

## United States Postal Service Unmanned Aircraft System (UAS)

### Request for Information Announcement

***The Postal Service does not intend to award a contract on the basis of this Request for Information (RFI) or to pay for the information solicited. The RFI is issued for the purpose stated in Section 2.0, Program Objectives.***

#### 1.0 Overview

The United States Postal Service (Postal Service or USPS) is investigating the feasibility of utilizing unmanned aircraft systems (UAS) or drones as delivery vehicles for mail as an integrated part of its vehicle delivery fleet, as well as to provide image and other data collection services. The Postal Service recognizes that the ability of UAS to supplement mail delivery and information collection can substantially benefit the country and further the development of other autonomous systems.

The Postal Service seeks information from UAS operators and developers interested in providing aircraft and aircraft operations for delivery of mail and to collect geodetic/spatial data to improve all autonomous vehicle performance. The aircraft operation will be regulated by Federal Aviation Administration (FAA) rules for Public Aircraft Operations and will support Postal Service missions, including (but not limited to):

- Long Driveway Delivery (drone launches from vehicle, makes delivery, returns to the vehicle while carrier continues their route)
- Remote/Difficult Delivery Points (i.e. rugged terrain, small islands)
- Ride-Sharing Model (customers use application to access USPS drone fleet for business to customer delivery)
- Infrastructure as a Service - Drone service providers leverage USPS Post Office and vehicle coverage, launching, charging, data, etc. (e.g., farm or power Line inspection)

The Postal Service is seeking market information as it considers any future requirements and, based on the level of interest from the industry, may identify candidates for a future solicitation to develop the Postal Service's UAS operations and demonstrate the necessary reliability and safety of unmanned aircraft technology. The Postal Service recognizes the potential benefits that UAS can provide to our operations and customers and that the program can accelerate the adoption and safety of UAS operations in the United States.

The Postal Service's investigation is focusing on developing solutions for remote piloted aircraft operations for delivery of mail beyond visual line of sight, as well as developing universal standard navigation capabilities for UAS, secure data protocols, and best practices for maintenance and training programs in the UAS arena.

We anticipate and welcome the cooperation of multiple entities that may be required to accomplish the objectives of this program.

The program objectives listed below identify the most important aspects of the program to the Postal Service. However, the objectives may not be all-inclusive. The objectives may be modified, updated or changed prior to any solicitation/RFP issuance.

## **2.0 Program Objectives**

Under a potential future solicitation/RFP, the Postal Service may seek UAS operators and technology developers to establish air operations and usable technologies for a drone delivery vehicle that could also collect geospatial and compressed visual data. Additionally, other data collection objectives include sensor data to create useful three dimensional mapping for use in autonomous vehicle initiatives, and the Postal Service's facility and land management. Under consideration is that the UAS would operate under a Public Aircraft Operations (PAO) umbrella from the Postal Service. Initially, the Postal Service views that it would require potential offerors to provide pilots and their training, and maintenance and repairs of UAS.

### **2.1 Documentation for FAA**

All documents that are to be developed to support a request for Certificate of Authorization (COA) to meet specific missions will be developed and evaluated on test sites in Maryland and/or Virginia. The documents include:

- Operational Plans
- CONOPs
- Airworthiness Certifications
  - Registrations for each UAS (Remote ID) and Tail numbers
- Operator/Pilot Training Program
  - Training Development
  - Pilot Certificate Program – Postal Unique
- Maintenance Plans
  - Maintenance Training Programs
  - Inspection Programs
  - Preventative Mandatory Maintenance Programs
- Risk Mitigations and Organization responsibilities
- Operational Docs
  - Preflight Inspection and Ground Operations including Weather
  - Preflight Checklist
  - FAA Flight Approvals for each flight
  - Navigation Methods and Controls
  - Loss of connection procedures
  - Emergency Procedures
  - Landing Checklist
  - Logs and other methods
- Accident review and recovery

FAA review of these documents and successful metrics from executing these operations will allow furtherance of aircraft operations, including greater flight distance and efficiency in operations.

The data collected for validation and additional value could include: latitude, longitude, altitude, air pressure, speed, direction, compressed binocular visual data, LiDAR, ultrasonic, RADAR, and/or temperature, as well as other data. This data will be collected on the UAS and, in most cases, relayed after the UAS is recovered/returned to base.

The final objective is to validate the aircraft operations via repetitive successful completions to provide the confidence necessary to be awarded a Type Certification of an aircraft as a UAS for delivery of mail. This will allow a UAS program to deploy nationally.

## **2.2 Testing**

The Postal Service anticipates a multipart program that will test UAS technology, starting with closed course testing on approved locations that will validate all operational requirements for 14 CFR Part 107, with additional exemptions to meet Postal Service missions which include flying over people, Beyond Visual Line of Sight (BVLOS), and night operations.

Successful and competent testing will lead to limited testing in real world delivery environments identified by USPS and with the consent of FAA and local governments. Repetitive successful testing and economic review should provide all metrics needed to warrant a Type Certificate for the aircraft/drone for delivery of mail. The overall testing goal is to bring a valued and safe service to the United States that is expandable and sustainable.

