Program Solicitation

Albatross

STRATEGIC TECHNOLOGY OFFICE

DARPA-PS-24-13

September 26th, 2024

PROGRAM SOLICITATION OVERVIEW INFORMATION

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Strategic Technology Office (STO)
- **Funding Opportunity Title** – Albatross
- **Announcement Type** – Initial Announcement
- **Funding Opportunity Number** – DARPA-PS-24-13
- **Dates – All times are Eastern Time (ET)**
  - Posting Date: September 26th, 2024
  - Industry Day: October 2nd, 2024
  - Questions Due Date: October 17th, 2024, by 5:00 PM
  - Questions and Answers Publication Date: October 24th, 2024
  - Abstracts Due Date and Time: November 15th, 2024, by 5:00 PM
  - Oral Proposals Due Date and Time: By government request, estimated December 5th, 2024, by 5:00 PM

- The Defense Advanced Research Projects Agency (DARPA) is soliciting innovative approaches to address challenges in the following technical area: Integrated planning, sensing, and control for autonomous soaring to extend range and endurance of small uncrewed aerial systems.
- **Multiple awards are anticipated**.
  - The government does not anticipate awards being designated as Fundamental Research.
- **Types of instruments that may be awarded** – Other Transactions (OTs) for Prototype
- **Agency Contact**

  The Solicitation Coordinator for this effort can be reached at:
  DARPA-PS-24-13@darpa.mil

  DARPA/STO
  ATTN: DARPA-PS-24-13
  675 North Randolph Street
  Arlington, VA 22203-2114

- **Appendices (see Section 3.4)**
  - Appendix (1): Model OT for Prototypes Agreement
  - Appendix (2): Cost Volume
  - Appendix (3): OT Certifications
  - Appendix (4): Intellectual Property Assertions
  - Appendix (5): Value-Based Assessment

PROGRAM SOLICITATION
Defense Advanced Research Projects Agency (DARPA)
Albatross

1. PROGRAM SOLICITATION (PS) AUTHORITY

This PS may result in the award of an Other Transaction (OT) for Prototype agreement, which can include not only commercially available technologies fueled by commercial or strategic investment but also concept demonstrations, pilots, and agile development activities that can incrementally improve commercial technologies, existing government-owned capabilities, and/or concepts for broad defense and/or public application(s). The government reserves the right to award an OT for Prototypes under 10 U.S.C. § 4022 or make no award at all. In all cases, the government agreements officer shall have sole discretion to negotiate all agreement terms and conditions (articles) with selected proposers. The OT for Prototypes agreement will not require cost sharing unless the proposer is a traditional defense contractor who is not working with a nontraditional defense contractor participating in the program to a significant extent.

2. PROGRAM INFORMATION

2.1. Program Description/Scope

The Albatross program seeks to develop effective autonomous aircraft soaring capabilities as evaluated via real-world flight testing. Traditionally, making an aircraft fly farther and longer requires careful attention to the design of the aircraft to ensure its propulsion system is efficient, its profile has low drag, and it weighs just enough to achieve its mission reliably. Those are all valuable areas of effort that can contribute to achieving extended flight, but Albatross approaches the problem from a new angle and seeks to develop weather forecast-informed mission planning and real-time onboard sensing of dynamic wind conditions across multiple environments to harness energy from winds to offset the total power of the system required for flight. This additional energy harvested from the wind reduces average power and allows the system to fly farther and longer. Aircraft soaring capabilities can be summarized as the active harnessing of energy from the natural environment's atmospheric flow field to reduce the onboard power demand and enable increased range and endurance. Albatross is NOT a dedicated airframe or aircraft design effort. The program is not focused on lowering the drag of the airframe or providing the highest energy density source. Rather, the focus is on developing and integrating planning tools, additional aircraft sensors, and unique control solutions applied to existing or otherwise quickly assembled small, uncrewed aircraft to autonomously plan for, identify, and respond to soaring conditions. Success is defined as capitalizing on soaring conditions to extend range and endurance in an operationally relevant manner.

This announcement solicits for the complete Albatross program. Performers are encouraged to form teams to achieve all program goals, as different technological aspects will need to come together to meet program metrics. The OT for prototype allows for follow-on awards without competition, such as a potential for direct aircraft procurement for testing. The government envisions commercial applications for this technology. Program goals include understanding the performer's commercial applications and development strategy. Cost share will be considered as part of that strategy.

2.2. Program Structure

The Albatross program will focus on a series of real-world flight tests of small uncrewed aircraft systems (s-UAS) in which performers will demonstrate autonomous soaring in a variety of

environments, seeking to drastically extend range and endurance. Albatross will be executed with a series of Test Events (TEs), each involving real-world flight testing to evaluate performance. Performance at the TEs will be measured to determine progress toward program metrics and objectives.

DARPA will use flight TEs to evaluate the progress of performers. Practice test events (PTE) will enable performers an opportunity prior to TEs for development and to verify platform functionality. PTEs are an opportunity for performers to test out soaring capabilities in a larger and less confined environment. In addition to the PTE space provided, performers are encouraged to identify local areas to legally flight test to validate algorithms and performance within the constraints of national airspace. In order to reliably harness energy in an operationally useable manner, it is anticipated that extensive flight testing will be required. The large fields set aside for PTE and TE will support testing and extension of the capability but will likely not offer enough time to adequately solve the technical challenges of the program. Therefore, performers are encouraged to outline how they plan to test autonomous soaring independent of the more formalized events.

Events within a test cycle are expected to occur at a common test range location. This means that PTEs provide an additional opportunity for performers to better understand the landscape and common flow patterns found at a particular location. Separate range locations are anticipated for each new test cycle. Failure to meet TE objectives will put performer teams at risk of elimination from the program. Further, DARPA reserves the right to eliminate performers at any point during the program for exceptionally poor performance/progress or unsafe flight operations. The government reserves the right to align the TE schedule between performers to maximize the efficient use of government-range assets.

The nominal 24-month program execution, based on an Albatross program Performer Kickoff Meeting held on day t0, is as follows:

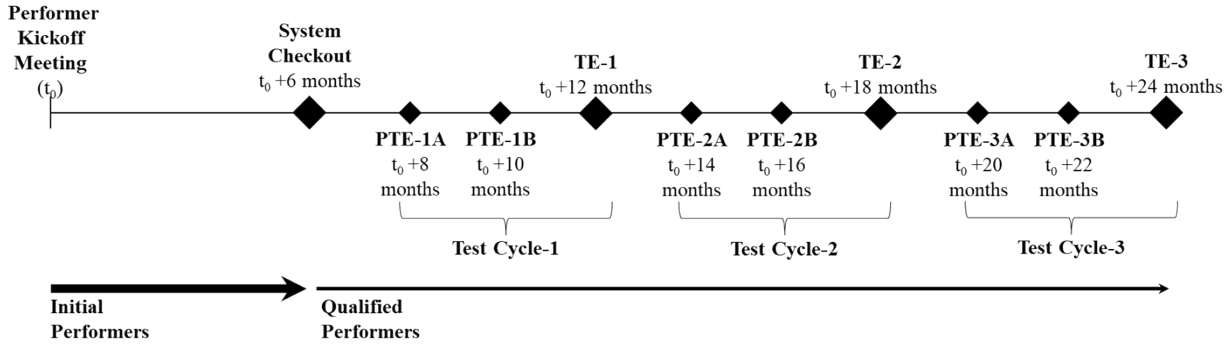

Figure 1: Albatross Program Structure/Schedule

Following a program kickoff, performers will have 6 months of preparation time to get their air vehicle ready for the system checkout. The first test cycle will be a 6-month effort with two PTEs (PTE-1A and PTE-1B) and culminate in TE-1. It is anticipated that each test cycle will take place at a common range location and last 6 months. The program will consist of three test cycles. The different test cycles will offer different environments for autonomous soaring.

As depicted in Figure 1, the program is structured as a series of flight tests taking place throughout the program. A System Checkout (TE-0) will be conducted at 6 months. Following that, three technology development and testing cycles are anticipated, each of which consists of two PTEs followed by a TE: thus, a total of six PTEs and three TEs over approximately 24 months. Figure 1 also depicts an exemplar elimination after System Checkout.

DARPA seeks complete solutions and encourages teaming where needed to offer a complete solution.

2.3. Program Goals

The Albatross program aims to create effective autonomous aircraft soaring capabilities over multiple operational domains. Autonomous aircraft soaring capabilities are defined as the independent active harnessing of energy from the natural environment's atmospheric flow field to reduce the onboard power demand and enable increased range and/or endurance. This energy-efficient flight technique could one day be combined with other technologies, such as highly efficient airframe designs and solar power generation, to enable perpetual s-UAS flight.

2.3.1 Soaring

Soaring includes static soaring, such as thermal, ridge, and wave soaring, and dynamic soaring, such as shear layer and boundary layer gradient soaring. Different types of soaring are available in different operating areas, and the objective of the Albatross program is to explore all forms of soaring to enable the widest application of autonomous soaring in operationally relevant environments.

