SECTION A. Project Title: UAS Flight Testing and Sensor Integration (cUAS Testing) R1

SECTION B. Project Description and Purpose:

Revision 1:

This Idaho National Laboratory (INL) project is a collaboration with Red Six Solutions, LLC (Red Six) to provide counter Unmanned Aerial Systems (cUAS) systems testing and demonstration. There is a mission critical need for national security to provide surveillance and protection from attacks and surveillance by drones or unmanned aerial systems (UAS). To address this need, there is a requirement to develop, test, and validate systems to help with the protection of critical Department of Energy (DOE) infrastructure and defense of Department of Defense (DoD) installations and personnel in the United States and abroad. New and emerging drones or UAS require new defense systems to meet the evolving challenges. INL has the ability to provide frequency allocation in both spectrum and power that is unavailable in many other locations and a large UAS test range that allows for multiple testing scenarios that can mimic real-world encounters and locations. The combination of these factors allows for Red Six to test and validate systems, understand the limitations, and identify strengths and weaknesses of cUAS systems.

In order to effectively field and validate any cUAS systems, non-biased real-world testing and evaluation must be accomplished. The proposed scope will target testing new features, configurations, and any additional requested features of the cUAS system in preparation for potential deployment. Full system testing has not been achieved due to operational frequency limitations imposed by test ranges, inability of test ranges to provide GPS jamming capabilities, and the need to provide UAS targets in a greater airspace of the test range. Full system validation requires each element to be tested individually and concurrently. INL provides capabilities to test and validate all features of full system operation. INL will help with frequency allocation, provide airspace utilizing the Certificate of Authorization from the Federal Aviation Administration unique to Contractor, coordinate flight operations over INL, and provide logistical and UAS flight operations.

The activity will take place in and around the UAS test range (Figure 1). Non-UAS flight activities (temporary equipment storage) will be conducted at Lindsay Boulevard Complex, IF-694/695. The project will generate non hazardous industrial waste including grubbing material.

Figure 1-1: Test location areas

Tasks include:

- Verification and Validation of System Radar Ranging and Detection
  - Range testing at various distances up to 20 kilometers or more
  - Radius testing at various angles and heights from test location
- Verification and Validation of RF Interferer
  - Range testing at various distances up to 20 kilometers or more
  - Radius testing at various angles and heights from test location

- Final System Validation Testing
    - Test radar ranging and detection, RF interfere, as a complete system versus multiple air and ground targets simultaneously.

The UAS Test Range and other identified locations based on geographic topography will be configured to support the UAS flights, as well as operations of the cUAS systems. This arrangement may include, but is not limited to:

- Operator Control Trailer (PBF-632)
- Operation and testing infrastructure (power, existing generators, internet, etc.)
- UAS Test Range and surrounding area for flight operations

INL waste may include:

- Personal protective equipment, wipes: 15 lbs

All vehicle traffic will be limited to T-roads. Any foot traffic will be within a few feet of the T-roads.

Original ECP:

The INL Unmanned Aircraft Systems (UAS) team has over 65 years of combined experience in both classified and non-classified sensor integration, testing, telemetry, and data collection/analysis using UAS systems have included multiple types of visual and nonvisual sensors and radios. Visual systems have included hyper-spectral, multi-spectral, and RGB line of sight analysis. Radio frequency analysis has included counter-drone radar analysis, radio frequency jamming, long range command and control validation, and encrypted communication development and testing. Other sensors tested include environmental conditions such as gathering wind information and radioactive fallout detection. INL receives requests to fly fixed wing and rotary wing UAS in support of the Department of Defense (DOD), Department of Energy (DOE), Department of State (DoS), other government agencies, academia, and private industry. INL continues to receive requests to support UAS training activities for government agencies and conduct flights for internal projects and programs for data collection. The collected experience and system integration support provided by the UAS team continues to draw new sponsors and opportunities.

A valuable asset that INL also has is the ability to leverage the INL Wireless Test Bed (WTB). Many UAS test sites (FAA and DOD) are often subjected to radio frequency interference due to their proximity to other locations (such as military bases or encroaching civilian populations). INL's inherently low RF noise floor, access to any frequency as a National Telecommunications and Information Administration (NTIA) Experimental Radio Station, and its ability to manage its own frequencies over a 980 square mile range is truly unique. This is a very powerful combination that continues to be in demand by many customers. This umbrella scope of work covers several activities involving UAS flight testing and sensor integration using Class 1 (< 150 KG) or Class 2 (150-600 KG), fixed wing or rotary wing UAV, or lighter than air airships. This covers the operation of the UAV under remote control, supervised pilot in the loop control, and autonomous control (autopilot-controlled flight). Due to potential operational testing limitations (size of payload or required altitude of flight), manned aircraft may be used as a test platform and to test air-to-ground, air-to-air, and long-distance relay communications.

