Call 001 – Point-to-Point Capability and Operational Demonstrations

Rocket Experimentation for Global Agile Logistics (REGAL)

THIS WILL BE A TWO-STEP SOLICITATION.

First Step: White papers will be accepted any time after 8:00am Wright-Patterson AFB, OH local time on 7 June 2021 and before 4:00pm Wright-Patterson AFB, OH local time on 1 June 2027**. Only white papers are due at this time.**

Second Step: To be provided in the Requests for Proposals sent to offerors that submit White Papers considered to meet the needs of the Department of the Air Force.

Delivery Instructions: In accordance with the ARA, FA8650-21-S-9307, please adhere to the following delivery instructions.

Due to COVID 19, the DAF requests electronic proposals be submitted using BOTH DoD SAFE (primary method) and email (backup method) to the following addresses:

AFRL.RS.RocketCargo@us.af.mil

The maximum email file size the Government can receive is 20 MB.

If the contractor needs a DoD SAFE drop-off invite from the DAF, please send that request to AFRL.RS.RocketCargo@us.af.mil no later than 7 days prior to the due date of proposals to ensure a drop off code is provided in a timely manner.

NOTE: Any proposal received at the Government Office designated in this ARA or subsequent Calls after the exact time specified for receipt of offers is "late" and will not be considered except at the discretion of the Government. Early proposal submissions are encouraged.

Anticipated Award Date: Variable, depending on proposal submission date. See below, Section 4 Schedule / Period of Performance

Anticipated Number of Awards: Estimate 20 or more awards

Anticipated Funding: See below, Section 6 Cost Objective/Funding Constraint

Advanced Research Announcement: FA8650-21-S-9307

1. Statement of Objectives (SOO)/Description of Technical Areas

A. Background/Scope:

Consistent with the overall approach for establishing point-to-point (PTP) space transportation for DoD logistics using commercial rockets as described in Advanced Research Announcement (ARA) FA8650-21-S-9307, this call seeks innovative demonstrations and experiments to explore a wide range of methods for integrating commercial PTP rocket capabilities and cargo platforms with the DoD logistics train. Experimentation may include, but is not necessarily limited to, use of commercial rockets to accelerate responsive delivery timelines, prototyping PTP cargo containers for materiel or human transportation, innovative solutions for loadmaster challenges, and integration of PTP ground operations with the existing DoD global logistics support. It is in the interest of the Department of the Air Force (DAF) to assess multiple commercial PTP transport capabilities for agile global logistics, such that the DoD is positioned to reach agreements with multiple commercial providers for PTP space logistics to achieve operational flexibility, availability, and affordability, similar to current commercial service agreements with U.S. Transportation Command (USTC) for air, land, rail, and sea cargo.

Multiple technical challenges and viable approaches to solve those challenges may be responsive to this call. The Government's interest in experiments to explore commercial PTP capability and operational demonstrations is illustrated by the following two use cases.

<u>Use Case 1: 2-Way Global Logistics Between Launch Pads</u>

The DoD global logistics train currently leverages commercial services to transfer cargo across the globe, including land, sea, and air transportation between established sites with existing logistics infrastructure. Similarly, a future PTP space transportation capability would leverage large reusable commercial rockets to deliver cargo between established launch pads anywhere in the world within one hour. However, routine and responsive cargo delivery requires successful integration of PTP space transportation into the DoD logistics train in order to optimize pre and post-launch timelines.

For this use case, the Government seeks to explore commercial capabilities for scheduled and responsive PTP space transportation between established CONUS or OCONUS launch pads. Also of interest are options for establishing launch pads optimized for DoD-unique locations at low cost and lower usage rates than standard launch pads.

<u>Use Case 2: 1-Way Rapid Resupply or Disaster Response</u>

Urgent DoD logistics requirements may necessitate cargo delivery to locations without an established landing pad, including rapid resupply missions to restore loss of mission capability or for Humanitarian Assistance / Disaster Relief

(HA/DR). In these scenarios, a commercial rocket would launch from an established launch pad (similar to Use Case 1) and land at a remote site with limited logistics infrastructure. In an austere location, the cargo would be unloaded without ground support, either autonomously or with personnel and equipment transported on the rocket. After unloading cargo, the rocket could be refueled and relaunched, or else returned by other transport modes to a launch pad. Unscheduled and responsive cargo delivery with PTP space transportation requires significant pre-planning and agility to successfully integrate with the DoD logistics train, including pre-launch, during flight, and post-launch operations.

