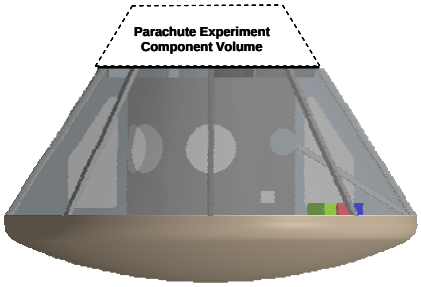
REQUEST FOR INFORMATION
NASA Parachute Experiment

This is a National Aeronautics and Space Administration (NASA) Langley Research Center (LaRC) Request For Information (RFI). It is emphasized that the requested information is for preliminary planning purposes only and does not constitute a commitment, implied or otherwise, that NASA will solicit for such a procurement in the future. The Government is not responsible for any costs incurred in furnishing this information.

The National Aeronautics and Space Administration (NASA) will be conducting a flight test of an alternate launch abort system designed for Orion, the manned spacecraft that will succeed the Space Shuttle. The test vehicle will be launched from NASA's Wallops Test Range on the east coast of Virginia in September 2008. The purpose of this test is to demonstrate the alternate system in a pad-abort scenario, propelling the crew module up and away from the launch site (as if escaping a hazardous condition) and providing a flight environment suitable for deployment of recovery parachutes. An opportunity exists to investigate an alternate parachute deployment concept for the *Orion* Crew Module (CM) Landing and Recovery System (LRS). The experiment will adapt and demonstrate the parachute deployment concept used on the Space Shuttle Solid Rocket Booster to splashdown the flight test vehicle in the Atlantic Ocean. The flight test vehicle is an 18,000-pound mass and inertial boilerplate simulator of the Orion CM. The experiment hardware will occupy the volume defined by the Forward Bay Cover (FBC) shown in the figure at right. In this concept, two mortared drogue parachutes will be deployed at approximately 4,000 feet of altitude and at a velocity of 100-200 feet per second to decelerate and stabilize the CM BP. Drogue deployment will occur with the CM BP heatshield oriented in the direction of the positive velocity vector and within the pitch and yaw rate envelopes of ±40 deg from the flight path and roll rates of ± 40 deg/sec. The drogues will be deployed through openings in the FBC. After deceleration and stabilization, the FBC will be released from the CM BP and pulled free of the CM BP by the drogue parachutes. Three main parachute deployment bags will be fixed to the inner mold line of the FBC. After FBC release, the drogues will pull the FBC with the main parachute deployment bags away from the CM BP, allowing synchronous extraction and deployment of the main parachutes. Steady-state descent rate should approximate that of the Orion CM. The main parachute risers, confluence fitting, and bridle rigging will all be contained within the FBC volume.



Orion Crew Module Boiler Plate (CM BP)
Flight Test Vehicle

Interested parties must have experience with mortar-deployed parachute systems and packaging and deployment of large clustered cargo/aerospace parachutes that have successful heritage (similar design/s with at least a 95% success rate throughout its operational history [10 deployments minimum preferred]).

Requirements for the development of the parachute experiment may include the following:

1. At least one ground-based extraction test of the parachute system to verify proper rigging.
2. To increase the chance of a successful experiment demonstration, the supplier may be required to conduct at least two air drop tests that would demonstrate correct operation of the critical deployment sequences. A drop test could consist of a simple pallet and only one drogue device and one main parachute and some facsimile of the FBC. Drop test hardware can be reused if proven to be flight-worthy.
3. Delivery of the Parachute Experiment Pallet and representative FBC that can be interfaced to the upper deck of the CM BP.

Use of off-the-shelf hardware wherever possible is highly desirable in order to keep cost and schedule risk low. It is anticipated that the achievable steady-state descent rate will be higher than that of the Orion CM due to the use of commercially available parachutes that, while clusterable, may have lower drag area than the Orion CM main parachutes. It is anticipated that the supplier will be required to submit a mechanical interface engineering report that describes the optimum method for mounting the Parachute Experiment pallet in the flight test vehicle and a installation and check out report that is tailored for the flight test vehicle.

