BAA 692M15-20-R-00004
White Paper Call 004

Airport Unmanned Aircraft Systems (UAS) Detection and Mitigation Research Program

August 21, 2020

This Call (0004) for white papers is being issued in accordance with FAA Broad Agency Announcement (BAA) 692M15-20-R-00004, which was posted on FAACO.com on December 05, 2019 and last updated on Beta.Sam.gov on August 21, 2020. Respondents must refer to the document entitled 692M15-20-R-00004 Rev r6, Amendment 005 (August 21, 2020) in conjunction with this Call to prepare and submit their white paper. All instructions set forth in the 692M15-20-R-00004 Rev r6, Amendment 005 solicitation document apply to the Call. This Call provides supplemental information and specific criteria to the Government requirements. Information included herein applies to this Call only.

The FAA has an immediate requirement in support of research Topic Number: ARAS0009: Airport Unmanned Aircraft Systems (UAS) Detection and Mitigation Research Program as described below.

Topic Number: ARAS0009: Airport Unmanned Aircraft Systems (UAS) Detection and Mitigation Research Program

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Purpose:

The purpose of this BAA Call for White Papers is to identify eligible manufacturers, vendors, and integrators ("offeror(s)") of UAS detection and/or mitigation technologies/systems in support of the FAA's Airport UAS Detection and Mitigation Research Program being carried out pursuant to 49 U.S.C. 44810(c)-(d). For purposes of this research program:

1) UAS detection system refers to a system or device capable of lawfully and safely detecting, identifying, monitoring, or tracking an unmanned aircraft or unmanned aircraft system. UAS detection systems may be integrated into or be linked to counter-UAS[1] systems, but, themselves, do not provide the capability to disable, disrupt, seize control, or otherwise directly interfere with UAS operations. Moreover,
2) Mitigation refers to actions taken to deter, prevent, respond to, and minimize the immediate consequences of safety and security threats posed by certain UAS operations.

[1] *See* 49 U.S.C. § 44801(12) for definition of UAS.[2] The FAA was expressly excepted from various federal laws that would otherwise present legal implications associated with UAS detection and mitigation activities. *See* section 44810(g). The authority conferred in section 44810(g) is limited to the testing and evaluation of UAS detection and/or mitigation technologies/systems by the FAA at five airports. This authority cannot be delegated.

Mitigation may be conducted using counter-UAS and UAS detection systems, or by using other means, including efforts not reliant on these technical systems.

Background:

Consistent with Section 383 of the Federal Aviation Administration (FAA) Reauthorization Act of 2018 (Public Law 115-254, Oct. 5, 2018), Airport safety and airspace hazard mitigation and enforcement, the FAA is launching an effort to test and evaluate technologies/systems that detect and mitigate potential aviation safety risks posed by unmanned aircraft systems (UAS),[1] hereafter referred to as the "Airport UAS Detection and Mitigation Research Program."

Section 383(a) of the *FAA Reauthorization Act of 2018* created a new section 44810 in title 49 U.S.C. Section 44810(a) requires the FAA Administrator to work with the Secretaries of Defense, Homeland Security, and the heads of other relevant federal departments and agencies to ensure that technologies/systems that are developed, tested, or deployed by federal departments and agencies to detect and/or mitigate potential risks posed by errant or hostile UAS operations do not adversely impact or interfere with safe airport operations, navigation, air traffic services, or the safe and efficient operation of the National Airspace System (NAS).

In addition, § 44810(b) requires the FAA to develop a plan for the certification, permitting, authorizing or allowing of UAS detection and mitigation technologies/systems in the NAS. Section 44810(b) requires the FAA to take certain actions as part of or potentially informing the plan, including convening an Aviation Rulemaking Committee. Further, § 44810(c) requires the FAA to test and evaluate technologies/systems that detect and/or mitigate risks posed by UAS at five airports and § 44810(d) directs the FAA to use detection and mitigation technologies/systems to detect and mitigate the unauthorized operation of an unmanned aircraft that poses a risk to aviation safety in the course of the required test and evaluation.[2]

As part of this Airport UAS Detection and Mitigation Research Program, the FAA has issued BAA Topic Number ARAS0010 to solicit interest from manufacturers, vendors, and integrators of UAS detection and/or mitigation technologies/systems that may be technically mature (technical reediness level (TRL) 7 or greater) for evaluation in a civil airport environment.

Requirements:

The FAA intends to evaluate at least 10 technologies/systems that have the ability to detect and/or mitigate UAS in a civil airport environment. Systems that may incorporate several different types of technologies will be counted as one technology/system. The FAA, when possible, will evaluate each technology separately, and collectively as a system. The FAA anticipates that each technology/system will initially be installed at the Atlantic City International Airport (KACY),[3] NJ, and then at one additional airport in the United States. The

[2] The FAA was expressly excepted from various federal laws that would otherwise present legal implications associated with UAS detection and mitigation activities. *See* section 44810(g). The authority conferred in section 44810(g) is limited to the testing and evaluation of UAS detection and/or mitigation technologies/systems by the FAA at five airports. This authority cannot be delegated.

[3] 'K' indicates the ICAO airport code or location indicator for United States Airports

additional airport location will be determined based on an FAA selection made from a separate, subsequent solicitation to be issued by the FAA.

