

SAMPLE TASK

Background:

NASA Ames is developing a proposal for a Science Mission Directorate New Frontiers Announcement of Opportunity for a comet surface sample return mission. The mission involves sending a probe to a comet, collecting a sample of 500cc or more from the surface, and returning the sample to Earth. A key element of the proposal for the Ames team will be design of the entry system for the sample return vehicle (SRV). The SRV design will require thorough definition of the aerothermal environment that the vehicle will experience throughout atmospheric entry upon return to Earth, as well as the thermal response of the thermal protection system (TPS) materials to that environment. The required analysis efforts encompass both the flight environment and ground test environment, where the materials, and other elements of the TPS, are tested and certified. This task will require the accurate modeling of the aerothermal environment, with computational fluid dynamics tools, and the TPS material performance, using material response tools. These analyses will inform the selection and sizing of the TPS material, for both the forebody and aftbody. Requirements for Entry, Descent, and Landing (EDL) instrumentation, as well as DFI (Development Flight Instrumentation) opportunities for new nano-based science instruments for atmospheric composition measurements, should be assessed.

The proposal and mission have the following constraints and assumptions:

- The SRV element of the mission will have a civil servant Project Manager, Lead Systems Engineer and Lead Safety and Mission Assurance (SMA) Engineer. All other SRV project support is to be provided by the contractor including the Deputy Project Manager role.
- The SRV is to be built and tested in-house at NASA Ames Research Center.
- The total mission cost not including launch vehicle may not exceed \$750M.
- Only one new technology in the design of the SRV will be accommodated.
- The project is Category 2, Risk Class B.
- Planetary protection requirements will be met.

Statement of work:

Given the technology, budget, and mission constraints specified, in order to help NASA Ames develop a winning proposal, it is requested that the Offeror deliver the following:

- A list of all additional assumptions made (including rationale for assumptions), as the task description may not contain all the information needed to plan for a successful sample return phase of the mission
- The top 3-5 potential technology constraints to achieving success of the sample return phase of the mission and explain their importance
- The top 3-5 technical and programmatic risks and the approach for eliminating or mitigating those risks
- The list and description of feasibility studies recommended to support a successful proposal

- A staffing plan for the full SRV development effort through mission closeout ~~launch~~, which addresses the complexity of the task and accommodates the requirement that the Project Manager Lead Systems Engineer and Lead SMA engineer are roles that will be filled by civil servants. Only the following elements of a staffing plan are required: (a) positions required, (b) definition of each position including responsibilities, (c) level of skill/experience required for each staff position identified and (d) the level of effort for each position per each phase of the mission where the position is required, for all phases from the beginning of A through the end of F as defined in NPR 7120.5E