I equipment is a part of the basic aircraft inventory and will be carried aboard NCAR aircraft at all times.

- Fire Extinguishers
- Ax
- First Aid Kit
- Tool Kit- Pliers, screw drivers, wrenches, fuses, tape, allen set and knife
- Flashlight

## B. CATEGORY II A

Category II A equipment will be aboard NCAR aircraft for all operations conducted over desert and over water beyond gliding distance of land.

- One life preserver for each crew member
- Enough life rafts to safely carry all crew members
- Water in addition to that carried in the survival kit
- Emergency radio
- Survival kit
- Smoke hoods

## C. CATEGORY II B

Category II B equipment will be carried on all flights where operations are to be conducted over mountainous terrain and arctic areas.

- Emergency radio
- Survival kit
- Exposure suits, sleeping bags, or blankets, as appropriate

## III. PROTECTIVE CLOTHING

Each NCAR employee serving as a crew member will be provided protective clothing appropriate to conditions which may be encountered. It will be the responsibility of the pilot-in-command to ensure that non-NCAR and other aircrew members wear appropriate clothing.

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**Safety Briefing Attended  
MPEX Project**

**Date:** 05-01-2013 **Time:** 10:00AM

**I understand and agree to comply by the NCAR RAF safety provisions as communicated in the formal project safety briefing by the RAF flight crew or project managers.**

**I have reviewed the MPEX project safety document and understand that failure to comply with RAF safety provisions may disqualify me from flying on RAF research missions.**

**Print Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_