Any selected offeror(s) must install and support the deployment of its technology/system at KACY as part of Tasks 1 and 2 (defined in the following sections), and one additional airport as part of Task 3. The selected offeror(s) will be responsible for training the FAA on the operation of the equipment, but will not be allowed to operate the technology and/or system during the test and evaluation activities. Any selected offeror(s) system or technology must be able to meet and/or enable FAA to meet all applicable federal regulatory requirements (*e.g.* National Telecommunications and Information Administration (NTIA) special authorization(s) and compliance with 14 CFR Part 77) for participation in this research program.

The period of performance is estimated to be approximately 3 to 4 months at KACY, including installation, training, the test and evaluation, and removal of the technology/system. The period of performance at the additional airport will be approximately 14 months, including site surveys, Safety Risk Management Panel support, installation, training, the test and evaluation, and removal of the technology/system. All times and dates are estimated and remain subject to change due to unforeseen circumstances.

Transition from KACY to the one additional airport will be based on the successful "graduation" of any selected offeror's technology/system from KACY, meaning that the technology/system performed as advertised, generated reliable and accurate data, and warrants further evaluation in another operational setting. "Graduation" is not guaranteed. The FAA will be executing a series of UAS operational test scenarios/situations, often referred to as "test cards", at both KACY and, as deemed appropriate, one additional airport to be identified by the FAA that will assist the FAA in evaluating detection/mitigation technologies/systems against UAS in an operational setting. UAS of various designs, size, color, operational speed, etc. will be used to support these test cards. These test cards will not be shared with the selected offeror(s).

The FAA notes that it will not be comparing or ranking the selected offeror(s) technologies/systems, nor is it developing a list of approved vendors as part of this research program. Moreover, the FAA reiterates that neither the offeror(s), nor the hosting airport operator, will be able to operate the detection and/or mitigation technologies/systems during the test and evaluation. The FAA will be collecting data on the UAS detection and mitigation technologies/systems and the associated impacts of these technologies/systems on the safe and efficient operation of the NAS for purposes of informing additional agency activities required under 49 U.S.C. § 44810.

Task 1 UAS Detection Testing and Evaluation:

The selected offeror(s) must provide the necessary equipment that will be installed within the 2,300 acres of KACY's air operations area (AOA),[4] as shown in figure 2 of Appendix B, to protect the AOA and as much surrounding area as possible with a general goal of reaching approximately 5 miles out from the center point of the AOA. The FAA is interested in determining UAS detection ranges from the center of the airfield. The FAA will assist the

[4] *See* 14 C.F.R. § 153.3 for definition of air operations area.

selected offeror(s) with determining sensor locations, providing power, communications, shelter and other site-specific support. The FAA will provide a dedicated 8 ft. by 20 ft. office trailer, located on the FAA Ramp at KACY, for use in setting up and storing equipment. The trailer will be heated and cooled, have sufficient lighting and electrical service, and have lockable doors.

The selected offeror(s) must ensure that their technology/system is operating correctly, train designated FAA personnel on the technology/system operation and basic troubleshooting techniques, and then depart the site. The selected offeror(s) will not be permitted to operate the detection technologies/systems during testing and evaluation by the FAA. When requested by the FAA, the selected offeror(s) may be allowed to remotely access the technology/system to provide maintenance, troubleshooting, or other support to the technology/system. The period of performance for the entire evaluation at KACY for this Task, including setup, training, testing and removal of equipment, is estimated to be approximately 3 to 4 months.

It is expected that the FAA will evaluate at least 10 different technologies/systems in total, on a staggered schedule. At KACY, the FAA will test and evaluate each system/technology for approximately 60 days against a variety of UAS platforms, in various weather conditions, and during various times of day. The selected offeror(s) must remove its technology/system from KACY at the conclusion of the evaluation. The FAA will evaluate both "standalone" technologies and those that are integrated with other technologies to make up a system, as part of this test and evaluation effort. The purpose of KACY evaluations is to generate baseline performance data for these types of technologies/systems and vet the overall performance capabilities before the technology may "graduate" to field validation testing at an additional airport as part of Task 3.

Task 2 UAS Mitigation Testing and Evaluation:

Selected offeror(s) with technologies/systems that offer mitigation, either as a "standalone" system or in conjunction with a detection capability, will be tested at KACY in conjunction with the testing and evaluation described under Task 1. As part of Task 2, selected offeror(s) must provide the necessary equipment to "mitigate" UAS targets in a designated testing area at KACY. The AOA at KACY is approximately 2,300 acres (3.6 sq. mi.) in size as shown in figure 1 of Appendix B, which will be available for positioning of equipment. Mitigation technologies/systems should be capable of mitigating a UAS to protect the AOA at KACY. Mitigation testing and evaluation will be limited to the AOA at KACY. If the selected offeror is unable to meet these requirements, they must declare/disclose the expected usable range of their mitigation technology/system so that the FAA can consider adjusting the size of the testing area to properly match the expected performance capabilities of the technologies/systems.