For this use case, the Government seeks to explore commercial capabilities for unscheduled and responsive PTP space transportation between established CONUS launch locations and remote landing locations.

Offerors with approaches that do not fit the use cases described herein are encouraged to discuss the idea(s) with the Technical Point of Contact (TPOC), whose contact information is found in Section 11 of this call, prior to developing a full proposal.

For both use cases, the commercial rocket and logistics train should be capable of delivering cargo equivalent to a C-17 capacity, or approximately 30 to 100 metric tons of payload. The DAF primary goals are cost and speed – with both measured at the full end-to-end system level. Offerors are free to consider any rockets, trajectories, or reusability options needed to achieve the cost and speed objectives. Global reach within 60 minutes is a fundamental requirement, so an exoatmospheric trajectory and atmospheric reentry is expected (albeit not required). Offerors are encouraged to suggest locations for their proposed experiments, and the ability to deliver residual enduring capability (e.g., launch pads at key locations). In addition, offerors are expected to address and discuss all major operational issues such as launch permits, overflight, safety regulations, environmental impacts, and range safety for both launch experimentation and the eventual operational system.

B. Technical Objectives: The Government seeks innovative experimentation to meet the following technical objectives:

   a. Launch a commercial rocket on a PTP trajectory (may be longer than 60 minutes for early proof-of-concept experimentation) and demonstrate the ability to land at a planned location based on Use Case 1 or Use Case 2. The commercial rocket should be capable of delivering approximately 30 - 100 metric tons of cargo, however, actual specific cargo does not need to be included in the launch experiment. Parameters of interest that should be considered in the experimentation include:

      (i) (Use Case 1) Demonstrate launch and landing between CONUS or OCONUS sites; may include rapid ground operations with cargo load/unload.

(ii) (Use Case 2) Demonstrate landing at a remote or unimproved site (e.g. not an established landing pad); may include rapid ground operations with unassisted cargo load/unload.
(iii) Versatility to launch and land in adverse weather.
(iv) Versatility to land on surfaces that are different than a typical launch pad, including on land and sea platforms.
(v) Versatility of the rocket to accommodate various loadmaster cargo configurations in the cargo bay.
(vi) Versatility to accommodate DoD human passengers.
(vii) Affordability, including costs driving launch operations, rocket reusability and refurbishment, and slow return of the rocket
(viii) Exploration and ground test of novel concepts for airdrop of a logistics cargo container(s) in the atmosphere; this may include high-speed separation.

b. Establish the ability of a commercial rocket to deliver 30 -100 metric tons of cargo anywhere on earth within 60 minutes from launch to landing. This timeline does not include cargo loading and unloading.

c. Experimentation and prototyping of cargo containers compatible with responsive PTP space transportation for global logistics, including loadmaster planning and agility, rapid cargo load/unload, and cargo survival in all PTP rocket environments from load to unload. Parameters of interest (for Use Case 1 and Use Case 2) that should be considered in the experimentation include:

(i) Versatility of the cargo container to rapidly accommodate a range of DoD logistics payloads, including size, weight, shape, and content as described in the Defense Transportation Regulations.
(ii) Survivability of payloads within the cargo container to PTP rocket environments, and sensitivity to loadmaster cargo configurations in the rocket cargo bay.
(iii) Versatility to rapidly package payloads in the cargo container, rapidly load the cargo container in a commercial rocket, and rapidly unload the cargo for Use Case 1 and Use Case 2 No specific timeline is required for the load/unload process, although speed is clearly a discriminator between offeror approaches.
(iv) Versatility of the cargo container to accommodate DoD materiel and passengers.
(v) Versatility of the cargo container to integrate with the DoD logistics supply chain and interface with multiple modes of DoD transportation.
(vi) Exploration and ground test of novel concepts for airdrop of a logistics cargo container in the atmosphere and precision landing; this may include high-speed separation.

d. Measure performance parameters and characterize environments in PTP launch experiments. Parameters of interest that should be quantitatively measured include:

