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TASK SPECIFIC STATEMENT OF WORK

SYSTEMS ENGINEERING/TECHNICAL ASSISTANCE (SE/TA) SUPPORT FOR

MINOTAUR—COSMIC LAUNCH

26 March 2004

PREPARED BY

SMC Det 12 / RPS

ROCKET SYSTEM LAUNCH PROGRAM (RSLP)

SPACE AND MISSILE SYSTEMS CENTER

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This SOW constists of 5 pages including the cover

0045-02 Revision

1. SCOPE AND OBJECTIVE

1.1 Scope: This statement of work (SOW) delineates the tasks required to provide Systems Engineering and Technical Assistance (SE/TA) support for the Minotaur launch of the Constellation Observing System for Meterological, Ionosphere and Climate (COSMIC) Program. This support consists of planning, analysis, trade studies, problem resolution, tests, and associated system engineering support tasks necessary for mission planning, integration of payload/satellites with launch vehicle, operations of launch vehicle systems and technology.

1.2 Objective: The objective of the Minotaur—COSMIC launch is to place the COSMIC payload consisting of six micro satellites into Low Earth Orbit (LEO). Each satellite will be placed into insertion orbit at 72 degrees with a minimum insertion apse of 475Km and a 475-600Km maximum non-insertion aspe and in such a manner to establish 6 orbital planes.

2. GENERAL BACKGROUND

2.1 COSMIC is sponosored by the Office of Naval Research (ONR) and was ranked 8th on the 1999 Space Experiments Review Board (SERB) list. This constellation of six satellites will make use of recent developments in remote sensing, communications technology, and computing to solve some of the most important geo-scientific issues today. Each spacecraft will carry three science payloads for weather and space weather research and prediction, climate monitoring, and geodesy. These payloads are 1) GPS occultation receiver 2) Tiny Ionospheric Photometer (TIP) and 3) Tri Band Beacon Transmitters (TBB). The COSMIC system includes the LEO satellites, ground data reception and spacecraft control stations, data analysis centers and the data communications networks.

2.2 Because of the scientific and educational merits of COSMIC, the National Science Council (NSC) of Taiwan has committed approximately $80 million for the project. Other COSMIC partners include the University Corporation for Atmospheric Research (UCAR), Taiwan's National Space Program Office (NSPO), the Jet Propulsion Laboratory (JPL), the Naval Research Laboratory (NRL), the University of Texas, the U.S. National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), the National Oceanographic and Atmospheric Agency (NOAA), the Office of Naval Research (ONR), and the United States Air Force.

3. CONTRACTOR TASKS

3.1 The individual items in paragraph 3.3, General Work Description, apply to the Minotaur—COSMIC Launch. The basic SOW may cover additional work.

3.2 Additional, Revised, and/or Future Work

3.2.1 The programs and projects primarily use assets from the RSLP inventory. These programs and projects will change annually and will be reflected in future contractual documents.

3.2.2 The nature of the individual programs and projects is directed by Congress, DOD priorities, or R&D accomplishments. Through negotiations, effort can be modified as necessary to reflect new or revised (within scope) R&D projects and objectives.

3.3 General Work Description

3.3.1 Review contractor activities, in-plant practices and procedures, plans, specifications, designs, analyses, drawings, test procedures, test activities, reports and other program documentation to evaluate compliance with technical guidelines and requirements.

3.3.2 Participate in a technical support role, at technical meetings, program status reviews, design reviews, configuration audits, progress report meetings, readiness reviews, pre-ship reviews, and other meetings having significant technical content. Assist in establishing and conducting technical working groups and tests. Provide technical support at Air Force meetings and/or briefings with higher headquarters and DOD or outside agencies.

3.3.3 Assist in review of contractor technical performance. Assess contractor compliance in terms of deliverables and end items, including Contract Data Requirements List items.

3.3.4 Provide technical advice on the establishment and maintenance of program schedules. Participate in the development, preparation, integration and evaluation of system element segment milestones schedules. Analyze and assess schedule data for conformance with requirements and coordinate the progress, changes, or slips with the program office.

3.3.5 Perform independent analyses and mission risk assessments to verify and validate contractor designs, analysis and reports.

3.3.5.1 Update and maintain test bed and other tools to incorporate changes in launch vehicle flight computer, software or other components that affect the capability to perform independent verification of flight software.