FAA will assist the selected offeror(s) with determining equipment locations, providing power, communications, shelter and other site specific support. The FAA will provide a dedicated 8 foot by 20 foot office trailer, located on the FAA Ramp at KACY, for the selected offeror(s) to use to set up and store equipment. The trailer will be heated and cooled, have sufficient lighting and electrical service, and have lockable doors. The selected offeror(s) must ensure that the technology/system is operating correctly, train designated FAA personnel on the technology/system operation and basic troubleshooting techniques, and then depart the site. The

selected offeror(s) will not be able to operate the mitigation technologies/systems as part of this research program. When requested by the FAA, the selected offeror(s) may be allowed to remotely access the technology/system to provide maintenance, troubleshooting, or other support to the technology/system.

Similar to Task 1, the period of performance for the entire evaluation at KACY for this Task, including setup, training, testing and removal of equipment, is estimated to be approximately 3 to 4 months. The FAA intends to evaluate at least 10 different detection and/or mitigation technologies/systems in total, on a staggered schedule. At KACY, the FAA will test and evaluate each technology/system for approximately 60 days against a variety of UAS platforms, in various weather conditions, during various times of day. The FAA will evaluate both "standalone" mitigation technologies/systems and those that are integrated into detection technologies/systems as part of this test effort. The purpose of the KACY evaluation is to generate baseline performance data for these types of mitigation technologies/systems and vet the overall performance capabilities before the technology may "graduate" to field validation testing, at an additional airport as part of Task 3. Task 2 and Task 1 may be conducted simultaneously. The selected offeror(s) must remove its technology/system from KACY at the conclusion of the evaluation under this Task.

The FAA reserves the right to pre-test mitigation technologies/systems in a controlled setting before introducing any system/technology into any airport environment, including KACY, for operational testing. The selection of any offered system/technology for FAA's research program may be denied, and testing of any selected mitigation systems/technologies may be discontinued at any stage, due to the identification of unacceptable adverse impacts or interference caused by the system/technology to safe airport operations, navigation, air traffic services, or the safe and efficient operation of the NAS.

Task 3 Field Activities for UAS Detection and Mitigation Testing and Evaluation at Additional Airports:

Following KACY testing, the FAA plans to deploy and test/evaluate any "graduated" UAS detection and mitigation technologies/systems at an additional airport to validate data collected at KACY in different operational environments. The FAA will use the baseline performance data collected during Tasks 1 and 2 to help determine whether and to what extent other airport variables (geography, noise, interference, proximity to metropolitan areas, airport infrastructure, etc.) impact the performance of each detection and/or mitigation technology/system. In support of this field activity, the selected offeror(s) must remove its technology/system from KACY and relocate it to at least one additional airport. At this time, the names and locations of these additional airports have not yet been identified. The FAA intends to select these additional airports through a separate solicitation to be issued by the FAA. The FAA will be responsible for identifying which technology/system goes to which airport, after the four airports are identified. The FAA may elect to relocate some technologies/systems to more than one airport, if deemed necessary.

Testing at the four airports that is contemplated under this Task will begin shortly after the testing of each specific technology is completed at KACY. The FAA will use an abbreviated

series of “test cards” customized to each specific airport and containing details on the specifics of the UAS flights that will be conducted. The FAA plans to execute these test cards on a monthly basis throughout the duration of the test and evaluation activity. The FAA will also be monitoring any anomalies or differences in performance, to develop an understanding of potential interference or issues that may be present in different airport environments. The FAA will be deploying technologies/systems on a staggered schedule as test and evaluation activities for each technology/system concludes at KACY. The first initial deployment could be as early as January 2021, with later deployments happening closer to the end of 2021.The period of performance under Task 3 is estimated to take approximately 14 months.

For the deployment at the new airport, the selected offeror will position and install its technology/system in an area that is approximately the same size as the full geographic area that was used at KACY (2,300 acres or 3.6 sq. miles). The selected technology/system should demonstrate the ability to duplicate the same detection distances identified at KACY. For mitigation technologies/systems, the selected offeror(s) should be prepared to demonstrate the same mitigation capabilities/ranges that were demonstrated at KACY. Should the selected technology/system not demonstrate the ability to duplicate the same detection distances identified in KACY, the FAA will allow the offeror to conduct a minor inspection (e.g., checking release plan updates/upgrades) to determine why its technology/system is unable to duplicate performance regarding detection distances. If the offeror is unable to duplicate the detection distances identified previously at KACY, participation in the testing and evaluation effort may be discontinued. The selected offeror(s) will be expected to provide additional/refresher training to FAA personnel or their designees on the operation of the technology/system at the second location, if necessary. As with Tasks 1 and 2, the selected offeror(s) will not be able to operate the detection and/or mitigation technologies/systems, nor be present, during the test and evaluation, except when permitted by the FAA. Participation in Task 3 is contingent on successful completion of Task 1 and/or 2 at the sole discretion of the Government. The selected offeror(s) must remove its technology/system from the new airport at the conclusion of the evaluation under this Task.

The testing of any selected mitigation systems/technologies may be discontinued at any stage, due to the identification of unacceptable adverse impacts or interference caused by the system/technology to safe airport operations, navigation, air traffic services, or the safe and efficient operation of the NAS.

The FAA is requesting interested offeror(s) to submit white papers to address the specific areas described in Tasks 1, 2, and 3, as appropriate, and those listed below at a minimum. Additional supporting information may be provided to the extent it does not exceed the page limits specified. In addition, offeror(s) must complete the Technical Screening Questionnaire provided in Appendix B.