Thermal soaring in the context of the Albatross program is defined as the harnessing of environmental energy by utilization of upward winds created when the Sun heats geographic features in a landscape. This type of soaring, usually in concert with ridge soaring (see below), is a means of low-energy flight employed by several large bird species, including the Andean condor, and enables those birds to travel vast distances with very little flapping.

Ridge soaring in the context of the Albatross program is defined as the harnessing of environmental energy by utilization of vertical components of winds created by flow over geographic features in a landscape. This includes phenomena such as slope lift and orthographic lift. This type of soaring, usually in concert with thermal soaring, is a means of low-energy flight employed by several large bird species.

Wave soaring in the context of the Albatross program is defined as the harnessing of environmental energy by utilization of features in separated leeward winds from flow over large geographic features in a landscape. In recent years, the use of wave soaring has led to crewed soaring of flights in excess of 1,500 miles at average speeds of over 100 mph.

Dynamic soaring in the context of the Albatross program is defined as the harnessing of environmental energy by utilization of differences in wind speed across an air mass boundary shear layer. Dynamic soaring is possible in winds created, such as when wind flows over the surface of water or over a mountain ridge. When air masses move at different speeds in close proximity, an air vehicle can rapidly pass through the shear boundary to momentarily increase air speed and generate additional lift. Since dynamic effects typically occur in close proximity to surfaces, additional considerations must be made for terrain avoidance.

2.3.2 Program Elements

The focus of the Albatross program is to understand where the opportunities exist for soaring in an operational domain, position the aircraft in those locations, detect soaring conditions onboard, and conduct the appropriate response to harness the energy. This will all be done while operating within the constraints of an operational scenario and without constant monitoring or manual input from the UAS operator. With that in mind, the technical focus areas of the development include:

1. A preflight planning perk (PF2P) that takes into account an understanding of historical, current, and forecasted weather, local geographical features, and their effect on airflow patterns, operational boundaries, and aircraft performance to output a flight plan that maximizes the power conserved. This planning utility is intended to act as an initial flight guidance and navigation plan for the aircraft to best position the aircraft to harness energy from the environment. Expected outputs from the focus area include the aircraft's initial flight plan, an environmental condition forecast for the expected flight region, and an aircraft performance prediction tool that provides information to the operator on the flight's expected power profile and time to complete, given the initial outlined plan. Additional goals of the PF2P tool include an opportunity to define constraints in the mission by the operator graphically and have updated flight planning occur given those constraints. Figure 2 provides an example of what the PF2P tool might offer to an operator of the system. Proposers are free to define anything about how the tool looks and its operation but are encouraged to remember that this tool, in addition to helping prepare the system for flight, is also an important interface for an operator to understand how to maximize the use of the system for their mission benefit.

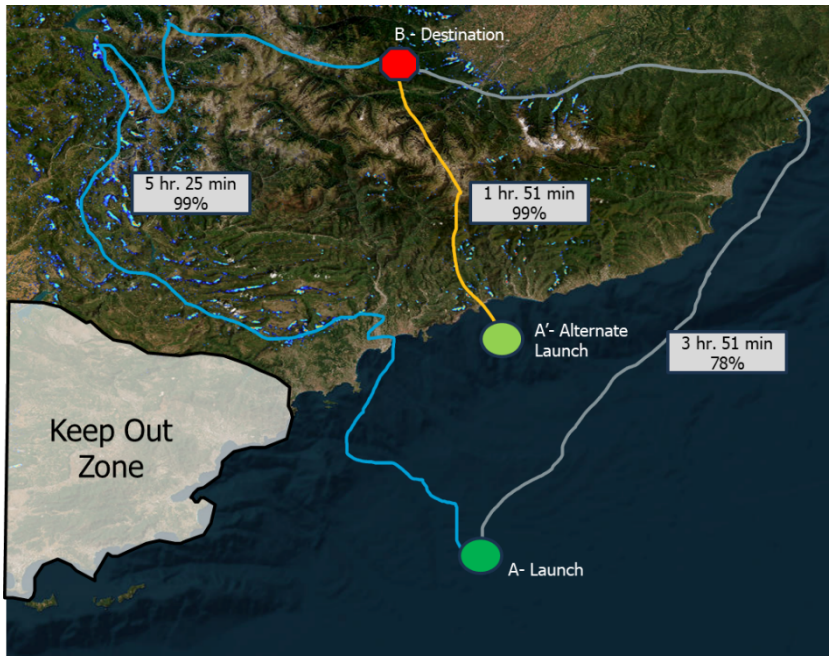

Figure 2: Example User Interface for Flight Planning

Figure 2 provides an example of a graphical flight planning tool used to aid an operator's ability to understand the constraints and utilize autonomous soaring. This example outlines the constraints of flight keep-out zones as they may be operationally required. It provides different flight route options in order to achieve the objective, which is signified here by reaching the destination, point B. Flight profiles may offer trade-off information such as expected flight time and/or probability of the system reaching a desired destination based on preflight planning understanding of the flight conditions prior to launch.

2. Sensing and Harnessing Control System (SHCS): The SHCS will include aircraft modifications that will sense when and what type of soaring flight conditions exist and will provide autonomous commands to the UAS to respond and harness environmental energy while continuing to make progress toward the flight objectives. The SHCS will use readily available sensing data on the UAS platforms (such as Inertial Measurement Unit (IMU),

Global Positioning System (GPS), and Airspeed) and incorporate additional sensing as necessary to detect the presence of real-time flow conditions or sense new soaring locations in the operational domain. Soaring-specific sensors to detect new sources or assist with avoiding obstacles may include pressure sensors distributed across the wing, three-dimensional airflow sensors, Light Detection and Ranging (LIDAR), and/or visual sensors, such as cameras. The emphasis of this development focus is the integration of existing hardware sensors to better recognize soaring opportunities rather than the development of custom sensors. As much of the energy in the air is found in the boundary layer, sensing will be necessary to operate safely in close proximity to terrain without crashing. Sensors may be needed to operate in close proximity to obstacles/terrain and harness the most energy out of the flow conditions while soaring. The SHCS will work in tandem with the PF2P to balance energy harvesting with higher-level mission objectives and safety requirements established on the aircraft.

While the focus is on developing and testing these capabilities on s-UAS, the program objective includes developing technologies that could extend to other aircraft or applications. Technological approaches that can be retrofitted are desirable.

Preflight planning and onboard sensing and control will work in tandem to support multiple types of soaring, with an emphasis on lowering the average power required for the system to navigate or operate. An example of this is shown in Figure 3.

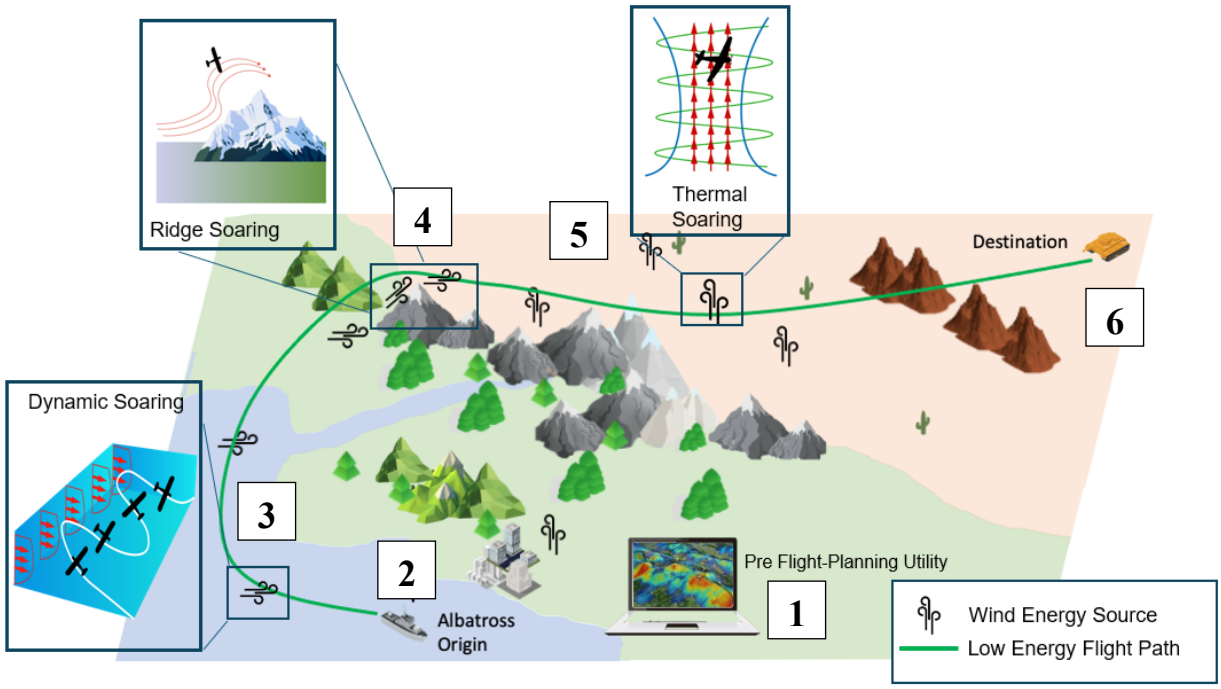

Figure 3: Idealized Example of Flight Profile in the Albatross Program

Figure 3 shows an idealized approach for utilizing autonomous soaring to enable navigation through a terrain. The envisioned mission would include:

1. Build full atmospheric models of the operating domain using geography, weather history, and forecast data to help identify probable locations of wind energy sources.

