

**CATEGORICAL EXCLUSION FOR ATMOSPHERIC RADIATION MONITORING  
PROJECT AIRCRAFT ACQUISITION AND OPERATION,  
PACIFIC NORTHWEST NATIONAL LABORATORY,  
RICHLAND, WASHINGTON**

**Proposed Action:**

Acquisition and operation of a replacement for the Battelle-owned G-1 aircraft that is used to support the Atmospheric Radiation Monitoring Project at locations worldwide.

**Location of Action:**

The replacement aircraft would be housed at the Tri-Cities Airport in Pasco, WA. Routine maintenance would occur at the Tri-Cities Airport. Operation of the aircraft could occur at locations worldwide.

**Description of the Proposed Action:**

Atmospheric Radiation Measurement (ARM) currently provides users with a network of heavily instrumented, long-term, fixed-location observation sites and mobile observation facilities; an aerial component to augment these ground-based measurements; and infrastructure to collect, process, and deliver data to the research community.

In 2020, a critical capability gap for the aerial component of the ARM will arise. The ARM Aerial Facility (AAF)-dedicated and piloted aircraft, the Battelle-owned G-1, will reach the end of its service life and need to be replaced. The Grumman Gulfstream-I (company designation G-159) remained in production from 1959 to 1969 with 200 units built. Built in 1961, the Battelle G-1 is one of only 10 G-1 planes that remain in service worldwide. In 2006, Gulfstream ceased supporting the airframe. The increasing costs to operate, pending major service items, unavailability of key parts, increased lack of certified commercial repair shops, and inability to certify new pilots necessitate retirement of the G-1 in 2020.

Future campaigns will require continued access to a piloted research aircraft with capabilities comparable to the G-1, and be able to carry the necessary state-of-the-art airborne instrumentation for measuring aerosol, cloud microphysical, radiative, and atmospheric state properties required to address crosscutting science questions.

The G-1 aircraft, in use today, is privately owned and was historically made available to the government at cost. The complexities of utilizing and modifying a private aircraft as well as the other economic barriers preclude this ownership model being used for replacement aircraft.

To meet the need for *in situ* aerial observations to support the Biological and Environmental Research (BER) high-priority science activities for the AAF, the large twin-turboprop Gulfstream-I (G-1) that measures *in situ* aerosol, cloud, and trace gas properties will need to be replaced with an aircraft capable of conducting the G-1 aircraft's weeks- to months-long intensive observational campaigns over a range of meteorological conditions and locations around the world, and carrying the necessary state-of-the-art airborne instrumentation and operators for measuring aerosol, cloud microphysical, radiative, and atmospheric state properties.

### *Technical Requirements:*

The replacement aircraft may be slightly larger than the current G-1, but will likely be a twin turbo-prop with similar overall structure. To provide the concurrent *in situ* observations of atmospheric state, aerosol chemistry, and cloud microphysics needed to address DOE science questions about aerosol and cloud life cycles and to develop improved representations of aerosol and cloud physics in Earth system models requires an airborne capability with:

- Payload capacity (floor space, weight, electricity) to carry multi-sensor packages to take concurrent measurements of aerosol, trace gas, clouds, solar and infrared radiation, and atmospheric state properties
- Floor space for payload: minimum of 20 m<sup>2</sup> (215 ft<sup>2</sup>)
- Payload weight (with fuel for 5 hours): minimum of 2270 kg (5000 lbs)
- Accommodations to carry complex cutting-edge instrumentation that has not been or cannot be easily miniaturized along with up to five required in-flight operators
- Ability to fly at altitudes (with fuel for 5 hours and payload minimum as described above) between surface and 7.6 km (25,000 ft) to gather data on a wide range of scientific priorities, including land-atmosphere interactions, boundary layer structure, tropospheric cloud and aerosol properties, and mixed-phase cloud microphysics
- Ability to fly safely at low altitudes (as low as 60 m or 200 ft) at speeds suitable (typically ~100 m/s or ~200 knot) for gathering *in situ* observations of aerosol and cloud microphysical properties
- Multiple engines for safe operations within clouds, as well as over the ocean and sea-ice
- Ability to operate in conditions ranging from the Arctic to tropics with full payload
- Ability to deploy at times that coincide with atmospheric phenomena of interest as determined by science user proposals
- Ability to conduct multi-week to multi-month campaigns at locations worldwide
- Ability to maintain commonly available aircraft support infrastructure.

### **Biological and Cultural Resources:**

The proposed actions are not likely to result in adverse impacts to sensitive biological or cultural resources. Activities, such as excavation, that could cause impacts to cultural or biological resources are not included in the scope of this Categorical Exclusion (CX). If any action related to the operation of the new aircraft includes activities that would trigger a biological and/or cultural resource review, those activities must have separate NEPA coverage with supporting cultural and biological reviews as required.

### **Categorical Exclusion to Be Applied:**

As the proposed action is to acquire and operate an aircraft, the following CXs, as listed in the DOE National Environmental Policy Act (NEPA) implementing procedures, 10 CFR 1021 Subpart D, Appendix B, would apply:

- B1.24 Transfer, lease, disposition, or acquisition of interests in personal property (including, but not limited to, equipment and materials) or real property (including, but not limited to, permanent structures and land), provided that under reasonably foreseeable uses (1) there would be no potential for release of substances at a level, or in a form, that could pose a threat to public health or the environment and (2) the covered actions would not have the potential to cause a significant change in impacts from before the transfer, lease, disposition, or acquisition of interests.