1. Equipment- The offeror(s) must provide all equipment necessary for the deployment of their technology/system, including antennas, point-to-point communication, computers, etc. The FAA will provide access to locations, electrical/power sources, and shelter for technology/system operations. The FAA will also assist in installation of equipment.

2. Scalability for an Airport Environment – For detection, utilization of approximately 2,300 acres (approximately 3.6 sq. mi) to install sensors and/or equipment, that will provide detection to protect the AOA and as much surrounding area as possible with a general goal of reaching approximately 5 miles out from the center point of the AOA. Scalability should address the number of sensors required, adaptation required, and operational considerations. For mitigation, scalability should also include information on the mitigation distances and range of impacts expected, number of sensors required, or other information unique to mitigation technologies/systems.

3. Technical Maturity Level - All technologies/systems must meet the requirements of TRL 7 or higher to qualify for this research program. See Appendix C for description of TRL. It is imperative that the offeror(s) have complete product documentation, training, product configuration management.

4. Robustness of the technology – Offeror(s) must supply detailed performance data regarding detection range, false alarm rates, interference testing, ability to detect, track, and identify. For mitigation technologies/systems, offeror(s) must supply detailed information on mitigation ranges, required times to complete mitigation, false or failed mitigations, interference testing, their ability to detect, track, and/or verify that mitigation of the UAS was successful.

5. Information production – The offeror(s) must describe whether the technology/system produces real-time information; how the information is made available (web browser, dedicated display, phone App) and how it provides guidance?

6. Spectrum Assessment - The offeror(s) must describe whether the technology/system emits any type of radio frequency and/or other type of potential signal disruption technology and, if it does, provide the technical specifications of those capabilities to ensure spectrum deconfliction.

7. Offeror(s) qualification narrative.

Offerors are advised that employees of the firm identified below will assist FAA personnel in the source selection process, reviewing white paper submissions and proposal submissions. These individuals will be authorized access to only those portions of white paper and/or proposal data and discussions that are necessary to enable them to perform their respective duties. The firm is expressly prohibited from competing on the subject acquisition.

General Dynamics Information Technology (GDIT)
600 Aviation Research Blvd.
Egg Harbor Township, NJ 08234

In accomplishing their duties related to the source selection process, the aforementioned firm may require access to proprietary information contained in the offeror's white paper and/or proposal. Therefore, pursuant to AMS Clause 3.13-15, Confidentiality of Data and Information, the firm must execute an agreement with each offeror that states that it will (1) protect the offeror's information from unauthorized use or disclosure for as long as it remains proprietary,

and (2) refrain from using the information for any purpose other than that for which it was furnished.

Each offeror must contact the Program Manager for the firm listed above, John McGrath at John.McGrath@gdit.com prior to the white paper submission deadline, to effect execution of such an agreement.

FAA highly recommends that offerors use the standard one page non-disclosure agreement (NDA) included in Appendix A of this BAA Call for White Papers. It is imperative that a copy of the fully executed NDA be sent to the firm at the email address above, in addition to providing a copy to the FAA with the offeror's white paper submission.

Failure to execute such an agreement with the above firm will result in the Offeror's white paper/proposal submission being found non-compliant. Non-compliant submissions will not be reviewed or evaluated. The FAA maintains all data rights from the evaluation.

Period of Performance/Rough Order of Magnitude:

The total period of performance for the selected offeror(s), from initial installation at KACY to removal of their technology/system from one of the four additional airports to be identified by the FAA, is estimated to be approximately 18 months.

Anticipated Funding:
The FAA anticipates selected Offerors may receive a total of up to $150,000.00 for completion of all Tasks, subject to the availability of funds.

APPENDIX A

Sample Non-Disclosure Agreement (NDA)

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The Parties to this Agreement agree that General Dynamics Information Technology (GDIT) and its supporting consultants and subcontractors also under non-disclosure agreement, may have access to proprietary information of Offeror contained within the white paper submission and/or proposal submissions, solely to perform technical advisory services for the Government, in evaluating proposals submitted in response to this Solicitation.

The Parties agree to protect the proprietary information from unauthorized use or disclosure for as long as it remains proprietary, and to refrain from using the information for any purpose other than that for which it was furnished

_____
Company Name (Offeror)

_____
Name of Company Official, Printed

_____ _____
Signed Dated

_____
Name of Company Official, Printed
General Dynamics Information Technology (GDIT)

_____ _____
Signed Dated

Appendix B
Technical Screening Request

The Federal Aviation Administration (FAA) is convening a program for testing and evaluating technologies/systems that detect and/or mitigate potential aviation safety risks posed by unmanned aircraft systems (UAS) operations in the airport environment. Task 1 of the effort will be conducted in the controlled setting of Atlantic City International Airport (KACY) adjacent to the FAA William J. Hughes Technical Center (WJHTC) in Atlantic City, NJ. Selected offereror(s) must provide the FAA a fully-executed copy of the Non-Disclosure Agreement (NDA) in Appendix A and complete the following Technical Screening Request to be considered for the operational activity. Note that selected offerors for the test and evaluation effort contemplated with this Call for White Papers are expected to enter into an NDA with the FAA, to the extent that certain sensitive information may be shared with the selected offeror during the course of the research program. All submissions will be received in confidence and become the property of the United States (U.S.) Government. All durations and date information is provided for general reference, and are subject to change due to unforeseen circumstances.