## **2.3 Specific Objectives**

The Postal Service anticipates that a potential UAS technology program will include the development of the following list of specific program objectives. These objectives are not exclusive and are subject to change.

- A. Secure Control Data Communication protocols
- B. Human and Machine Interaction (HMI) and maps
- C. UAS Detect and Avoidance sensors
- D. Collision Recovery algorithms
- E. Loss Link performance to UAS recovery solutions
- F. Hardware Design and Life Cycle Cost for 5 year support model
- G. UAS reaction to midflight malfunctions, such as damaged or broken propellers; a battery or electrical component failure; or a total system failure, etc.
- H. UAS reaction to midflight payload shift, creating an asymmetric loading condition.
- I. UAS reaction to forecast and/or unexpected weather conditions, such as a wind gust and sudden rain, etc.
- J. UAS navigation to avoid objects such as power lines, tree branches, pedestrians, and other UAS/ aircraft, etc.
- K. Parcel Retention Mechanism (PRM) and delivery method

- L. Identify options on how the parcel will be loaded and/or picked-up, secured and retained during flight so the payload will not be dislodged by unexpected events.
- M. Identify options on how the parcel may be delivered; for example, a low altitude drop, hover/winch delivery, complete touchdown and release, a parachute drop from altitude, etc.
- N. Concept of Operations (ConOps) outline
- O. Software Design
- P. Course editing and management (Graphical Tools)
- Q. Safety & Contingency Protocol development strategies
- R. Human Machine Interaction (HMI) protocol from user/operator to delivery customer interaction with the UAS.

### **3.0 Intended Use**

This technology may be used on specific delivery routes that have high operational costs and could benefit from UAS performance. They will be operated in all FAA approved weather conditions found in the United States. UAS will be operated for a minimum of eight (8) continuous hours per day with exchangeable batteries, over hilly terrain, water, semi-improved roads, and, eventually, over city streets. The UAS will make on average four flights and deliveries per day of mail and packages, but may have as many as three per operational hour; additionally stops will be made to collect data from specified locations as value is determined. The operator will load the UAS, turn the UAS on and off, perform preflight and weather checks and set a predetermined flight path for the UAS to fly. Once FAA authorizations are provided, the UAS will fly to a defined location to deliver the mail or package or collect data and return in reverse of the flight path to the defined UAS flight base of operations. It is anticipated that the battery will be replaced and recharged for the next delivery. The technology is intended to operate in a USPS mission with temperature ranges of -40 degrees to +140 degrees Fahrenheit with a relative humidity of 5% to 98%

### **4.0 Legal Requirements**

The UAS technology must be designed to meet all federal, state, and local requirements pertaining to data privacy, aircraft, aircraft operations, and UAS. In addition, the vehicle must meet all applicable federal and state requirements regarding ergonomics and safety, including, but not limited to, FAA, OSHA or DOT requirements. If any federal or state waiver, deviation, or permit is required in order for the Postal Service to operate a proposed prototype UAS in the National Airspace, any eventual supplier(s) must be solely responsible for obtaining the required waiver, deviation, or permit from the appropriate authority at no additional cost to the Postal Service.

### **5.0 Request for Information Submission**

Responders are requested to submit the following:

- a. Information that describes what technology your firm provides and feedback on the approach set forth above.
- b. Past performance information citing examples of projects or programs where your company or teaming partners have successfully designed, developed or integrated unmanned aircraft systems.

- c. Literature (such as practical research, spec sheets, product information) detailing UAS capabilities in your integrated solutions.
- d. Information regarding the potential period of time required to achieve such development, integration or testing efforts to achieve the USPS program objectives.

Responders are requested to refer to **U.S. Postal Service RFI# "RFI-USPS-UAS"** in all correspondence. Only electronic copies submitted in Microsoft Word (.doc or .docx) or Portable Document Format (.pdf) will be reviewed by the Postal Service. Submissions are limited to no more than 30 pages. Keep your responses consolidated. All submittals must be written in English.

Responders that include in their informational response data they do not want used or disclosed by the Postal Service for any purpose other than internal USPS consideration may take the following steps:

- a. Include on the title page or in the introductory material of their response the following: "This response includes data that may not be duplicated, used, or disclosed outside the Postal Service — in whole or in part — for any purpose other than to evaluate this response. This restriction does not limit the Postal Service's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets (Responder insert numbers or other identification of sheets)."
- b. Mark each sheet of data they wish to restrict with the following legend: "Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this response."

Submission must include responder's technical and/or administrative points of contact (names, addresses, phone numbers, fax numbers, and email addresses) to enable discussions to clarify information.

**Responder's final submission of information to this RFI must be received no later than 5 P.M. EST on November 4, 2019 and should be submitted via email to: [maryellen.mcgowan@usps.gov](mailto:maryellen.mcgowan@usps.gov).**