2. Utilize the model to plan the initial navigation path to take advantage of data and harness energy while meeting other constraints of the mission objective. Constraints include items such as do-not-fly regions, launch locations, geofences, altitude limitations, or time constraints.
3. While navigating along a path, use aircraft onboard sensors to measure real-time wind conditions and respond with aircraft energy-harnessing maneuvers.
4. When operating in close proximity to obstacles, implement sensing and behavior to avoid obstacles while performing soaring maneuvers.
5. Alter the flight path as necessary in real time to harness additional energy from the flow field while also meeting the original constraints of the flight activity.
6. Complete the flight mission and rendezvous at the desired end-point destination.

Figure 3 serves as an illustrative example of how the program focus areas work collectively to enable autonomous soaring of aircraft to reduce energy consumed while still meeting mission objectives. Since the focus of the effort is on delivering a mission-capable soaring capability, the system will provide the operator with consistent updates on anticipated remaining mission duration and a comparison of original energy usage prediction against real-time performance while in flight.

The program intends to use flight testing to demonstrate three key metrics described in section 2.5.

Note that a key program element is not air vehicle development. DARPA seeks to minimize the cost associated with modifying and operating a flight vehicle. S-UAS were specifically selected to reduce these costs and to minimize the cost of attrition during the program. Cost sharing is another example of how a proposer could minimize the cost associated with the flight vehicle. Additionally, other power harvesting mechanisms besides soaring, such as solar power, are discouraged. If other energy harvesting subsystems are integrated into the platform, a means to differentiate those gains from soaring dependent gains will be necessary.

2.4 Metrics

The Albatross metrics identify the primary way success will be measured in the program. With the primary goal to harness energy from the environment, the qualitative metrics for the program are:

1. Reduce the total energy used for a given flight when compared to a baseline (the same aircraft system which is not employing autonomous soaring).
2. Correctly predict how much energy savings are possible given the operating conditions.
3. Complete the mission objective by reaching the destination within preset mission constraints.

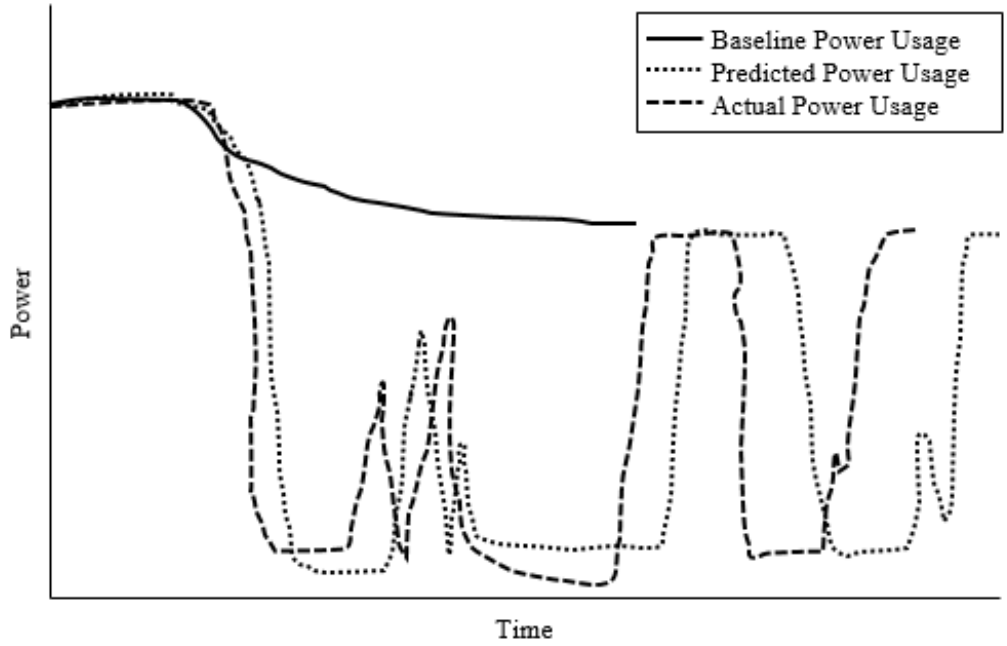

Figure 4: Hypothetical s-UAS Flight Power Profile Showing Power Usage Over Time

Figure 4 shows an idealized example of flying from point A and arriving at point B. Metrics 1 and 2 are explained through the use of this hypothetical flight profile. There are three curves associated with the figure. The solid line represents the line of power used for a single flight over time. This flight is intended to represent a power profile (power over time) of an existing aircraft that is launched and flies directly to its destination. No effort is being made to harness energy from the environment. This is called a baseline. During testing, DARPA may request that participating aircraft fly the full distance from start to finish without autonomously soaring to establish the total energy usage for a baseline flight. The dotted line represents a power profile plan that is predicted by the mission planner if autonomous soaring is utilized. For that flight, the mission planner predicts a slightly longer path but one that allows the aircraft to take advantage of soaring conditions to reduce the total energy needed for the flight. The final dashed line curve represents the actual power profile during a test event or some practice test event. Here, the time axes between the baseline flight and the planned and actual flight do not line up in recognition that harnessing energy likely results in longer flight times than the traditional straight-line route.

The first metric, energy use reduction, refers to the reduction of the total energy used for a given mission. Traditional aircraft are limited by onboard energy stores in the form of fuel or charged batteries for range and endurance. By using soaring to harvest environmental energy, the total onboard energy requirements can be reduced to achieve extended range and endurance. Albatross intends to reduce the total onboard energy needs by 75% across a range of missions. The metric is demonstrated in Figure 4 by comparing the area under the curve between the baseline flight and the actual flight.

The second metric refers to the ability to accurately predict the onboard energy needed to achieve a given mission, given the availability of environmental energy for harvesting. Based on weather predictive models, Albatross will provide estimates of the total stored energy needed to achieve mission range and endurance requirements. For a given mission, these predictions should be within 15% of actuals as measured after a flown mission. The metric is demonstrated in Figure 4 by

comparing the area under the curve between the predicted flight profile and the actual flight.

The third metric refers to the ability to complete the mission. If the mission is a range mission, was the system able to reach the destination while autonomously soaring? This is important because the logic must be developed to ensure that the onboard mission planning forces the system to make progress in the mission and not just remain in ideal conditions to harness environmental energy. For a loitering mission, there is a need to coordinate effects at a specific time. This may allow the aircraft freedom to be in an ideal location for energy harvesting but redirect when the aircraft is required to be in a different position to meet mission objectives. For a loitering mission, the ability to meet the timing objectives is important operationally and may serve as a contrast to optimal soaring. The final metric underscores the importance of completing the mission objective. A complete overview of the program metrics can be found in Table 1.

Energy Use Reduction	75% from baseline
Mission Planning Accuracy – Energy Consumption	within 15% of prediction
Mission Completion	100%

Table 1: Program Metrics

2.5. Deliverables

Albatross seeks to deliver soaring capability to the widest possible user base. Delivery of technology developed under Albatross is critical to achieving the maximum possible impact. Attention will be given throughout the program to ensure technologies developed with government funds are delivered in an easy-to-distribute format. The following item descriptions are provided as definitions for achieving the program milestones.

Item #	Item	Type(s)	Location (permitted attendees)	Date
1	Kickoff Meeting	Meeting / OT Milestone #1	Performer Site	t_0
2	TE-0 System Checkout	Event / OT Milestone #2	Performer Site	t_0 + 6 mo.
3	PTE-1A	Event / OT Milestone #3	Government Range	t_0 + 8 mo.
4	PTE-1B	Event / OT Milestone #4	Government Range	t_0 + 10 mo.
5	TE-1 Software	Deliverable	N/A	t_0 + 12 mo.
6	TE-1 Readiness Review	Meeting	Virtual	t_0 + 12 mo.
7	TE-1	Event	Government Range	t_0 + 12 mo.
8	TE-1 Test Report	Meeting / OT Milestone #5	Virtual	t_0 + 12 mo.
9	PTE-2A	Event / OT Milestone #6	Government Range	t_0 + 14 mo.
10	PTE-2B	Event / OT Milestone #7	Government Range	t_0 + 16 mo.
11	TE-2 Software	Deliverable	N/A	t_0 + 18 mo.
12	TE-2 Readiness Review	Meeting	Virtual	t_0 + 18 mo.
13	TE-2	Event	Government Range	t_0 + 18 mo.
14	TE-2 Test Report	Meeting / OT Milestone #8	Virtual	t_0 + 18 mo.
15	PTE-3A	Event / OT Milestone #9	Government Range	t_0 + 20 mo.
16	PTE-3B	Event / OT Milestone #10	Government Range	t_0 + 22 mo.
17	TE-3 Software	Deliverable	N/A	t_0 + 24 mo.
18	TE-3 Readiness Review	Meeting	Virtual	t_0 + 24 mo.
19	TE-3	Event	Government Range	t_0 + 24 mo.
20	TE-3 Test Report	Meeting	Virtual	t_0 + 24 mo.