3.3.6 Recommend design, process, or procedural changes as required to mitigate mission risk.

3.3.7 Support requests for mission feasibility assessments, vehicle performance evaluations, site selection evaluations and launch processing flows.

3.3.8 Perform analyses and trade studies to define mission requirements, support mission planning, and to evaluate launch vehicle configuration. Support the integration of technical requirements. Evaluate and analyze the resolution of conflicting technical requirements at the system and subsystem level. Review and evaluate system compatibility of technical changes.

3.3.9 Review and observe booster and payload integration activities to ensure compatibility between the payload and launch vehicle including electrical interfaces, electromagnetic interference effects, mechanical/envelope interfaces, support equipment requirements, thermal effects, dynamic loads and structural margins, and payload environments. Support interface control documentation and integrated test activities.

3.3.10 Perform trajectory analyses, stability, and control analyses, mass properties analyses, post-boost deployment performance analyses, and modal analyses to support guidance and controls. Conduct break-up analyses and hazards analyses to support Range Safety requirements. Aid in pre-flight qualification of on-board software via computer simulation. Support pre-flight Range Universal Documentation System and safety documentation generation.

3.3.11 Support post-flight analyses and mishap/anomaly investigations and assist in determining root cause of failure(s). Develop corrective action and solutions to mitigate recurrence.

3.3.12 Support the development and production of new or modified launch vehicles, support equipment, and facilities.

3.3.13 Support test and evaluation activities.

3.3.14 Provide logistics support to Government assets including, but not limited to, Minuteman and Peacekeeper motors and components.

3.3.15 Support inspection, nondestructive testing, and refurbishment activities to ensure excess ICBM assets are flight worthy.

3.3.16 Support booster and launch vehicle processing including inspection and nondestructive testing. Develop and maintain procedures and processing documentation, design and develop support equipment, and assist in associated depot activities. Provide for field activities as requested.

3.3.17 Support the establishment of requirements and procedures for interface control. Perform reviews, studies, and analyses of the interfaces between systems segments and between major items within each segment to assure that systems integration efforts properly encompass all system elements. Evaluate the soundness of contractor systems integration analyses, plans and activities. Review, analyze and assure thorough definition of the interfaces between equipment and facilities including tracking telemetry and command systems, existing launch base facilities and equipment, and user facilities and equipment.

3.3.18 Develop facility and transportation and handling equipment requirements for use of excess ICBM assets. Support the design, test, and checkout of new and modified equipment and facilities. Support facility utilization, acquisition, physical security, and modification activities.

3.3.19 Ensure that the safety designed into systems is not degraded by the repair methods, procedures or changes initiated during work processes associated with this contract.

3.3.20 Prepare mission requirements documents and other documentation in support of procurement actions as identified by the PCO.

3.3.21 Support technical, schedule production, and cost requirements for program planning and control. Provide technical, schedule production, and cost support in the evaluation of contractor proposals as well as the development and evaluation of SOOs/SOWs, technical briefings, documentation, and visual aids.

3.3.22 Upon Government approval, procure items not available from Base Supply to support refurbishment activities. Identify future shortfalls of components, subsystems, and support equipment needed to refurbish or use stored ballistic missile assets. Develop preliminary design concepts and assist in the reprocurement.

3.3.23 Provide support for range documentation preparation, mission integration actiivties with the test range, non-range mission assets. Provide support as requested for sensor integration studies and analysis.

4 CONTRACTOR DATA REQUIREMENTS LIST (CDRL)

4.1 Report subtitles shall be determined by need. Contractor format is acceptable. Data shall be delivered by paper/electronically as required. Distribution of CDRL item A001 to the government OPR is as follows: one to SMC/TEBL and one letter of transmittal to

SMC/TEKB. Distribution of CDRL item B001 to the government OPR is as follows: one to SMC/TEBL, SMC/TEKB, and SMC/TEPB.

5 ADDITIONAL WORK REQUIREMENTS

5.1 The Basic SOW paragraphs for safety requirements, government furnished property, travel and environmental compliance will apply for this tasking. In addition, specific travel requirements for Minotaur—COSMIC may include, but are not limited to, San Bernardino CA, Hill AFB UT, Vandenberg AFB CA, Kirtland AFB, NM and Chandler, AZ.