It is anticipated that the requirements would include delivery of the Parachute Experiment Pallet to Wallops Flight Facility, consisting of one dual-drogue flight system, main parachute systems, rigging, releasable forward bay cover and electrical interfaces by mid-August, 2008.

Interested parties should respond with the following information:

1. General Description
    a. Physically describe the device or device concept providing diagrams/photographs if available, to include mass and volume.
    b. Describe device operation (e.g., how the device is packaged and deployed.
2. Flight or Technology Heritage/Qualification
    a. Describe company relevant experience to include experience with drag devices in the size range described above.

b. Describe the extent to which existing proven commercial technology can be leveraged to minimize technical and schedule risk.

c. Describe any new technologies to be employed on this effort, and any modifications to existing technology, necessary to meet the SOW requirements. Describe risks associated with incorporating the new or modified technology and how the risks can be minimized.

d. Briefly describe any other issues or considerations that the Government should be aware of for employment of a drag device in this application.

3. Test and Inspection Program
   a. With regard to Requirement 2, above, Submit a brief discussion of what evidence could be offered to demonstrate that the drag device will meet the success rate requirements? Are analytical techniques sufficient in lieu of air drop tests?
   b. For any field testing, describe in some detail the conditions of the test, the test objectives, and any results.
   c. Submit a sample of existing manufacturing, inspection and test, and acceptance plans to control this type of work, and list any current International Standards Organization (ISO) certifications or equivalent.
   d. Describe whether the device is qualified for flight and if so, describe the qualification program including environments used (e.g., against a MIL spec. or other).
   e. Plans for any air drop tests of drag devices must be presented to the NASA Langley Research Center Airworthiness Safety Review Board for approval. Submit a outline of a sample safety plan that would control these flight tests.
4. Costs
   a. If the device has undergone a flight qualification (or has the capability to undergo one as it is currently designed), please provide Rough Order of Magnitude (ROM) costs to deliver flight devices.
   b. If the device is a commercially available, please provide an “Off-the-Shelf” procurement estimate for your device.
   c. If the responder must incorporate new technologies or modifications to existing technologies, provide a ROM for any development plans and associated costs.
5. Delivery
   a. Provide an estimated delivery timeframe.

b. What are the major risks to meeting the delivery - how can they be overcome?

c. Briefly discuss the merits of the supplier providing the forward bay cover with all interfaces and release mechanisms versus being a Government Furnished Item.

6. Procurement Strategy

a. NASA intends to issue the requirements as commercial solicitations under the authority of FAR part 12 and FAR 13.5, Test Program for Certain Commercial Items. Indicate whether this solicitation type is appropriate.

If additional information is required to respond to this RFI, please contact the point of contact listed below. Such information may be International Traffic in Arms Regulations (ITAR) or other controlled information, and if so determined the information will not be available via the internet in accordance with NASA LaRC Internet Publishing Content Guidelines and Export Controlled Regulations. If this information is controlled, you may be required to provide evidence of registration with the Department of State, Directorate of Defense Trade Controls. You would be required to provide a copy of your registration letter received from the Department of State or your PM/DTC Code. Additionally you would be required to provide the name and contact address of the Empowered Official as defined in Part 120.25 of the International Traffic in Arms Regulations (ITAR) (22 CFR 120-130) who is authorized to receive and assume responsibility for the ITAR controlled information.

Limit your responses to 15 pages or less not including diagrams, pictures, or figures. Existing documents that describe suitable existing products or proposed products are acceptable as Attachments to your response; please limit the total attachment volume to less than 30 pages. Responses that can stand on their own without further explanation are expected. However, if NASA has specific questions, please provide your contact information so we can contact you.

Response requested by 4:30 p.m. EST November 27, 2007

Interested firms should submit RFI responses and any routine communications concerning this notice to Mr. Daniel E. Yuchnovicz at daniel.e.yuchnovicz@nasa.gov and Mr. Timothy P. Cannella at timothy.p.cannella@nasa.gov.

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