21	Final Report with Hardware/Software Technical Data Package	Deliverable / OT Milestone #12	N/A	t_0 + 24 mo.

Table 2: Program Meetings, Events, and Deliverables

2.5.1 Kickoff Meeting

The program will begin with a full-day kickoff meeting at the performer location. This will mark the beginning of the effort. An introductory and instructional brief from the DARPA program manager (PM) on the technical and administrative details of the program is available and includes time for dialogue with the program performer. The performer will present the team and additional technical and programmatic details that are planned to achieve program goals and metrics.

2.5.2 System Checkout

System Checkout (TE-0) will be a major event at month 6, demonstrating the performer's existing UAS capability at the performer's location. The primary purpose of the system checkout is for the performer to verify that they have a baseline system that is ready to go into the soaring flight test cycles. Soaring flight may be shown and tested but the focus will be on ensuring the necessary safety features of the aircraft system are in place to support responsible testing. The performer will demonstrate a short flight mission and the ground control station in compliance with Table 3. The performer will brief a complete program development plan to the government team detailing when the Albatross program objectives will be met. The performer will provide a draft test plan to cover test cycle 1 (PTE-1A, PTE-1B, and TE-1).

For the Albatross TEs, the performer will provide a s-UAS with a flight vehicle takeoff weight of less than 55 pounds. Additional details are addressed in Table 3. While the term s-UAS is used, this is not meant to imply that only fixed-wing powered aircraft can be used in the program. Other examples of potential aircraft include powered gliders and paragliders.

The terms "Baseline s-UAS" and "Albatross-enabled s-UAS" are used to refer to the existing s-UAS platforms and modified versions to be developed, respectively. Adequate quantities of s-UAS to complete the TEs, inclusive of hardware failures and flight incidents, should be prepared. The performer will provide an adequate quantity of Baseline s-UAS to the program to develop the capability, demonstrate the baseline capabilities during TEs, and modify as necessary to demonstrate mission-relevant autonomous soaring. It is the responsibility of the performer to determine the number of s-UAS they expect will be necessary to support all testing.

PHYSICAL CHARACTERISTICS:

1. U.S. Department of Defense (DOD) Group 1 UAS preferred (<20 pounds) or Group 2 (<55 pounds) when the transportation launch/land and resources required to build and test are well justified.
2. Battery-powered.
3. Environmental exposure equivalent of Ingress Protection level 54 (IP54) or similar. Expect the possibility of operations in proximity to sand and saltwater. Due to the difficult operating conditions in dynamic soaring in a sea environment, a high probability exists that test assets will end up in the ocean.
4. The launch and landing technique does not assume access to an improved runway or an extended takeoff area. Launch and recovery from a boat are highly desired.

5. To facilitate approval and testing, the s-UAS adheres to Section 848 of the National Defense Authorization Act and Executive Order 13981 regarding foreign sourcing.
6. s-UAS must be approved for flight on U.S. military ranges.

PERFORMANCE CHARACTERISTICS:

7. Flight range of >50 miles.
8. Flight endurance of >2 hours.

NAVIGATION CHARACTERISTICS:

9. Autonomous GPS waypoint navigation.
10. Guidance, Navigation and Control subsystem suitable for modification in support of Albatross.
11. 3-dimensional geofence capability (able to stay within predefined boundaries.)
12. Responsible/programmable loss-of-link behaviors.

COMMUNICATION/DATA CHARACTERISTICS:

13. Communication link range of >50 miles.
14. Ground control station handoff or non-line of sight, such as Satellite Communications (SATCOM), communications capability.
15. External output of 3-dimensional UAS location to government system highly desired. Micro Air Vehicle Link (MAVLINK) format preferred.
16. Record total energy state. Record battery levels and power output levels. Downlink power over time to the ground to be recorded independently.

Table 3: s-UAS Characteristics for System Checkout

2.5.3 Practice Test Events

There will be a series of two PTEs leading up to each TE for a total of six PTEs throughout the program. Each PTE is expected to be about one week in duration and will be conducted at the same government test range as the upcoming TE. The personnel and material logistics of PTE attendance will be managed by the performer under the supervision of the government test team. The purpose of these PTEs is to give performers an opportunity to conduct real-world flight testing during their development efforts. The PTEs will not include government evaluation. The government team may provide a representative flight test objective during the PTE to help support performer practice in preparing for the TE and supporting evolving test processes to help improve the planning of TEs. The PTEs do not preclude program performers from conducting their own flight testing elsewhere, and at other times, it is merely an opportunity where the government will have set aside specific airspace and infrastructure for this purpose. Prior to each PTE, the performer will submit and present to DARPA a half-hour safety review presentation summarizing efforts to validate safety for the PTE.

2.5.4 Test Event Readiness Review

A test plan is due one month prior to each TE. The test readiness review will confirm the team is prepared in accordance with the approved test plan. As part of the test readiness review, the performer will deliver all mission-systems software and documentation developed under the

program to a repository designated by the government team. Further, the performer will submit and present to DARPA a one-hour safety and readiness review presentation summarizing their technical development work and efforts to validate safety and readiness for the TE. Key safety requirements are given in Table 4.

1. Aircraft will continuously update current position (Lat/Long/Alt) back to operator (threshold) and back to central flight test repository (objective) to facilitate understanding of the airspace during testing. 2. The system will enable an operator to override the mode so that an operator can take immediate control of the autonomous system. 3. The operator will maintain continuous communications with range control. 4. Aircraft will implement a Geofence, a software-defined barrier that captures the extremes of the operational boundary. If an aircraft leaves an established flight area, it will return promptly and automatically, allowing for manual override and operation or conducting a safe descent to the ground. 5. A flight checkout of each flight vehicle will be conducted in reference to a preflight checklist to ensure basic safeties are in place prior to flight test activity. 6. An aircraft will initiate an emergency landing procedure if it is no longer able to navigate and no communications with the system are in place. An example of this scenario is if an aircraft does not have GPS or an established communications link, it will initiate a landing process unless other safe navigation boundaries are established and demonstrated in that specific flight environment.

Table 4: Key s-UAS Safety Requirements

2.5.5 Test Events

There will be a series of three TEs, each of which will have a unique set of flight tests for the targeted exercise of various soaring capabilities in various environments. TEs are likely to be conducted at different test ranges to increase exposure to various environments and encourage broadly applicable soaring solutions. Each TE is expected to be one week in duration with three test days each. The performer will operate multiple flight vehicles simultaneously to efficiently utilize range time. Testing will conform to all government test range requirements, and safety requirements will be implemented.

Flight tests will be designed to incrementally allow performers to demonstrate performance improvements. Each test will expand on the previous test while adding a new capability. The ability to create and execute plans will be demonstrated at all TEs. The performer should demonstrate the ability to predict, find, and utilize soaring to reduce s-UAS power consumption during range and endurance-focused missions.

TE-1 will occur at a land-based range with opportunities to focus on thermal, ridge, wave, and dynamic soaring. The target area spans approximately 2000 square miles, with long paths that can be traversed. Thermal soaring will exploit common vertical velocities of 2-4 m/s, while ridge soaring will leverage predictable trade wins over mountainous terrain with prominent ridges. The potential sites for this test include Fort Irwin, California, and Yuma Proving Ground, Arizona.

TE-2 will occur at a sea-based range with opportunities to focus on ridge and dynamic soaring near the sea surface amidst moving ocean waves. The target area spans approximately 500 square miles, including both ocean and land sections. The goal is to demonstrate dynamic soaring with winds

fairly consistently between 10-15 mph. The potential sites for this test include the Pacific Missile Range Facility, Hawaii; San Clemente Island, California; and Roosevelt Roads, Puerto Rico.

TE-3 will occur across both land and sea ranges. The objective is a combination of land and sea, aiming to cover extensive areas. The potential sites for this test include Vandenberg Space Force Base, California; Kodiak, Alaska; and south of Agadir, Morocco.

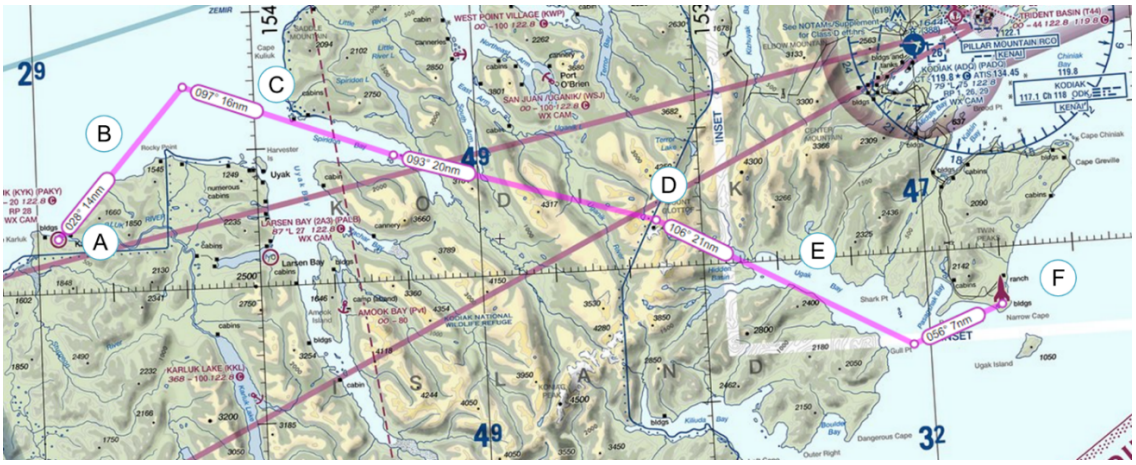

Figure 5. Exemplar TE-3. Combined overwater and overland soaring to traverse Kodiak, Alaska.