   (i) Characterize the steps, measure durations, and determine a timeline of ground operations leading up to launch, such as cargo loading and propellant loading.
   (ii) Measurement and characterization of the PTP rocket trajectory from launch to landing.
   (iii) Measurement and characterization of the rocket plume environment and interactions at launch and landing locations, including acoustics, heat, and ground surface interactions.
   (iv) Measurement and characterization of the rocket plume in flight.
   (v) Measurement and characterization of environments within the rocket cargo bay, including acoustics, heat, and gravitational load.
   (vi) Measurement and characterization of external environments during the launch experimentation, including weather, surface materials at launch and landing locations, and available logistics infrastructure.

e. Experimentation and prototyping of logistics operations to enable responsive PTP space transportation, including command and control scheduling, agile ground infrastructure, rapid loadmaster operations, and integrating commercial rocket and cargo container capabilities with the DoD logistics train for Use Case 1 and Use Case 2. Parameters of interest that should be considered in the experimentation include:

   (i) (Use Case 1) Time from Execution Order (EXORD) to launch where the cargo and landing location are known a priori.
   (ii) (Use Case 1) Time from landing to cargo unload, where there is existing ground logistics infrastructure at the landing site and the cargo arrives on schedule.
   (iii) (Use Case 2) Time from EXORD to launch if the cargo and destination is not known a priori.
   (iv) (Use Case 2) Time from landing at a remote site to cargo unload, where there is no ground logistics infrastructure at the landing site, and the cargo is unscheduled.
   (v) (Use Case 2) Time from landing at sea platform to cargo unload, where there is limited logistics infrastructure and the cargo is unscheduled.
   (vi) Ability to refuel and relaunch the rocket from a remote site without ground launch infrastructure; ground infrastructure and fuel may be transported to the rocket.
   (vii) Ability to secure the rocket in-place and return the rocket to a distant launch pad, including by land or sea.
   (viii) Versatility to rapidly adapt to the types of cargo identified in the USTRANSCOM Defense Transportation Regulations (available online).

(ix) Versatility of sea platforms to support PTP rocket logistics, including logistics infrastructure, sea platform mobility, and integration with other modes of transportation.

f. In addition to the technical objectives above, the retirement of unanticipated challenges is responsive to this call. Given the rapidly evolving nature of large reusable commercial launch systems, and the unprecedented intent to rapidly deliver DoD cargo anywhere in the world, it is reasonable to expect that unforeseen challenges will arise.

2. Deliverable Items

A. Data Items: Negotiable, but may include: test data for rocket operations and environments, logistics operations, cargo containers.

B. Software: Negotiable, but may include: command & control scheduler, loadmaster planning tools, global weather prediction and winds aloft tools.

C. Hardware: Negotiable, but may include: used rocket stage for loadmaster training, intermodal containers and pods, advanced weather monitoring systems.

D. Other: Not anticipated.

E. Final Report and Technical reports describing test results.

3. Data Rights Desired

The government desires Unlimited Rights for all technical data, non-commercial software (NCS), and NCS documentation developed using government funds, however due to the desired use of commercially-developed rocket systems in this program, more restrictive data rights are anticipated and will be considered where appropriate. The desired, but negotiable, data rights are:

(1) Technical Data: Unlimited Rights
(2) Non-Commercial Software (NCS): Unlimited Rights
(3) NCS Documentation: Unlimited Rights
(4) Commercial Computer Software Rights: Customary License

4. Schedule/Period of Performance

The ability of the Government to experiment with commercial rockets for PTP space transportation is dependent on the commercial rocket development and test schedule. As such, the Government is flexible on the start date and

duration of awards under this solicitation in order to maximize the probability of success of each individual effort. Although start date is a secondary consideration, the technical period of performance for any individual effort under this solicitation is estimated to be approximately 6-30 months. An additional three (3) months are allocated for preparation and review of the final report, resulting in an overall estimated period of performance of approximately 9-33 months. This period of performance is provided as an estimate only. Offerors should propose a schedule that is executable and maximizes the probability of achieving the technical objectives of this call.

The following dates represent desired limits on the earliest start date and latest end date for technical efforts under this call.

Project Kickoff: No earlier than October 2021

End of Technical PoP: No later than December 2027

5. Government Furnished Property/Equipment

The Government anticipates there may be base support and test range support to facilitate commercial experiments for PTP space transportation. Potential support will be determined by contract or agreement. Anticipated support includes, but is not necessarily limited to, access to DoD-unique logistics and landing locations, additional sensors, and support for range safety to accommodate effective experimentation.