If your technology/system is only for mitigation purposes please skip to Section 2 of this Appendix.

Section 1. General Information Technical Screen:

1. **Are you willing to enter into a firm-fixed-price contract with the U.S. Government consistent with the terms of BAA 692M15-20-R-00004?**

Would your organization be willing to enter into a contract with the U.S. Government to allow unrestricted and independent Government use of your detection and mitigation technology/system equipment, during FAA testing and evaluation events: 3 months at KACY and, if chosen, up to 1 year at an additional airport (location has yet to be determined) for a total of 18 months? Yes ☐ No ☐

Are there currently any International Traffic in Arms (ITAR) restrictions on your product? Yes ☐ No ☐

What is the Country of origin of your technology/system?

Does your company carry Liability Insurance of at least $5,000,000.00 for your employees to operate/conduct work on an airport? Yes ☐ No ☐

Are there FCC licensing requirements for the technology/system? Yes ☐ No ☐

> If yes, do you have experience in obtaining the necessary approvals? Please provide requisite evidence/reference of any prior or existing Federal Communications Commissions (FCC) approvals.

Do you have experience partnering with another U.S. federal agency in research related to testing and evaluation of UAS detection and mitigation systems?

If yes, please describe prior research undertaken with other U.S. federal agencies.

If yes, please describe whether you have experience in supporting another U.S. federal agency in obtaining any necessary NTIA special authorizations or otherwise responding to requests for data concerning spectrum impacts from NTIA.

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2. Scalability for an Airport Environment

One of the key elements for the success of this initiative is determining whether the technology/system scales appropriately to the requirements of a civil airport environment. The FAA requires the offeror(s) to closely examine the following two maps of KACY (Figures 1 and 2), and propose a configuration of their technology/system. The offeror(s) must plan to position their technology/system within the 2,300 acre area within the Air Operations Area (AOA). (Figure 2). The FAA will work with each offeror to discuss requirements for sensor placement, with the goal of matching sensor locations with locations that may have existing sources of electrical power and/or communication. The FAA will provide data on the details of these locations, including lat/long, elevations, power availability, etc. Offeror(s) should note any specific support required including communications links, power requirements, antennae / platform height etc.

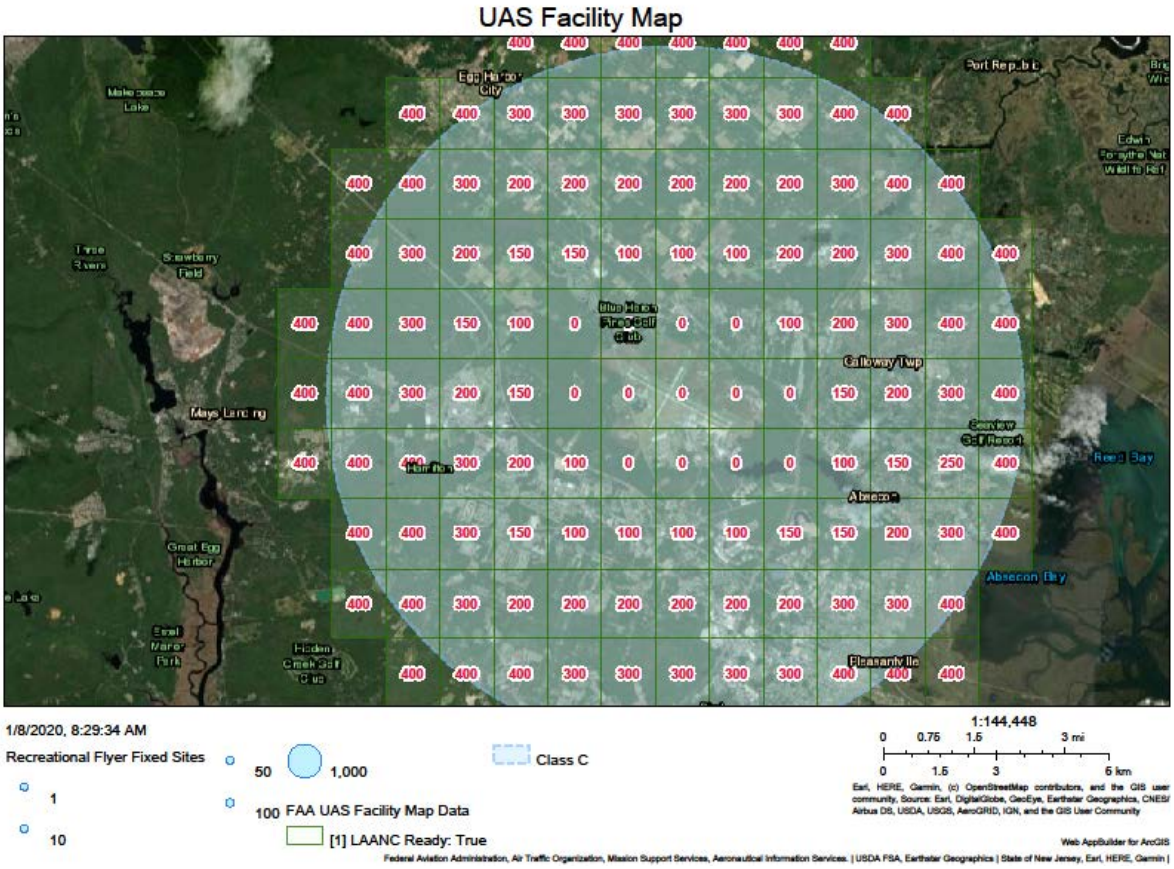

Figure 1. KACY Map[5]