Figure 5 is shown to identify the scale of testing anticipated in the program. The total distance shown is 78 nautical miles from Launch point (A) and terminating at point (F). Different segments may be combined to focus on different flight demonstrations described below. For example, a loitering flight demonstration may launch at point (A) and coordinate activity in the region around (D).

2.5.5.1 Preflight Planning Tool Demonstration

The PF2P tool is a critical element of flight testing. Prior to each flight test, the performer will demonstrate the tool as part of the planning process. The tool will aid the s-UAS operator in understanding the additional benefits and constraints that soaring present to the mission. An apt analogy is the way Google Maps presents alternate paths with the associated timeline and tolls as part of its direction's functionality.

A demonstration of the tool will address the key features of soaring, such as weather, proximity to terrain, mission limitations, and uncertainty associated with chosen paths. For example, as the desired range increases, the confidence that the path is viable decreases. This type of information will be presented as output to the user as part of all flight demonstrations.

The PF2P tool demonstration is a key part of a successful TE. The tool will be evaluated for mission relevance and performance. Integration of various predictive toolsets is necessary for accurate planning. Human factors will be considered concerning the tool's integrated ability to assist in planning mission objectives. Multiple options for flight paths will be provided to the operator, with expected performance, benefits, and risks conveyed per path. The desire for the PF2P tool weights improvement to path planning and representation as a decision aid over improved weather modeling and microclimate modeling.

2.5.5.2 Flight Demonstration

Flights will consist of a series of flight test segments. Each flight segment will be either (1) an extended range test segment or (2) a loitering extended endurance flight test segment.

An extended-range flight test segment replicates an operationally relevant mission that requires an s-UAS to fly from one point to another and use as little energy as possible to extend the possible range. An example flight test format contains the elements in the following list and depicted in Figure 6:

- A designated course start point
- A designated course end-point
- A geofenced course boundary (3-dimensional)
- A time constraint
- A preflight, performer-generated power versus time use estimate
- A Baseline s-UAS, which flies straight between start and end-points while not intentionally taking advantage of soaring conditions.
- The simultaneous launch of the Baseline and Albatross-enabled s-UAS
- s-UAS location tracking
- s-UAS power use monitoring

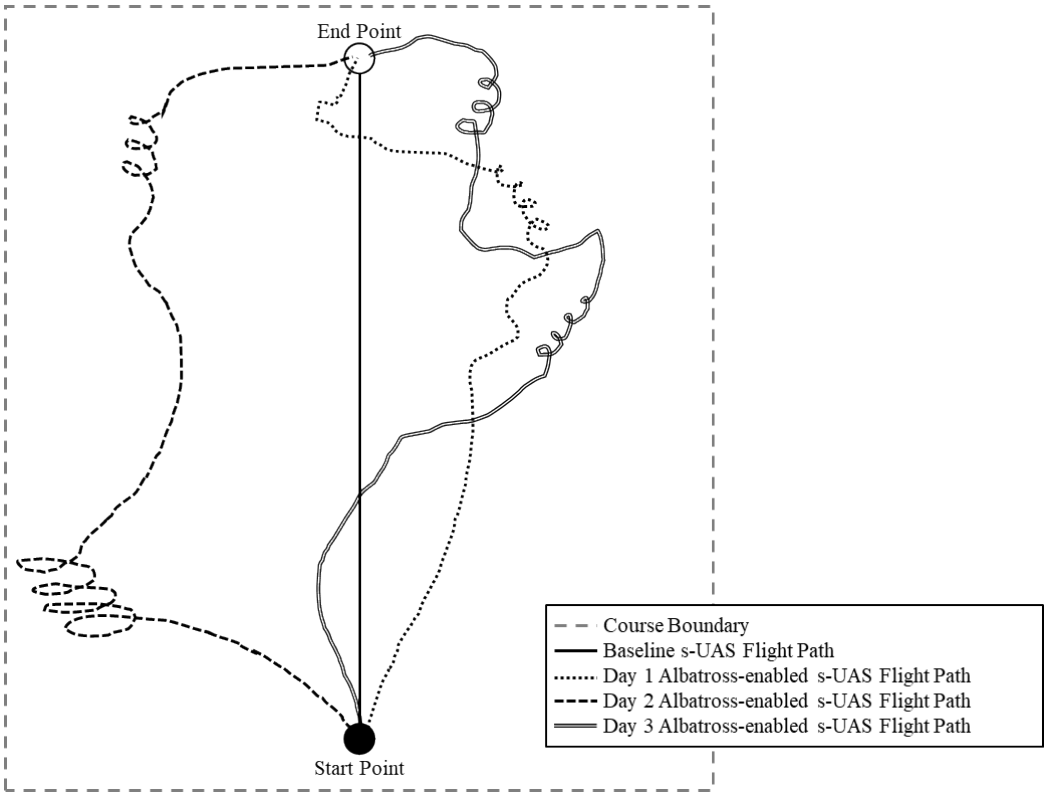

Figure 6: Example Extended Range Flight Test Segment

A loitering endurance flight test segment replicates the operationally relevant mission, which requires an s-UAS to fly to a destination and provide timely coverage while using minimal energy. Operationally, this may require the coordination of events, and therefore, the system may need to arrive early, wait near a desired location, and then coordinate its objective in conjunction with other mission-relevant events. The loiter flight test will include a need to arrive and provide payload-relevant functionality at a specific time. Here, being in the right position at the right time is important and requires balancing mission objectives with soaring constrained to features close enough to meet time-critical objectives. An example flight test format contains the elements in the following list and depicted in Figure 7:

- A designated course start/end point – The start and end points may not be the same point with a finalized endurance flight test segment
- A geofenced course boundary (3-dimensional)
- An identified launch time as well as a coordinated time to be on station
- A preflight, performer-generated power versus time use estimate
- A Baseline s-UAS, which flies in a required loiter pattern while not intentionally taking advantage of soaring conditions
- The simultaneous launch of the Baseline and Albatross-enabled s-UAS
- s-UAS location tracking
- s-UAS power use monitoring

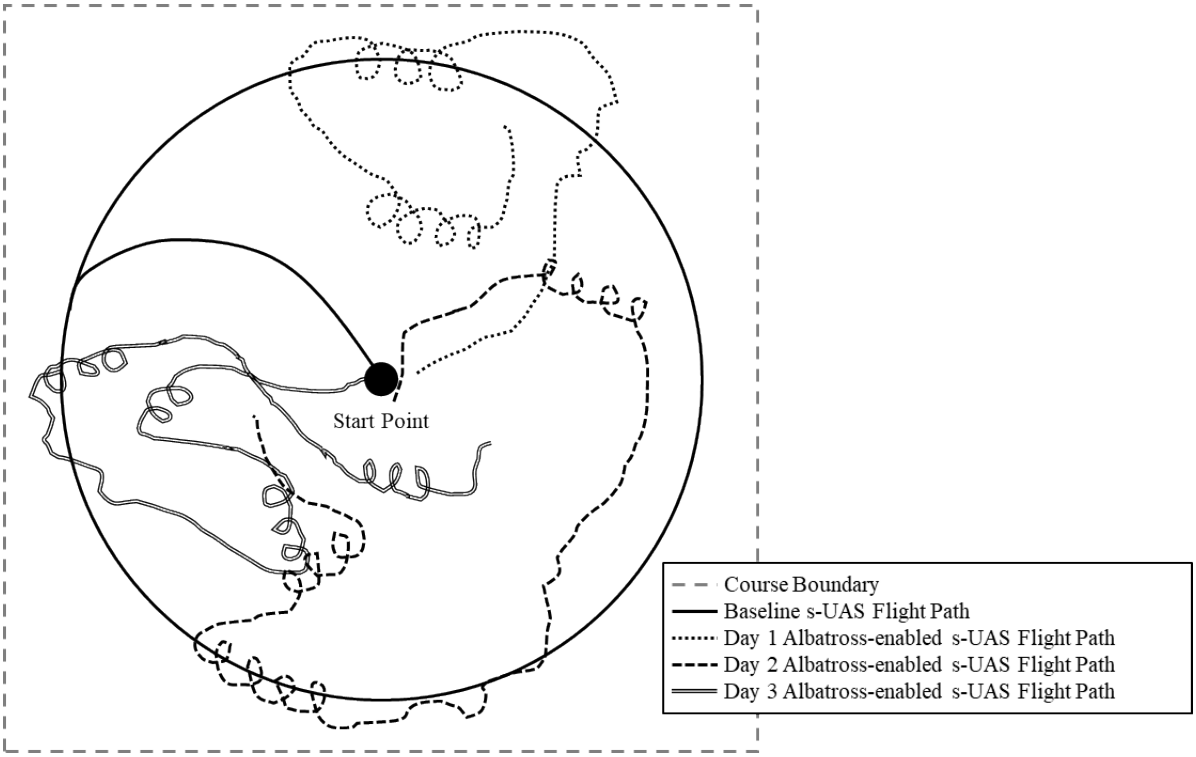

Figure 7: Example Extended Loiter Flight Test Segment

2.5.5.3 Test Event Evaluation

Progress towards program metrics found in Table 1 will be evaluated using data collected at each TE. Evaluation takes into account performance with respect to the objectives/metrics of the Albatross program and involves the elements in the list depicted in Figure 4.

