REQUEST FOR INFORMATION
NASA MAX LAUNCH ABORT SYSTEM
VEHICLE REORIENTATION DRAG DEVICE

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 design for the Orion Crew Module (CM), the manned spacecraft that will succeed the Space Shuttle. The 32,000-pound mass flight test vehicle is a CM mass and inertial simulator enclosed in an ogive aerodynamic fairing that is 18 feet in diameter and 18 feet in length, and will be launched from NASA's Wallops Test Range on the east coast of Virginia in September 2008. The purpose of this flight test is to demonstrate the alternate launch abort system in a pad-abort scenario, propelling the flight test vehicle up and away from the launch site (as if escaping a hazardous condition) and providing a flight environment suitable for deployment of recovery parachutes from the CM.

A critical performance requirement for the project is a vehicle maneuver following motor burnout and near apogee (6000 feet altitude and 290 feet per second velocity) that would reorient the vehicle angle of attack approximately 180 degrees, turning the ascent-phase trailing edge toward the positive velocity vector. This maneuver will position the vehicle for release of the CM from the fairing so that an operational CM could deploy parachutes and safely land. The vehicle reorientation maneuver will be executed by the deployment of drag devices, currently envisioned as dual drogue parachutes, from near the nose of the vehicle. A preliminary analysis indicates that an equivalent drag area (Cd*S) of approximately 258 square feet is required to reorient and stabilize the flight test vehicle for release of the CM from the fairing by an altitude of 4000 feet. The drag devices would notionally be mortar-deployed from two areas on the vehicle located approximately 5 feet from the nosetip, clocked 90 degrees apart. The drag device deployment vector would be normal to the ogive outer mold line of the fairing and therefore would be slightly forward "into the wind" on a nominal trajectory. Trajectory dispersions at the deployment point are being investigated. Riser line lengths should be sufficient to allow proper inflation and operation of the drag devices at or near their rated drag level. The portion of riser and bridle that contacts the fairing will need to be investigated for selection of materials or methods that minimizes structural damage to the fairing and to the risers during the orientation maneuver. The fairing material is made of a sandwich shell construction consisting of E-glass fiber facesheets with vinyl ester resin over a structural foam core. The drag devices may require at least one reefing stage to

keep initial opening loads below the steady-state loads. A permanent reefing stage may be acceptable in order to meet the drag area requirement with a commercially available drag device. A three point bridle or other design that assists with the stabilization of the flight test vehicle will be required.

Interested parties must have experience with mortar-deployed parachute systems 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 reorientation system may include the following:

1. Mortar initiation system redundancy.
2. Drag device redundancy, such that the reorientation maneuver can be accomplished according to specification with one drogue if the other fails to properly inflate.
3. A reliability analysis of the system.
4. At least one ground test of mortar deployment.
5. At least one ground-based extraction test of the parachute system to verify proper rigging.

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 supplier will be required to submit a mechanical interface engineering report that describes the optimum method for mounting the drag devices 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 consistent of one dual-drogue flight system plus a spare drogue/mortar assembly, required four to six months after award.

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 experience with the mechanical interfacing of a drag device in a similar or non-standard application.

e. Describe methods to minimizes structural damage to the fairing and to the risers during the orientation maneuver.

f. 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. What test program or evidence could be offered to demonstrate that the drag device will meet the success rate requirements?

   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).

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?

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.

Timothy P. Cannella
timothy.p.cannella@nasa.gov
NASA Langley Research Center
9A Langley Blvd, M/S 126
Hampton, VA 23681-2199
Phone: 757-864-5028

NASA DISCLAIMER

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 Government desires that the information provided be furnished with unlimited rights to the maximum extent possible.