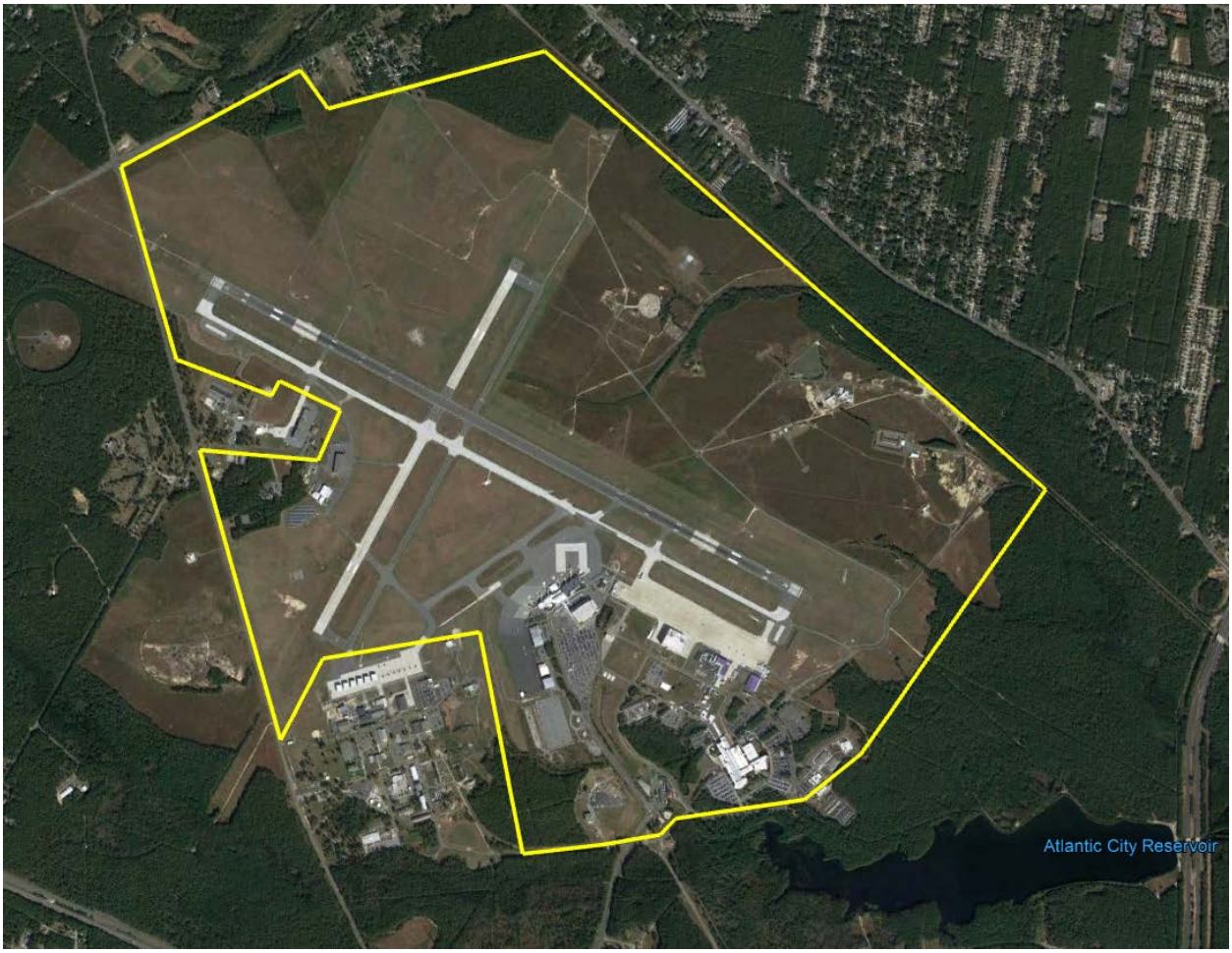

Figure 2. KACY AOA

Please provide a summary of your proposed installation layout, including number, type, and location of sensors, as well as basic communications requirements on the AOA map. If possible, please provide overlays on the map of the area where you are confident the technology deployed can perform optimally.

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3. What is the Technical Readiness Level (TRL) of the proposed technology/system, as defined in Appendix C?

[5] https://www.faa.gov/uas/commercial_operators/uas_facility_maps/

Please provide the number of reference installations and their applicable environments.

Does your product have formal documentation? Yes ☐ No ☐

Do you provide product training? Yes ☐ No ☐

If yes, what is the typical time required to become proficient on the use of your product and does it require and specific skills to operate the product (e.g., programming)?

Briefly describe the product support policy (e.g., troubleshooting, maintenance, repair, and upgrades).

