

TECHNICAL SAMPLE TASK

The format below is similar to a Space Technology Division Task Order. Provide *only your approach* to performing the following task, rather than providing the specific requested deliverables below.

TASK TITLE: Heatshield Design

PERIOD OF PERFORMANCE: 12 months

1. GOALS:

Apply computational tools and diagnostic capabilities to design efficient thermal protection systems for aerospace entry vehicles.

2. GENERAL DESCRIPTION OF REQUIRED SERVICES:

TPS DESIGN FOR MARS ASTROBIOLOGY FIELD LABORATORY

The design of the thermal protection system (TPS) for the Mars Astrobiology Field Laboratory (AFL) entry vehicle will require thorough definition of the aerothermal environment that the vehicle will experience throughout atmospheric entry, as well as the thermal response of the materials to that environment. The required analysis efforts encompass both the flight environment and ground test environment where the materials are tested and certified, most often in high enthalpy arc jets. This task will require the proper modeling of the aerothermal environment with computational fluid dynamics and thermal response tools. The CFD and radiative heating solutions are to be computed using the latest versions of the DPLR flow solver and the NEQAIR radiative transport code respectively. The thermal response modeling will be accomplished with the latest version of FIAT. From these results, the weight, size and characteristics of the TPS are developed, and the impact on overall vehicle performance is assessed.

DELIVERABLE: Perform trade studies and the design of the heatshield for one configuration of the AFL.

DELIVERABLE: Identify requirements for advanced materials capabilities.

3. GOVERNMENT-FURNISHED EQUIPMENT AND SERVICES:

Ames Research Center will furnish office space and equipment, computer resources, laboratory equipment and laboratory space for the direct performance of this task. The major experimental facilities involved in this work are the Ames Research Center Arc Jet Complex and the range complex. A collection of laboratories is also dedicated to the development of thermal protection materials. The computational resources include local terminals, personal computers, high performance workstations, and licenses for commercial software and use of Government "off-the-shelf" software. Access to these facilities will be provided as necessary and will be shared with other NASA research programs requiring access. Refer to attachment J.1 (a) 3.

4. GENERAL DELIVERABLES TASK IMPLEMENTATION:

The following deliverables are expected from the task:

<u>Deliverable</u>	<u>Delivery Required</u>
<ul style="list-style-type: none">Monthly status reports (including Quarterly Objectives to be included in every 3rd monthly) will be required to track progress. These reports are to be brief, written reports stating "progress to date," covering the calendar month and to be delivered by the sixth (6th) of the following month. In addition, the monthly reports will detail any questions or difficulties encountered during the report period.	5 working days after the end of each month.
<ul style="list-style-type: none">Quarterly Objectives shall be proposed and negotiated with Task Requester and agreement shall be reached every 3rd month.	5 working days after the end of each quarter.