ATTACHMENT J-1

STATEMENT OF WORK
FOR
MARSHALL SPACE FLIGHT CENTER (MSFC)
MSFC ADVANCED CONCEPTS BRANCH (ED04) EXPLORATION MISSION ANALYSIS AND SUPPORT

1.0 Description

The Advanced Concepts Branch requires support pursuant to Specialized Engineering and Project Support (SEPS) Category III, Specialized Program Planning, Analysis and Support, under the following technical tasks:

871-2 Concept Development and Requirements Analysis – Services requires under this SIN involve abstract or concept studies and analysis, requirements definition, preliminary planning, evaluation of alternative technical approaches and performance specifications of space exploration transportations systems and mission elements. Tasks shall include, but are not limited to requirements analysis, cost-performance trade-off analysis, feasibility analysis, technology analysis and technology conceptual designs.

871-3 System Design, Engineering and Integration – Services under this SIN involve the translation of advanced space exploration system concepts into preliminary design, including engineering plans and specifications, performing risk identification, analysis, mitigation planning and traceability. System component models shall be integrated to produce system models. Tasks shall include, but are not limited to computer-aided system modeling and design, design studies, system and environment modeling and simulation, configuration management, and training.

2.0 Period of Performance

The period of performance shall consist of a one year base period beginning December 27, 2010, and may be extended for two option periods of one year each as program and funding conditions dictate. Initial funding for the tasks will cover the period December 27, 2010 through December 26, 2011. Task scope and durations may be changed subject to project requirements and funding availability.

3.0 Deliverables

Task products shall include analysis tools and output, data summaries, as well as documentation of analysis assumptions, and techniques. Tasks shall be documented through monthly status reports, written task reports and presentation charts suitable for MSFC management and Project reviews. Task deliverables shall include interim and final products. Submission dates shall be defined according to project needs. Task payment shall be made according to the established task budget based on monthly invoices to be submitted in conjunction with the monthly status reports for each task.

4.0 Travel

There is no travel anticipated under this agreement.

5.0 Task Descriptions

5.1 Integrated Mission and System Architecture Definition and Analysis:

The Contractor shall perform integrated mission and vehicle preliminary design analyses for space exploration transportation systems related to the National Vision for Space Exploration. The contractor shall support Advanced Concepts design studies of lunar and Mars transportation systems, performing vehicle performance analysis, transportation architecture trade studies, requirements definition and integrated mission and system analyses for human lunar and Mars missions. Mission analysis tasks shall include in-space trajectory analysis, mission profile definition and analysis of in-space environments. Vehicle performance analysis tasks shall include system trade studies, propulsion system trades for chemical and nuclear thermal propulsion systems as well as other advanced propulsion technologies applicable to exploration missions. The contractor shall develop or modify existing analysis tools as required to perform the analyses. The Advanced Concepts Office (ACO) shall approve analysis tools and processes. The contractor shall provide informal inputs directly to the study monitor (these include study results and products suitable for presentation to MSFC and NASA management as well as appropriate data to allow detailed review and documentation of study results).

5.2 Space Transportation Vehicle Performance Capabilities

The contractor shall develop space transportation performance and sizing tools suitable for conducting parametric and sensitivity studies of a wide range of space transportation stages including Earth-to-orbit stages. The contractor shall develop parametric analysis tools based on the Computer Optimized Performance Analysis (COPA) program used by the Advanced Concepts Branch. The tool shall include capabilities to perform parametric and sensitivity studies of mission design, vehicle stage sizing, propulsion system options, and mission payload parameters. The final product shall be the delivery of the completed computer analysis tool and associated program user documentation. Also, the contractor shall have the ability to use the Program to Optimize Simulated Trajectories (POST) in support of system design and development of space transportation vehicles.

5.3 Qualifications

Senior Level Engineer:

- Bachelors degree in engineering required, advanced degree preferred.
- 5 - 10 years applicable experience related to space transportation system preliminary design and performance analysis

- 5 - 10 years applicable experience related to orbit mechanics, spacecraft trajectory analysis and spacecraft propulsion systems

- Expertise and demonstrated competence in the generation of technical presentations and documentation

Business Specialist:

Performs all labor efforts identified as business and finance in nature, including but not limited to project control, finance and accounting, project planning and scheduling, and cost estimating.

Performs complex evaluation of existing procedures, processes, techniques, models, and/or systems related to management problems or contractual issues that would require a report, and recommends solutions.

Principal duties may include, but are not limited to, preparing work breakdown structures, charts, tables, graphs, and diagrams to assist in analyzing problems. Provides daily supervision and direction to administrative staff.

6.0 Data Deliverables

The contractor shall report and document this work and fulfill the requirements of associated Data Requirement Descriptions (DRD's) as outlined in Data Procurement Document (DPD) 1385 (Attachment J-2). The contractor shall determine the data restriction that applies to each data deliverable and mark or transmit the data restriction in accordance with section 2.3.3 of the Data Procurement Document.

The contractor shall prepare and submit a Monthly Status Report in accordance with DRD 1160MA-001.

The contractor shall report mishaps and safety statistics to the MSFC Industrial Safety Office in accordance with DRD 1385SA-001. The contractor shall submit direct to the NASA Incident Reporting Information System (IRIS) or shall use the forms listed in section 15.4 of DRD 1385SA-001 or electronic equivalent to report mishaps and related information required to produce the safety metrics.