Is the product under active configuration management? Yes ☐ No ☐

If yes what is the release plan schedule for 2020 /2021?

Can the technology/system be installed by the customer Yes ☐ No ☐

If yes, what is the typical installation time?

If the technology/system must be installed by the manufacturer what is the typical installation time?

Please describe any components that may require special handling, such as sensors over 50lbs, fragile optical equipment, high voltage electronics, etc.: (limit one page)

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4. **Robustness of the Technology**

Provide a description of the operational envelope for the detection, tracking, and identification capabilities of your technology/system in terms of range, altitude, speed, and target size. If available, please provide illustrative tables or graphs to typify the performance envelope in terms of range, altitude, speed, and target size.

Please provide operational statistics related to above to include false alarm rates from operational installations, if available, and any relevant test data.

Please describe how your product acquires targets? What are the target attributes your technology/system exploits? (e.g., radar cross section, radio frequency (RF)/acoustic signature, speed.)

Please describe how your product reliably filters environmental clutter such as birds, precipitation, wind-blown debris, smoke/fog, airborne particulates, other RF signals etc:

Does your technology/system perform Target Tracking? Yes ☐ No ☐

If yes, what is the update/refresh rate?

Can it provide intent information/speed/vectors /or any sort of predictive guidance? Yes ☐ No ☐

If yes, please describe:

Does your technology/system differentiate and track multiple simultaneous targets? Yes ☐ No ☐

If yes, what is the upper limit on the number of targets it can track?

Can your technology/system identify the target UAS (e.g., manufacturer, model)? Yes ☐ No ☐

If yes, what is the method it uses to identify the target?

Does your technology/system have a predefined integrated product library of known UAS?

Yes ☐ No ☐

If yes, please describe:

Can the technology/system detect, locate, track, and identify the Ground Control Station / operator? Yes ☐ No ☐

If yes, what is the accuracy?

Can your technology/system detect UAS powered-on, but prior to flight? Yes ☐ No ☐

Is your system able to detect an operator who is purposely hopping or changing frequencies at a random and / or rapid rate in order to escape detection? Yes ☐ No ☐

If yes, please describe:

Does your technology/system rely on sensor elevation to ensure detection performance? Yes ☐ No ☐

If yes, what is the required elevation?

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5. Does the technology/system produce real-time information – how is the information made available (web browser, dedicated display, phone app)

Does the technology/system provide real-time processing and notification of UAS activity?

Yes ☐ No ☐

If yes, please describe:

Does the technology/system provide a graphical interface to the user with a clear indication of both the operator Ground Control Station (GCS) and the UAS(s) in question? Yes ☐ No ☐

If yes, please describe:

Does detecting, tracking and identifying the target require human intervention or is this process automated?

If yes, please describe:

Describe how activity is reported and distributed to the technology/system user? (e.g., is there an app, does it require dedicated communication lines, microwave links?)

Does the technology/system log historical data for subsequent retrieval and analysis?

Yes ☐ No ☐

Are there any limits on data archival? Yes ☐ No ☐

If yes, please describe:

Can the technology/system be integrated along with existing security operations centers and infrastructure, such as security cameras, data connectivity, and display systems on the airport? Yes ☐ No ☐

If yes, please describe:

Does the technology/system employ a digital chain of custody procedure for producing evidence in a court of law? Yes ☐ No ☐

Is the technology/system capable of displaying detection information about the UAS and the operator to a mobile device/tablet? Yes ☐ No ☐

If yes, please describe:

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6. Spectrum Assessment

If your technology/system is deemed disruptive to an unacceptable level of safety in the NAS, your proposal will not be considered. Air Traffic Organization (ATO) spectrum will use established safety evaluation processes to assess potential impacts to the NAS.

Does your technology/system emit radio frequency? Yes ☐ No ☐

If yes, please provide technical specifications of signal disruption technology and all potentially affected radio frequencies.

The response for Section 1, Questions 1 through 6 must not exceed more than six pages total, single spaced, single-sided, using a 12 point font. Submission content beyond six pages will not be reviewed/evaluated.

7. **White Paper Narrative - Technical Qualifications**

Please provide any additional information that illustrates the technical performance of the proposed technology/system that has not been previously requested in this screen. What differentiates it from the rest of the market – reference installations /technical innovation / initial cost / operating cost, ease of use/ etc.

White papers for Section 1, Question #7 must not exceed more than five pages total, single line, single side, using a 12 point font size. Submission content beyond five pages will not be reviewed/evaluated.

If your technology/system does not have mitigation/countermeasure capabilities, please stop here. If it does, please continue to section 2.

Section 2. Mitigation Technical Screen:

1. **Are you willing to enter into a firm fixed price contract with the U.S. Government consistent with the terms of BAA692M15-20-R-00004?**

Would your organization be willing to enter into a contract with the U.S. Government to allow unrestricted and independent Government use of your UAS mitigation equipment, during testing and evaluation events: three months at KACY and, if chosen, up to one year at a national airport (location to be determined)? Yes ☐ No ☐

Are there currently any ITAR restrictions on your product? Yes ☐ No ☐

What is the Country of origin of your technology/system?

Does your company carry Liability Insurance of at least $5,000,000.00 for your employees to operate/conduct work on an airport? Yes ☐ No ☐

Is the proposed technology/system classified? Yes ☐ No ☐

If, yes, is there a non-classified version available for this evaluation?