The area shown in Figure Original ECP 1 is used for vehicle parking, equipment storage and staging, and depending on the weather, launching UAVs. The original pad area is where operations and equipment trailers are staged. Depending an event, there will almost always be a control trailer and usually an equipment trailer. In the tent (soon to be replaced by a temporary metal structure) is where work is performed on UAVs, including changing out cameras or radios and performing preflight inspections on the UAVs before they are launched. All personnel are asked to stay on the gravel pads during normal operations.

Figure Original ECP 1: - UAS Operations

The purpose of this umbrella scope is to utilize the capabilities of the UAS team as mentioned and allow customers to work with the UAS team to test and collect data for the equipment (from here on called a "Payload") they are working on. The payload brought will change depending on the customer. The use of Unmanned Aerial Systems and Unmanned Ground Systems (UAS/UGS) to perform customer required testing, performance evaluation, and data collection/analysis include:

- Counter-Drone/UAS/UAG testing and analysis operations. The payload would be ground or air based radar and RF frequency monitoring to track and jam signals of Drone.
- Drone/UAS/UGS Intelligence, Surveillance, and Reconnaissance (ISR) Operations. The payload would be cameras and/or sensors placed on the UAS to detect ground activity.
- Drone/UAS/UGS/Manned fixed wing aircraft payload development, testing and analysis operations to include testing visual and nonvisual sensors, payloads and communication systems development, testing and analysis operations, visual navigation computers, and other black boxes needing above ground analysis before being integrated into future planned system. The payload will include air to ground radio systems transmitting camera data, collecting Lidar images, or radar imaging.
- Drone/UAS/UGS durability testing and analysis operations of payloads mentioned above.
- Provide System and Design engineering in support of payload integration and UAS modifications.
- Determine proper modifications to UAS for testing to include safety and hazard analysis as well as establish Size, Weight, and Power (SWaP) requirements to fulfill payload work requests.
- System and component testing and analysis. Design and conduct UAS and sensor component and system testing, including test plan preparation, testing execution, sensor or payload data processing, test results analysis, and test reporting.
- Define requirements for platform or payload integration, bench testing and operational testing of various components (e.g., visual camera payloads, radio testing, external detectors, Electronic Warfare components, etc.) against established specifications or requirements.
- Performing analytical review of complete system and/or individual components of a larger system, and all related activities for above work requests.

Activities will be constrained to the INL Site (primarily centered around the UAS Runway) and to in-town REC facilities (Bonneville County Technology Center).

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Use of existing generators covered under approved APADs may be used.

Discharging to Surface-, Storm-, or Ground Water

NA

Disturbing Cultural or Biological Resources

There is the potential for this work to impact vegetation and for project personnel to interact with various wildlife species. A Biological Resource Review will be arranged within two weeks prior to the initiation of any activities that might disturb soil or vegetation and again following completion of project activities. A nesting bird survey is included with the Biological Resource Review for actions occurring between April 1 - October 1 per compliance with the Migratory Bird Treaty Act. Bat surveys are also included with the Biological Resource Review in accordance with the INL Bat Protection Plan.

Cultural: Impacts to cultural resources have the potential to result from unexpected events, such as malfunction or when UAVs are forced to the ground to prevent them from leaving predetermined flight boundaries.

Generating and Managing Waste

When wastes are generated, how they are disposed can adversely affect the environment. Managing wastes appropriately and responsibly and implementing recycling or reuse practices, where feasible, during project activities can reduce the potential impact on the environment.

Releasing Contaminants

When chemicals are used during the project there is the potential for spills that could impact the environment (air, water, soil).

Using, Reusing, and Conserving Natural Resources

Project description indicates materials will need to be purchased or used that require sourcing materials from the environment. Being conscientious about the types of materials used could reduce the impact to our natural resources.

Environmental Justice

NA

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: B1.2 "Training exercises and simulations", B3.2 "Aviation activities", B3.11 "Outdoor tests and experiments on materials and equipment components"

Justification: Based on the purpose and need and description of the proposed action and potential environmental impacts, the proposed action fits within the class of actions that is listed in Appendix B CX B1.2, B3.11, and B3.2. There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal (10 CFR 1021.410(b)(2)). The proposed action has not been segmented to meet the definition of a categorical exclusion (10 CFR 1021.410(b)(3)). This proposal is not connected to other actions with potentially significant impacts, is not related to other actions with individually insignificant but cumulatively significant impacts, and is not precluded by 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement (10 CFR 1021.410(b)(3)).

Authorizing the proposed action will not (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive orders; (2) require siting of new facilities or expansion of existing facilities; (3) disturb hazardous substances, pollutants, or contaminants; (4) adversely affect environmentally sensitive resources; or (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species.

B1.2 Training exercises and simulations. Training exercises and simulations (including, but not limited to, firing-range training, small-scale and short-duration force-on-force exercises, emergency response training, fire fighter and rescue training, and decontamination and spill cleanup training) conducted under appropriately controlled conditions and in accordance with applicable requirements.

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

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 Robert Douglas Herzog, DOE-ID NEPA Compliance Officer on: 2/26/2025