As outlined in the metrics section, the "Baseline energy usage" is that of the Baseline s-UAS flown simultaneously with the corresponding Albatross-enabled s-UAS. "Actual energy usage" is that of the performer's Albatross-enabled s-UAS. "Predicted energy usage" is that of the performer's Albatross-enabled s-UAS, which is generated by the performer prior to flight. The energy usage is the integrated power over time for the vehicle to complete the flight objective.

- Was the course completed in accordance with the rules? [yes or no]
- "Actual energy usage" / "baseline energy usage"? [lower is better]
- "Actual energy usage" / "predicted energy usage"? [closer to 1 is better]

Different baseline energy usage measurement or analysis approaches may be used based on the

constraints of the weather, time, or number of aircraft that may be operated at a given location.

2.5.6 Test Event Hot Wash and Report

Following each of the TEs, the performer will submit and present to DARPA a one-hour hot-wash presentation summarizing their technical development work, analysis of TE performance, and lessons learned. Configuration changes during the event will be noted.

2.5.7 Final Report

Following either the down select of performers or the conclusion of the Albatross program (whichever occurs first), and in accordance with applicable contract requirements, the performer will deliver a final report that includes all data mission-system software and documentation developed under the program to a government repository, a technical data package for the developed hardware, and a final test report detailing the completed TEs.

2.6 Acquisition Strategy

The government's aim is to lower the administrative burden to entry, reduce program risk, foster competition, and have performing teams begin work faster. To facilitate this objective, the government will use the following acquisition process for Albatross:

1. Abstracts: Through this solicitation, the government requests proposers submit Abstracts (see Section 3.2) in response to this PS. Abstracts submitted after the due date may or may not be considered by DARPA. The government will review all submitted Abstracts for technical comprehension and ability (see Section 3.3). Selected proposers will be invited to provide an Oral Proposal (see Section 3.4) to the government.
2. Oral Proposals: Upon the government's request, proposers will have the opportunity to present their proposal to the DARPA program team. The government will evaluate all Oral Proposals (see Section 3.5) and anticipates OT for Prototype awards to selected performers based on the availability of funds.

The process and requirements for Abstract and Oral Proposal submissions are detailed in Section 3 of this PS.

2.7 Eligibility

This PS encourages solutions from all responsible sources capable of satisfying the government's needs, including large and small businesses, nontraditional defense contractors as defined in 10 U.S.C. § 3014, and research institutions as defined in 15 U.S.C. 632. Non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security regulations, export control laws, and other governing statutes applicable under the circumstances. For Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers, and Government entities interested in participating or proposing to this PS should first contact the agency Point of Contact (POC) listed in the Overview section prior to the abstract due date to discuss eligibility.

2.8 Intellectual Property / Data Rights

The government assumes unlimited rights, as defined in Section 5 of this PS, to intellectual property (IP) developed under the program unless otherwise specified by the proposer's asserted restrictions. Rights may be negotiated if appropriate consideration is reached. This applies to all mission-systems hardware and software developed under the program. The government expects the delivery of technical data packages for all hardware and software developed under the program.

For IP developed prior to the start of the agreement that will be directly utilized during program activities, proposers must certify during proposal submission, via Appendix 4 of this PS, what rights are being offered to the government. Where software is matured under this effort, the government will receive "Government Purpose Rights" (GPR) over all deliverable software source code that includes these IP products and list all third-party licenses, if any. Interfaces between GPR software and licensed software will have fully defined interfaces delivered with GPR. In other words, GPR will be applied broadly to ensure that the software developed under this effort is accessible and meaningful to the government.

2.9 PS Procedure

Abstracts (result if successful: invitation to participate in Oral Proposals)

In response to this solicitation, proposers are asked to submit a 5-page Abstract as described in Section 3.2. This process allows DARPA to ascertain (1) whether the proposers understand the key challenges of the Albatross program and (2) whether they will successfully execute a proposed concept. Specific evaluation criteria used to make the assessment can be found in Section 3.3.

It is important to note that proposers must submit an Abstract in response to this solicitation to be considered for participation in the Albatross program. Proposers will not be invited to provide an Oral Proposal or be included in any further progression of the program without participating in the Abstract phase of the solicitation.

Oral Proposals (result if successful: OT award, potential 24-month period of performance)

If DARPA finds that both of these conditions are met, it may request the proposer participate in an Oral Proposal to DARPA, as described in Section 3.4, where the proposed technical solution will be evaluated. Specific evaluation criteria used to make the assessment can be found in Section 3.5.

Oral Proposals will take place approximately three weeks after notification from the government that an Oral Proposal is requested. Additional instructions (including content due date and presentation date/time) will be provided in the official invitation to participate in Oral Proposals.

Awards

Upon favorable review and subject to the availability of funds, the government may award an OT for Prototype agreement under 10 U.S.C. § 4022. OT for Prototypes will be based on the Appendix 1 baseline agreement, with fixed milestones and a price to be proposed and negotiated with selectees or as otherwise negotiated. DARPA explicitly reserves the right to cease negotiations if they are not timely. The absolute minimum of changes to the template OT is highly recommended to help shorten the negotiation period.

The government will not pay proposers responding to this PS for the costs associated with Abstract submissions or Oral Proposals.

3 GUIDELINES FOR ABSTRACTS AND ORAL PROPOSALS

3.1 General Guidelines

- **a.** Do not include elaborate brochures or marketing materials; only include information relevant to the submission requirements or evaluation criteria.
- **b.** Use of a diagram(s) or figure(s) to depict the essence of the proposed solution is permitted.
- **c.** All Abstracts and Oral Proposals shall be unclassified.

d. Proposers are responsible for clearly identifying proprietary information. Submissions containing proprietary information must have the cover page and each page containing such information clearly marked with a label such as "Proprietary" or "Company Proprietary." NOTE: "Confidential" is a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

e. Questions can be sent to DARPA-PS-24-13@darpa.mil by the due date on page 2. Controlled Unclassified Information (CUI) must be encrypted when sending over the internet. A comprehensive list of questions and answers will be compiled, updated, and available online at http://www.darpa.mil/work-with-us/opportunities, with this program solicitation on www.sam.gov or disseminated in accordance with appropriate CUI handling requirements.

f. Send Abstracts (and, if invited, Oral Proposals) to DARPA-PS-24-13@darpa.mil by the due date on page 2. Files containing CUI must be encrypted when sent over the internet.

g. Proposers providing Abstracts that are not invited to an Oral Proposal will be notified in writing as soon as practicable.

h. Questions, Abstracts, and Oral Proposals submitted through other mediums, channels, or after the prescribed PS deadlines may not be considered, reviewed, or evaluated.

3.2 Abstract Content

a. Abstracts should not exceed five (5) single-sided 8.5" by 11" written pages using 12-point Times New Roman font with 1" margins all around.

b. Abstracts must include the following clearly labeled sections:

1. ***Title page*:** Proposer Name, Abstract Title, Date, Address, CAGE Code, and two Points of Contact with Name, Email Address, Phone number and rough-order-of-magnitude (ROM) cost. (The Title Page does not count against page limits).

    - The proposer shall include a statement that no people on the proposer's team work for DARPA as Scientific Engineering Technical Assistance (SETA), Advisory and Assistance Services (A&AS), or similar support services, as DARPA has a policy prohibiting such people from working as a technical performer. Include this statement on the title page; it will NOT count as part of the written page limit.
    - Cost Rough Order of Magnitude (ROM): Provide a ROM for the total cost of the proposed solution with minimal, high-level instantiations of said cost. This cost can be given as a range. The ROM should not be more than ½ page.

2. ***Technical Understanding*:** Provide a summary of Albatross's technical goals. This summary shall be stated in the proposer's own words without any "copy and paste" of this solicitation. The goal is for the proposer to demonstrate a clear understanding of Albatross' purpose and goals and knowledge of the existing body of work.

3. ***Technical Ability*:** Detail the proposer's team and organization, as well as relevant experience and resources, and explain the basis for the ability to be successful at achieving the goals, if selected, for Albatross. The proposer may include past experience, organizational capabilities, team members' qualifications, or anything

else that demonstrates competence in designing and executing the Albatross program. Proposer should include details of the s-UAS to be utilized in the conduct of the program and why it is uniquely suited for Albatross. A mature s-UAS is desired as either a whole unit or straight-forward construction of mature subsystems. The proposer should not include prospective or not yet achieved capabilities in this section.