2. **TRL Level – Product Maturity**

Does your product have formal documentation? Yes ☐ No ☐

Do you provide product training for the use of your technology/system, as appropriate for a deployable prototype product of this maturity level? Yes ☐ No ☐

If yes, what is the typical duration to become proficient on the product and does it require and specific skills to operate the product (e.g., military training)?

Briefly describe the product support policy (e.g., troubleshooting, maintenance, repair, and upgrades).

Is the product under active configuration management? Yes ☐ No ☐

If yes what is the release plan schedule for 2020?

Can the technology/system be installed by the customer? Yes ☐ No ☐

If yes what is the typical installation time?

If the installation must be done by the manufacturer, what is the typical installation time?

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3. **Feasibility: Can the product be adapted for use in a civil airport environment?**

Briefly describe the technology/system operations concept including level of automation, operator requirements / special skills.

Describe the mitigation technique /countermeasures:

How does the technology/system minimize collateral damage to the National Airspace System, including other aircraft and aviation systems, persons and property on the ground, and the surrounding community? Please provide any supporting safety analysis.

Has this mitigation technology/system been deployed in an operational setting including an airport environment? Yes ☐ No ☐

If yes, please describe:

Do you have performance measures on effective range, accuracy, misses? Yes ☐ No ☐

Please provide objective quantifiable data:

The response for Section 2, Questions 1 through 3 must not exceed more than five pages total, single spaced, single-sided, using a 12 point font. Submission content beyond five pages will not be reviewed/evaluated.

4. Spectrum Assessment

If your technology/system is deemed disruptive to an unacceptable level of safety in the NAS, your proposal will not be considered. ATO spectrum will use established safety evaluation processes to assess potential impacts to the NAS.

Does your technology/system have emissions with the potential to disrupt other signals or electronic devices/avionic technologies/systems? Yes ☐ No ☐

If yes, please provide technical specifications of emission technology and range of effected frequencies.

If no, please describe the technology or method to be used to mitigate UAS and provide technical specifications of such technology. (e.g. kinetic, directed energy, etc.)

Does your technology/system emit any radio frequency that could impact global positioning system (GPS) functionality?

Yes ☐ No ☐

If yes, please provide technical specifications and detailed description of effects on GPS.

The response for Section 2, Questions 1 through 4 must not exceed more than five pages total, single spaced, single-sided, using a 12 point font. Submission content beyond five pages will not be reviewed/evaluated.

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5. White Paper Narrative - Technical Qualifications

Please provide any additional information that illustrates the technical performance of the proposed technology/system that has not been previously requested in this screen. What differentiates it from the rest of the market – reference installations /technical innovation / initial cost / operating cost, ease of use/ etc.

White papers narratives for Section 2, Question 4 must not exceed more than five pages total, single line, single side, using a 12 point font size. Submission content beyond five pages will not be reviewed/evaluated.

Appendix C
Technical Readiness Level (TRL) Definitions

The Government Accountability Office (GAO) describes a TRL within the construct of a technology readiness assessment:

> *"A technology readiness assessment (TRA) is an evaluation of the maturity of critical elements of a product's technologies, often called critical technologies. It is a normal outgrowth of the system engineering process and relies on data generated during the course of technology or system development. The TRA frequently uses a maturity scale—technology readiness levels (TRLs)—that are ordered according to the characteristics of the demonstration or testing environment under which a given technology was tested at defined points in time. The scale consists of nine levels, each one requiring the technology to be demonstrated in incrementally higher levels of fidelity in terms of its form, the level of integration with other parts of the system, and its operating environment than the previous, until at the final level the technology is described in terms of actual system performance in an operational environment.*[5]"

Though a technology readiness assessment isn't a policy requirement, the GAO guidance draws heavily from the Department of Defense, National Aeronautics and Space Administration, and Department of Energy best practices, terminology, and examples. Government agencies and other organizations commonly use TRLs to describe the maturity of a given technology within its development life cycle. Some organizations have tailored the TRL definitions to suit their product development applications. The performance of a technology is compared to definitions of maturity numbered 1-9 based on demonstrations of increasing levels of fidelity and complexity as shown in *Table 1: Technology Readiness Levels*.

Table 1: Technology Readiness Levels

TRL	Definition	Description
1	Basic principles observed and reported	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.
2	Technology concept and/or application formulated	Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies.
3	Analytical and experimental critical function and/or characteristic proof of concept	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate the analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
4	Component and/or breadboard validation in laboratory environment	Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared with the eventual system. Examples include integration of "ad hoc" hardware in the laboratory.
5	Component and/or breadboard validation in relevant environment	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements, so they can be tested in a simulated environment. Examples include "high-fidelity" laboratory integration of components.
6	System/subsystem model or prototype demonstration in a relevant environment	Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in a simulated operational environment.
7	System prototype demonstration in an operational environment	Prototype near or at planned operational system. Represents a major step up from TRL 6 by requiring demonstration of an actual system prototype in an operational environment (e.g., in an aircraft, in a vehicle, or in space).
8	Actual system completed and qualified through test and demonstration	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.
9	Actual system proven through successful mission operations	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. Examples include using the system under operational mission conditions.