DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

CX Posting No.: DOE-ID-INL-16-126 R1

SECTION A. Project Title: Unmanned Aerial Vehicle Operations R1

SECTION B. Project Description and Purpose:

Revision 1:

Location changed from BCTC to Lindsay Blvd as the end of the lease. Additional testing activity to include soft parafoils (parachutes).

Original ECP:

The purpose of the proposed action is to address the need for understanding, developing, and applying control schemes, architecture, and behavior of Unmanned Aerial Vehicles (UAVs). This overarching environmental checklist (EC) covers flight testing using class 1, class 2, or class 3 UAVs and lighter than air airships under remote control, supervised pilot in the loop (trim adjustments, stick mode or jog mode) control, or autonomous control (autopilot controlled flight). In addition, various sensor packages and video and communication packages would be tested for use with UAVs. Each individual project conducted under this EC must have a project specific 2nd tier EC approved prior to conducting activities to verify scope falls within the scope analyzed in this document.

In addition, projects determined by the NEPA Technical Lead or the PEL to be not covered by this EC (e.g. have the potential to disturb sagebrush or sage grouse habitat or have work scope not addressed in this EC), must prepare a 1st tier EC. Preparation and approval of ECs could take up to three weeks or longer, so projects should plan accordingly.

Activities would occur at the Bonneville County Technology Center (BCTC; building IF-670) and across the INL Site and would include use of the UAV Runway (B16-710) at the Site. Off-Site locations could be used upon approval by the Federal Aviation Administration (FAA).

The following activities are included in the proposed action:

- Procure aerial platforms and platforms components
- Integrate, test, and debug aerial platforms, components, and control and communication systems
- Conduct UAV flight operations
- Supervise flight control
- Use research data to improve and develop new control schemes, behaviors, flight paths, payloads, communication, and sensor packages

Non-flight development and testing conducted at the BCTC would include integration, prototyping, and debugging of the platforms.

The UAVs would be limited to class 1 (2 to 20 lbs), class 2 (21 to 70 lbs), or class 3 (71 to 500 lbs) airframes or lighter than air aircraft obtained through commercial vendors. Vehicle payloads are expected to include sensors, video cameras, communication devices and control hardware. Modifications to the UAVs to accommodate sensors and other equipment would occur, but no modifications would occur that would compromise the flight worthiness of a UAV.

Fixed wing aircraft would use commercially available engines including small reciprocating engines or electric motors. It is anticipated reciprocating engines would use glow plugs or spark plugs depending on engine type and fuel. Glow plug engines require glow fuel containing methanol and varying amounts of nitro methane which increases the energy provided by the fuel. Engines would range from 0.46cc to 150cc and generate up to six horsepower.

Lighter than air aircraft would be tethered or would use small electric ducted fan motors. NiCd, NiMh, lithium polymer, sealed lead acid batteries, or an onboard generator would provide power. Other power sources could be considered and approved for use as technology changes. Prior to implementing other power sources, this Environmental Checklist (EC) will be reviewed to determine if additional hazards would be introduced, and, if so, needed mitigation strategies.

Most field testing, takeoffs, and landings would occur at the B16-710 runway. Flight tests would also be conducted throughout the Idaho National Laboratory (INL) Site as approved by the FAA Certificate of Authorization (COA) and with permission of applicable INL facility owners. Takeoffs would be accomplished using a pneumatic launcher or unused roads with adequate clearance. A commercial rail launch system could also be used to allow launch of UAVs from any location.

The rail launch system is designed to aid UAVs in takeoff when the aircraft is not configured with take-off or landing gear or when no suitable runway is available. Operational scenarios require the aircraft to be launched from many different locations including areas around the Central Facilities Area (CFA), Materials and Fuels Complex (MFC), Critical Infrastructure Test Range Complex (CITRC), Idaho Nuclear Technology and Engineering Center (INTEC), Advanced Test Reactor (ATR) Complex, Radioactive Waste Management Complex (RWMC), and Test Area North (TAN). Launches would occur from 2-track and gravel roads without disturbance to vegetation. Vehicles would turn around only within the confines of the road to avoid vegetation disturbance. Parking, when required, would also be limited to the confines of the road.

During supervisory (radio-controlled [R/C], pilot in the loop) controlled flight operations, two types of control would be used--1) a standard hobby radio transmitter and receiver for full R/C control or 2) a 900 MHz transmitter to manually control UAVs through

onboard autopilot electronics. The standard hobby radio under R/C control has a range of approximately 1 mile while the 900 MHz radio has a range of up to 4 miles.

During autonomous controlled flight, the control system would provide a safety over-ride feature to handle unexpected events and to return the vehicle to the launch site or stop the engine. In the event communications are lost with the aircraft, a programmable preset time would be used to implement a predetermined flight path close to the safety pilot where communications could be re-established. In the event communications could not be re-established or the global positioning system signal were lost, a programmable preset time would stop the engine, causing the aircraft to ground. These features would prevent a UAV from leaving the predetermined flight boundaries were a malfunction to occur. Tethered balloons or blimps would use equipment to deflate the balloon or blimp if release from moorings were to occur.

A COA with the FAA is in place which allows UAV flight operations in INL air space. The FAA would be notified prior to all flights, as required by the COA, to coordinate airspace with governing agencies or local authorities.

Test flights would most often be conducted below 6000 ft mean sea level (MSL) or below 1200 ft above ground level (AGL) in daylight flight conditions. Approved FAA COAs allow flights to occur above 1200 AGL if required. Flights conducted below 400 AGL during the day may operate under Part 107 rather than a COA. Deviations from this (night operations or beyond line-of-sight) would be approved by the FAA, local governing authorities and Battelle Energy Alliance, LLC (BEA) Operations Management.

Flight restrictions around INL facilities and operational restrictions occurring within the Sage Brush Steppe Ecosystem Reserve and the Sage Grouse Conservation Area (SGCA) would be observed. Flights would be prohibited within 1 Km (vertical and horizontal) of a Sage Grouse Lek during breeding season.

The UAV program will perform USQ screens and determinations as specific activities are identified and in project specific 2nd tier ECs.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Air emissions have the potential to occur during UAV launches or from leaks in lighter-than-air UAVs. Emissions are expected from portable electrical generators which will remain in place for less than one year. Project activities have the potential to create fugitive dust.

Discharging to Surface-, Storm-, or Ground Water

NA

Disturbing Cultural or Biological Resources

Cultural: Pursuant to the 2023 Programmatic Agreement, this federal undertaking does not trigger Section 106 review as the proposed activity has no potential to cause effects to historic properties.

Generating and Managing Waste

NA

Releasing Contaminants

Because the proposed action would use fuels and other potentially hazardous industrial chemicals, there is the potential for release of small amounts of contaminants into the air, water, or soil.

Using, Reusing, and Conserving Natural Resources

Scrap material and failed batteries would be generated and be recycled to the extent practicable.

Environmental justice (describe potential impacts)

NA

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SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date.

For Categorical Exclusions (CXs), the proposed action must not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References:

B3.11 "Outdoor tests and experiments on materials and equipment components"

Justification:

B3.11 Outdoor tests and experiments on materials and equipment components. Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components) under controlled conditions. Covered actions include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water immersion, or thermal tests. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) ☐ Yes ☒ No

Approved by Jason L. Anderson, DOE-ID NEPA Compliance Officer on: 11/2/2023