4. ***Technical Approach*:** Identify specific technical challenges faced in Albatross. The proposer should include what they think the primary risks are to successful development of the Albatross program. The proposer should provide details of required work to achieve Albatross objectives. The proposer should not include previously achieved capabilities in this section.

3.3 Abstracts – Process and Basis of Evaluation

Abstract evaluation criteria are listed in order of importance. Individual Abstracts will be evaluated against the evaluation criteria described below:

a. **Technical Comprehension:** The proposed technical understanding is accurate, and key technical challenges and risks are identified.
b. **Technical Ability:** The proposers demonstrate an ability, if selected, to achieve the goals of the Albatross program.
c. **Technical Approach:** The proposers demonstrate an approach likely to achieve Albatross program goals.

Abstracts will be evaluated by DARPA using the evaluation criteria listed above. DARPA will use the evaluation criteria to assess similarities, differences, strengths, and weaknesses of the competing abstracts and, ultimately, use that assessment to determine the selection of those proposers offered the opportunity to proceed to Oral Proposals. The government will endeavor to complete the evaluation of Abstracts within 10 business days of the closing of the submittal period. As stated above, proposers are required to submit an Abstract for evaluation by DARPA to minimize effort and reduce the potential expense of preparing an unsuccessful Oral Proposal.

DARPA will respond to the Abstract with a statement as to whether DARPA is interested in receiving an Oral Proposal. At the government's sole discretion, additional feedback may be provided. If DARPA is not interested in an Oral Proposal, it will state this in an email to the proposer. Upon review of Abstracts, the government may elect to invite all, some, or none of the proposers to Oral Proposals. *Only Abstract proposers invited by DARPA to participate in Oral Proposals are eligible to provide one.*

3.4 Oral Proposals Content

If DARPA expresses interest in an Oral Proposal, the proposer will be asked to provide a presentation to provide further details on its proposed solution. Specific instructions (including content submission guidelines) will be provided in the invitation to participate. If selected, proposers can expect to be asked to provide the following information (proposer can address them in any order they choose):

a. Organization/Company introduction/overview: Provide information regarding the company and key personnel dedicated to the program and how their past performance and qualifications will contribute to the Albatross technical approach. Fewer, full-time personnel are preferred over more, low-time personnel. Identify and explain efforts of

similar scope and complexity. Describe current capabilities and future plans for commercialization of soaring capabilities.

b. Technical Approach: Provide a technical approach to accomplish the objectives and scope laid out in this solicitation. This should include at least the following elements:

    1. Description of the proposer's approach to preflight route planning.
    2. Description of the proposer's approach to in-flight sensing and control and flight plan adjustments.
    3. Description of the proposer's s-UAS to be utilized in the conduct of the program and airframe modifications needed.

c. Deliverables: Describe the delivery of technology developed under the proposed agreement. With consideration of the information in Section 4.5 below, identify the proposed patent or data rights to be given to the government under this agreement for the components of the proposed solution. For IP developed prior to the start of the agreement that will be utilized during program activities, clearly identify that IP and the anticipated level of IP rights that will be given to the government. In particular, explain any anticipated license restrictions on the data to be delivered in the program. Describe how data and firmware/software developed under the effort will be delivered to the government and explain how the delivered format supports use for government purposes.

d. Budget estimation for the effort including a resource loaded Integrated Master Schedule (IMS). For pricing purposes, please price three separate locations for the TEs. The proposal can specify which location was selected, but it is recommended to identify one Continental United States (CONUS) site, one U.S. site but Outside the Continental United States (OCONUS), and one international location. The price breakdown should be loaded across major milestone events as a resource loaded IMS. The full details of the price breakdown should be included as a separate cost volume (Appendix 2) to be submitted with the Oral Presentation. Discuss any cost share.

e. Teaming/subcontractors: Identify any teammates or subcontractors expected to comprise the team. Identify their roles and major tasks, any key personnel, and how their past performance and qualifications will contribute to the technical approach.

f. Condition met to permit use of OT for Prototypes in accordance with 10 U.S.C. 4022(d)(1): The Proposer shall include a statement (Appendix 3) that identifies and substantiates, in narrative, which of the conditions identified in 10 U.S.C. 4022(d)(1) is met to permit the use of OTs for Prototypes. Include this statement in the presentation.

    1. If condition (A) under 10 USC 4022 (d)(1) is identified as the criteria met by a prime contractor, the prime contractor is responsible for attesting to the nontraditional defense contractor or nonprofit research institution status of the organization with which it is partnering. The prime contractor is also responsible for providing a detailed description of the nontraditional defense contractor or nonprofit research institution's participation; specifically identifying how the effort being performed by the nontraditional defense contractor or nonprofit research institution is critical to the technical success of the project. The attestation submitted by the prime and the description of participation are subject to government review/approval and are required to meet condition (A) under 10 USC 4022. The attestation information and description of participation shall be submitted in support of each phase, as relevant.

In the invitation to submit an Oral Proposal, proposers will also be provided Appendices (1-5). All appendices must be submitted with the Oral Proposal, with the Model OT in Appendix (1) completed. All requested red lines to agreement are expected at this time to minimize future negotiations.

The required Appendices are detailed below:

APPENDIX	DESCRIPTION
Appendix (1) Model OT Agreement	Proposers will be asked to review content and fill-in the highlighted sections. Proposers must complete and submit the Model OT for Prototype Agreement provided as Appendix (1) as part of the Oral Proposal presentation package. The model OT is representative of the terms and conditions that DARPA intends to award and is intended to expedite the negotiation and award process. Proposers may suggest edits to the model OT for consideration by DARPA. Please note that suggested edits may not be accepted by DARPA. The government reserves the right to remove a proposal from award consideration should the parties fail to reach agreement on OT award terms and conditions.
Appendix (2) Cost Volume	Cost Proposal may include DARPA standard form or similar information in a form created by the proposer.
Appendix (3) OT Certifications	Standard Certifications required for OT award will be provided; these are available to preview at the following link: https://www.darpa.mil/work-with-us/reps-certs. If the proposer represents that it is eligible for the award of an OT under 10 U.S.C. § 4022(d)(1)(A) because at least one nontraditional defense contractor or nonprofit research institution is participating to a significant extent, an attestation must be provided. Specific instructions (including content submission guidelines) will be provided in the invitation to participate. *Example attestation may include (but is not limited to):* *Validation that subject nontraditional defense contractor has not received a single Cost Accounting System (CAS)-covered contract award of $50 million or more or received $50 million or more in net CAS-covered awards during the nontraditional defense contractor's preceding cost accounting period.* *Tax-exempt status of the subject nonprofit research institution under IRS § 501(c).*
Appendix (4) Intellectual Property Assertions	Intellectual Property Assertions, if relevant. If all unlimited rights apply, mark as N/A.
Appendix (5) Value Based Assessment	Proposers are encouraged, but not required to provide answers to some, all, or none of the following questions as part of the Oral Presentation Package (Please note these will not need to be presented during the Oral Proposal Presentation and will be reviewed whether presented or not. Further, the

	answers to the questions are not subject to any Oral Presentation Evaluation Criteria). Questions to be answered are as follows: 1. How would your proposed solution, if successful, enable federal entities to accomplish what is not possible today? a. How much time and money could the DOD / federal government save when compared to the current state of technology? b. What future value does this technology offer to the DOD / federal government? c. What commercial best practices or processes do you plan to utilize to deliver value to the government? 2. How would your proposed solution, if successful, enable commercial markets to accomplish what is not possible today? a. What future value does this technology offer to the commercial sector? b. Is your solution disruptive to the market, or does it provide incremental improvements to current practices? 3. Does DARPA's investment in development of soaring capabilities accelerate, mitigate, or reduce potential technical debt? If so, how? 4. How does DARPA's engagement in this program accelerate the timeline for value, schedule, and transition to commercial or DOD marketplaces?

In addition to the above required areas, the government may request the proposer provide additional information or detail with respect to its proposal. Proposers should expect to have approximately 60 minutes for presentation and approximately 30 minutes to address any questions from the government panel. Oral proposals are subject to the following constraints:

- Slides in PDF or PowerPoint format. The presenter may prepare any number of slides, but only specifically briefed slides will be considered.
- No smaller than 12-point font.
- Video demonstrations are allowed.
- All presented material, as well as the appendices identified above, is to be submitted to DARPA-PS-24-13@darpa.mil in accordance with the date identified in invitation to participate. Files containing CUI must be encrypted when sending over the internet. If the file size is too large for email, send an email to the address above for further instructions.