B3.2 Aviation activities for survey, monitoring, or security purposes that comply with Federal Aviation Administration regulations.

**Eligibility Criteria:**

The proposed activity meets the eligibility criteria of 10 CFR 1021.410(b) because the proposed action does not have any extraordinary circumstances that might affect the significance of the environmental effects, is not connected to other actions with potentially significant impacts [40 CFR 1508.25(a)(1)], is not related to other actions with individually insignificant but cumulatively significant impacts [40 CFR 1508.27(b)(7)], and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during environmental impact statement preparation.

The "Integral Elements" of 10 CFR 1021 are satisfied as discussed below:

<b>INTEGRAL ELEMENTS, 10 CFR 1021, SUBPART D, Appendix B (1)-(5)</b>	
<b>Would the Proposed Action:</b>	<b>EVALUATION:</b>
Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health?	The proposed action would not threaten a violation of regulations or DOE or Executive Orders.
Require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities?	No waste management facilities would be constructed under this CX. Any generated waste would be managed in accordance with applicable regulations in existing facilities. Waste disposal pathways would be identified prior to generating waste and waste generation would be minimized.
Disturb hazardous substances, pollutants, or contaminants that preexist in the environment such that there would be uncontrolled or unpermitted releases?	No preexisting hazardous substances, pollutants, or contaminants would be disturbed in a manner that or results in uncontrolled or unpermitted releases.
Involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species?	The proposed action would not involve the use of genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species.
<p>Have the potential to cause significant impacts on environmentally sensitive resources., including, but not limited, to:</p> <ul style="list-style-type: none"> <li>• protected historic/archaeological resources</li> <li>• protected biological resources and habitat</li> <li>• jurisdictional wetlands, 100-year floodplains</li> <li>• Federal- or state-designated parks and wildlife refuges, wilderness areas, wild and scenic rivers, national monuments, marine sanctuaries, national natural landmarks, and scenic areas.</li> </ul>	<p>No environmentally sensitive resources would be adversely affected by the proposed transfer actions</p> <p>The proposed action would not adversely affect floodplains, wetlands regulated under the Clean Water Act, national monuments, or other specially designated areas, prime agricultural lands, or special sources of water.</p> <p>Potential impacts to Biological or Cultural resources would be addressed as described above.</p>

**Summary of Environmental Impacts:**

The following table summarizes environmental impacts considered when preparing this CX determination.

<i>Would the Proposed Action:</i>	Evaluation
Result in more than minimal air impacts?	The replacement aircraft will be very similar to the current one, and would be utilized in the same manner. Air emissions would be similar to typical aircraft of similar size.
Increase offsite radiation dose measurably?	The proposed acquisition and operation of a replacement aircraft will not increase offsite radiation dose.
Require a radiological work permit?	The proposed acquisition and operation of a replacement aircraft will not require a radiation work permit.
Discharge any liquids to the environment?	The proposed acquisition and operation of a replacement aircraft would not include any planned discharge of liquids to the environment.
Require a Spill Prevention Control and Countermeasures plan?	None required. Neither the hangar nor the aircraft will contain hydrocarbons in any quantity that would trigger the SPCC requirement.
Use carcinogens, hazardous, or toxic chemicals/materials?	Other than jet fuel and maintenance fluids no carcinogenic, hazardous, or toxic chemicals or materials would be required. Chemicals and materials used as part of the sample collection and analysis systems currently do not require a Chemical Process Permit.
Involve hazardous, radioactive, polychlorinated biphenyl, or asbestos waste?	PNNL currently maintains a satellite accumulation area at the existing hangar at the Tri-Cities Airport for temporary storage of hazardous waste such as used oil and solvents, oil soaked rags, etc., and a universal waste storage area for batteries and lamps. These would be continued to support the replacement aircraft. No radioactive, PCB, or asbestos waste would be created or handled.
Cause more than a minor or temporary increase in noise level?	The proposed acquisition and operation of a replacement aircraft will not increase noise beyond current aircraft operations.
Create light / glare, or other aesthetic impacts?	The proposed acquisition and operation of a replacement aircraft will not create light / glare or other aesthetic impacts.
Require an excavation permit (e.g., for test pits, wells, utility installation)?	The proposed acquisition and operation of a replacement aircraft will not require an excavation permit.
Disturb an undeveloped area?	The proposed acquisition and operation of a replacement aircraft will not require the disturbance of undeveloped areas.

<i>Would the Proposed Action:</i>	Evaluation
Result in more than minimal impacts on transportation or public services?	The proposed acquisition and operation of a replacement aircraft will not impact transportation or public services.
Disproportionately impact low-income or minority populations?	The proposed acquisition and operation of a replacement aircraft will not disproportionately impact low-income or minority populations.
Require environmental or other permits from federal, state, or local agencies?	Pilots will require specific FAA type rating for the replacement aircraft. No other permits would be required.

**Compliance Action:**

I have determined that the proposed action satisfies the DOE NEPA eligibility criteria and integral elements, does not pose extraordinary circumstances, and meets the requirements for the CX referenced above. Therefore, using the authority delegated to me by DOE Order 451.1 B, Change 3, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation. This determination must be reviewed at least once every 5 years.

Signature:   
Tom McDermott, PNSO NEPA Compliance Officer

Date: 11-2-17

cc: MR Sackschewsky, PNNL