The locations at which this support and these items will be available, and the durations for which they will be available, will be determined based on availability, government discretion, and the offeror's request. Offerors should note in their proposal the anticipated timeframe when access to Government base support or test range support will be desired.

6. Cost Objective/Funding Constraint

The government anticipates multiple awards (potentially 20 or more), each with a cap on value of approximately $25M. However, this does not mean each award will be valued at $25M. The value of the award will reflect the scope of work proposed.

7. OPSEC/Safety/Classification

A. OPSEC: General Operations Security (OPSEC) procedures, policies and awareness are required in an effort to reduce program vulnerability from successful adversary collection and exploitation of critical information. OPSEC

will be applied throughout the life cycle of any award resulting from this solicitation.

B. SAFETY**:** The following requirements must be incorporated into awards resulting from this call:

   a. Must comply with all federal, state, local, and DAF safety and environmental regulations.
   b. Must comply with system safety requirements contained in MIL-STD 882E, Section 4 "General Requirements" for any deliverable systems or hardware. Must identify safety-critical components of those systems or hardware, and software interfaces with those components. Must test and verify the safety-critical hardware and software for safety acceptance.

C. PROGRAM SECURITY CLASSIFICATION: Activities under this Call are **expected to be unclassified**, however classified activities may be possible, and will be addressed accordingly. If a DD254 is applicable, offerors must verify their Cognizant Security Office information is current with the Defense Counterintelligence and Security Agency (DCSA) at www.dcsa.mil.

8. White Paper / Proposal Submission

A. Overview: This Call consists of a two-step submission process described in detail below. White Papers/Proposals submitted shall be in accordance with this call and the ARA (FA8650-21-S-9307). The Government intends to review white papers/proposals and award some, all, or none of the proposals received without negotiation/discussion; however, the Government reserves the right to negotiate with those offeror(s) whose proposal is selected for funding.

   ONLY WHITE PAPERS ARE BEING SOLICITED AT THIS TIME.

   Offerors should be alert for any amendments that may permit extensions to the white paper submission date.

B. First Step (White Paper) Instructions:

   a. General: The First Step requests a white paper and a rough order of magnitude (ROM) cost. The white paper shall include a discussion of the nature and scope of the research and the offeror's proposed technical approach. The Government will review the white papers in accordance with the First Step Peer or Scientific Review criteria, set forth below. Based on this review, the Government will determine the white papers which have the potential to best meet the DAF needs. Offerors will be notified of the disposition of their white paper. It is anticipated that Government review of the white papers submitted will take 10 working days. Those offerors submitting white papers assessed as meeting DAF

needs will be asked to submit a technical and cost proposal. Those offerors not requested to submit a technical and cost proposal will be notified but may, however, still elect to submit a technical and cost proposal. An offeror submitting a proposal without first submitting a white paper will still be eligible for an award. However, it is recommended that a white paper be submitted first to save time and resources. Proposals must be submitted before 1 July 2027. The cost of preparing white papers in response to this Solicitation is not considered an allowable direct charge to any resulting or any other contract or agreement; however, it may be an allowable expense to the normal bid and proposal indirect cost as specified in FAR 31.205-18.

b. Page Limitation: The White Paper shall be limited to 6 pages, prepared and submitted in Word format. Font shall be standard 10-point business font Arial. Character spacing must be "normal," not condensed in any manner. Pages shall be double-spaced (must use standard double-space function in Microsoft Word), double-sided (each side counts as one page), 8.5 by 11 inches, with at least one-inch margins on both sides, top and bottom. All text, including text in tables and charts, must adhere to all font size and line spacing requirements listed herein. Font and line spacing requirements do not have to be followed for illustrations, flowcharts, drawings, and diagrams. These exceptions shall not be used to circumvent formatting requirements and page count limitations by including lengthy narratives in such items. Pages shall be numbered starting with the cover page being Page 1, and the last page being no greater than Page 6. The page limitation covers all information including indices, photographs, foldouts (counted as 1 page for each 8.5 by 11 portion) tables, charts, appendices, attachments, resumes, etc. The Government will not consider pages in excess of these limitations. Offerors should adhere to the delivery instructions specified in the ARA.

c. Format: The white paper will be formatted as follows:

(i) Section A: ARA and call Number, Title of Program, Name of Company, Business Size, Company's Commercial and Government Entity (CAGE) number, Dun & Bradstreet (D&B) Data Universal Numbering System (DUNS) number, Contracting POC and Technical POC with appropriate telephone numbers, fax numbers, and email addresses for the POCs.
(ii) Section B: Period of Performance and Task Objectives;
(iii) Section C: Technical Summary and Proposed Deliverables; and
(iv) Section D: Cost of Task (Rough Order of Magnitude (ROM).

d. Technical Portion: The technical portion of the white paper shall include a discussion of the nature and scope of the research and the offeror's proposed technical approach/solution. It may also include any proposed deliverables. Resumes, descriptions of facilities and equipment, a proposed Statement of Work are not required at this point.

e. Cost Portion: The cost portion of the white paper shall include a ROM cost estimate. No detailed price or cost support information should be forwarded; only a time-phased bottom line figure should be provided.

f. Other Information: Multiple white papers within the purview of this announcement may be submitted by each offeror. If the offeror wishes to restrict its white papers, they must be marked with the restrictive language stated in FAR 52.215-1(e).

g. White Paper/Proposal Content Summary: You may be ineligible for award if all requirements of this solicitation are not met on the proposal due date.

C. Second Step (Proposal) Instructions: Based on a review of the white paper a proposal may be requested. The Second Step consists of offerors submitting a technical and cost proposal in accordance with the instructions in the ARA (FA8650-21-S-9307) and this call. The technical proposal is limited to 25 pages. This page limitation does not apply to the Statement of Work (SOW). The SOW has no page limitation. All other required information regarding the proposal submission requirement is captured in the ARA. After receipt, proposals will be reviewed in accordance with the award criteria in this call.

9. White Paper / Proposal Review Information

A. First Step – White Paper Peer or Scientific Review Criteria: The Government will review White Papers to determine which of them have the potential to best meet DAF needs based on the following criteria, which are of equal importance:

(1) Soundness of the offeror's technical approach to accomplish the technical objectives.

(2) Relevance and impact of the proposed technical effort to the overall goals of the ARA and Call.

(3) Affordability (Proposed ROM Cost Estimate).

B. Second Step – Proposal Peer or Scientific Review Criteria: Proposals will be reviewed against the criteria listed below. The technical aspect is ranked as the first order of priority.

a. Technical: The technical aspect shall be reviewed based on the following criteria that are of equal importance.

(1) Unique and innovative approach proposed to accomplish the technical objectives. New and creative solutions and/or advances in knowledge, understanding, technology, and the state of the art.

(2) The offeror's understanding of the scope of the technical effort.

(3) Soundness of the offeror's technical approach including whether the proposal identifies major technical risks, clearly defines feasible mitigation efforts, and demonstrates related experience and qualifications of technical personnel.

(4) The potential to transition the research and development deliverables to future Government needs. Any proposed restriction on technical data or computer software will be considered.

b. Cost/Price: The cost evaluation includes the realism of the proposed cost. Cost/Price is a substantial factor, but ranked as the second order of priority. (If an offeror proposes the use of GFP other than any GFP identified in the ARA, and that proposed GFP provides the offeror an unfair competitive advantage, then FAR 45.202 requires rental equivalent be applied to the Cost Factor for evaluation purposes only).

C. Review and Selection Process

a. Categories: Based on the Peer or Scientific Review, proposals will be categorized as Selectable or Not Selectable (see definitions below). The selection of one or more sources for award will be based on the Peer or Scientific Review, as well as importance to agency programs and funding availability.

(1) **Selectable:** Proposals are recommended for acceptance if sufficient funding is available

(2) **Not Selectable:** Even if sufficient funding existed, the proposal should not be funded.

Note: The Government reserves the right to award some, all, or none of proposals. When the Government elects to award only a part of a proposal, the selected part may be categorized as Selectable, though the proposal as a whole may not merit such a categorization.

b. No other criteria will be used.

c. Prior to award of a potentially successful offer, the Agreement Officer will make a determination regarding price reasonableness.

10. Award Administration Information

A. Award Notices: Offerors will be notified whether their proposal is recommended for award on or about 30 working days from date of proposal submission. The notification is not to be construed to mean the award is

assured, as availability of funds and successful negotiations are prerequisites to any award.

B. Administrative and National Policy Requirements: Refer to the ARA.

C. Reporting: For reporting requirements and frequency, refer to Section 2.

11. Agency Contact for this Call

Address questions to: AFRL.RS.RocketCargo@us.af.mil