3.5 Oral Proposals – Process and Basis of Evaluation

Oral Proposal evaluation criteria are listed in order of importance. Individual presentations (including written cost proposal supplements) will be evaluated against the evaluation criteria described below:

a. **Technical Approach:** The proposed technical approach is reasonable, feasible, and innovative. The approach demonstrates an innovative yet feasible approach to address the identified technical risks and challenges and meets the full Albatross program objectives and metrics.
b. **Relevant Qualifications:** Personnel and/or company experience and qualifications are

accurate, relevant, and demonstrate the ability of the proposer to meet the technical goals of the program. Key personnel are allocated sufficiently with a cohesive core team. Team demonstrates ability to support safe flight operations.

c. **Budget:** The proposed solution is realistic for the proposed approach and accurately reflects the technical goals and objectives of the solicitation. All costs to include but not limited to labor, material and travel are consistent with the proposer's technical description and reflect a sufficient understanding of the level of effort needed to successfully accomplish the proposed technical approach.
d. **Data Rights:** Extent to which data assertions and data delivery format allows the government to utilize data and software developed under the Albatross program.

The government intends to give performers the option to attend Oral Proposals in-person (Arlington, VA) or virtually. Note, in either case the government reserves the right to record presentations. The government will evaluate information provided in the content submission (documentation), the Oral Proposal and Q&A session as basis for evaluation. Oral Proposals will be evaluated by the Albatross Program Manager with support from a panel composed of government subject matter experts (SMEs).

After completing evaluation of Oral Proposals, DARPA will: 1) inform the proposer of selection for award negotiation; or 2) inform the proposer that its proposed concept/technology/solution is not of continued interest to the government, and they are no longer considered for participation in the program. If DARPA does not intend to issue an award for the effort to a proposer, DARPA may provide brief feedback to the proposer regarding the rationale for the decision.

4 AWARDS

4.1 General Guidelines

Upon favorable review of the Oral Proposal and subject to the availability of funds, the government may choose to award an OT for Prototypes agreement for program participation.

The Agreements Officer reserves the right to negotiate directly with the proposer on the terms and conditions prior to execution of the resulting OT agreement, including payment terms, and will execute the agreement on behalf of the government. A copy of the draft OT agreement may be included with invitation to an oral proposal (Appendix 1) for review. In order to speed up negotiations, proposers selected for Oral Proposals will be required to either attest to compliance of all OT agreement articles or note those they take exception to. Be advised, only a government Agreements Officer has the authority to enter into, or modify, a binding agreement on behalf of the United States government.

In order to receive an award:

a. Proposers must have a Unique Identity ID number and must register in the System for Award Management (SAM). Proposers are advised to commence SAM registration upon notification of entry to the program.
b. Proposers must also register in the prescribed government invoicing system (Wide Area Workflow: https://wawf.eb.mil/xhtml/unauth/registration/notice.xhtml). DARPA Contracts Management Office (CMO) personnel will provide assistance to those proposers from whom a proposal is requested.
c. Proposers must be determined to be responsible by the Agreements Officer and must not be suspended or debarred from award by the federal government nor be prohibited by Presidential Executive Order and/or law from receiving an award.

d. Being asked to submit an Oral Proposal does not guarantee that a proposer will receive an award. The government reserves the right not to make an award.

4.2 Controlled Unclassified Information (CUI) and Controlled Technical Information (CTI) on Non-DOD Information Systems

Further information on CUI identification, marking, protecting and control, to include processing on Non-DOD Information Systems, is incorporated herein and can be found at www.darpa.mil/work-with-us/additional-baa. A program-specific CUI Guide has been established to help proposers determine CUI thresholds for information relevant to, and technologies developed under the program. As CUI (with the possibility of CTI) is anticipated for this program, foreign proposers are encouraged to understand U.S. export law and have a plan in place to obtain export licenses when necessary. Possible methods include teaming with a U.S. prime and/or having a U.S. subsidiary/parent company. Dependent upon selection for award, the program specific CUI guide will be provided to the performer to observe and follow.

4.3 Representations and Certifications

All proposers are required to submit DARPA-specific representations and certifications for Prototype OT awards in order to be eligible to receive an OT award. See http://www.darpa.mil/work-with-us/reps-certs for further information on required representations and certifications for Prototype OT awards.

4.4 Competition Sensitive Information

DARPA policy is to treat all submissions as competition sensitive, and to disclose their contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA sponsored technical research and are bound by appropriate nondisclosure agreements. Input on technical aspects of the proposals may be solicited by DARPA from non-government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

4.5 Government Furnished Equipment (GFE)

The government plans to supply the following as GFE:

Item #	Item	Supplied By Date	Disposition
1	Flight Test Range	TE-1, TE-2, TE-3	
2	High Performance Computing Access	Performer Kickoff	

Additional reasonable requests for GFE will be considered.

4.6 Procurement Integrity Act (PIA)

All awards under this PS shall be treated as Federal Agency procurements for purposes of 41 U.S.C. Chapter 21. Accordingly, the PS competitive solicitation process and awards made thereof must adhere to the ethical standards required by the PIA.

4.7Non-Fundamental Research

As of the date of publication of this solicitation, the Government expects that program goals as described herein either cannot be met by proposers intending to perform fundamental research or the proposed research is anticipated to present a high likelihood of disclosing performance

characteristics of military systems or manufacturing technologies that are unique and critical to defense. Therefore, the Government anticipates restrictions on the resultant research that will require the awardee to seek DARPA permission before publishing any information or results relative to the program.

Proposers should indicate in their proposal if they believe the scope of the research included in their proposal is fundamental. While proposers should clearly explain the intended results if their research, the Government shall have sole discretion to determine whether the proposed research shall be considered fundamental and to select the award instrument type. Appropriate language will be included in resultant awards for non-fundamental research to prescribe publication requirements and other restrictions, as appropriate. This language can be found at Proposer Instructions and General Terms and Conditions.

For certain research projects, it may be possible that although the research to be performed by a potential awardee is non-fundamental research, its proposed subawardee's effort may be fundamental research. It is also possible that the research performed by a potential awardee is fundamental research while its proposed subawardee's effort may be non-fundamental research. In all cases, it is the potential awardee's responsibility to explain in its proposal which proposed efforts are fundamental research and why the proposed efforts should be considered fundamental research.

5 PS DEFINITIONS

"Data" refers to recorded information, regardless of form or method of recording, which includes but is not limited to, technical data, software, mask works and trade secrets. The term does not include financial, administrative, cost, pricing or management information and does not include inventions.

"Government Purpose" means any activity in which the United States government is a party, including cooperative agreements with international or multi-national defense organizations, or sales or transfers by the United States government to foreign governments or international organizations. Government purposes do not include the rights to use, modify, reproduce, release, perform, display, or disclose technical data for commercial purposes or authorize others to do so.

"Government Purpose Rights" means the rights to use, duplicate, or disclose Data, in whole or in part and in any manner, for government purposes only, and to have or permit others to do so for government purposes only.

"Nontraditional Defense Contractor" is defined in 10 U.S.C. § 3014 as an entity that is not currently performing and has not performed, for at least the one-year period preceding the solicitation of sources by the DOD for the procurement or transaction, any contract or subcontract for the DOD that is subject to full coverage under the cost accounting standards prescribed pursuant to 41 U.S.C. § 1502 and the regulations implementing such section. This includes all small business concerns under the criteria and size standards in 15 U.S.C. § 632 and 13 C.F.R. Part 121.

"Other Transaction" refers to the type of OT that may be awarded as a result of this PS. This type of OT is authorized by 10 U.S.C. § 4022 for prototype projects directly relevant to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components, or materials proposed to be acquired or developed by the DOD, or for the improvement of platforms, systems, components, or materials in use by the armed forces.

"Prototype Project" is described in the DOD Other Transactions Guide (Version 1, Nov. 2018) issued by the Office of the Under Secretary of Defense for Acquisition and Sustainment: https://www.dau.edu/guidebooks/Shared%20Documents/Other%20Transactions%20(OT)%20Guide.pdf.

"Small Business Concerns" is defined in the Small Business Act (15 U.S.C. § 632).

"Unlimited Rights" means the rights to use, duplicate, or disclose Data, in whole or in part and in any manner, for any purpose, and to have or permit others to do so.

6 ACRONYMS

A&AS: Advisory and Assistance Services
CAGE: Commercial And Government Entity
CMO: Contracts Management Office
CTI: Controlled Technical Information
CUI: Controlled Unclassified Information
DARPA: Defense Advanced Research Projects Agency
DOD: Department of Defense
ET: Eastern Time
FFRDC: Federally Funded Research & Development Center
GFE: Government Furnished Equipment
GPS: Global Positioning System
IMU: Inertial Measurement Unit
IP: Intellectual Property
IP54: Ingress Protection level 54
lbs: pounds
LIDAR: laser detection and ranging
MAVLINK: micro air vehicle link
mph: miles per hour
N/A: not applicable
NDA: Non-Disclosure Agreement
OT: Other Transaction
PDF: portable data format
PF2P: Pre Flight-Planning Perk
PIA: Procurement Integrity Act
PM: Program Manager
PMRF: Pacific Missile Range Facility
PS: Program Solicitation
PTE: Practice Test Event
Q&A: Question and Answer
ROM: Rough Order of Magnitude
SAM: System Award Management
SATCOM: Satellite-supported Communications
SETA: Scientific Engineering Technical Assistance
SHCS: Sensing and Harnessing Control System
SN: Special Notice
STO: Strategic Technology Office
s-UAS: small Uncrewed Aerial System

TE: Test Event
UARCs: University-Affiliated Research Centers
UAS: Uncrewed Aerial System