

National Aeronautics and Space Administration
Langley Research Center
100 NASA Road
Hampton, VA 23681-2199



July 1, 2013

Reply to Attn of:

12

TO: 12/Research and Development Contracting Branch, Office of Procurement
Attn: C. Lynn Jenkins

FROM: 431/Walter E. Bruce, Structural and Thermal Systems Branch, Engineering
Directorate

SUBJECT: Justification for Exception to the Fair Opportunity Process (JEFOP) for
The Boeing Company, Estimated Value \$775K – NNL10AA05B

In accordance with FAR 16.505, the following information is provided to support this justification:

I. Recommendation

NASA Langley Research Center (LaRC) intends to award a task order directly to Boeing under the existing Structures, Materials, Aerodynamics, Aerothermodynamics, and Acoustics Research and Technology (SMAAART) contract. The purpose of this task order is to ground test Flexible Thermal Protection System (FTPS) coupons in flight relevant conditions at Boeing's Large Core Arc Tunnel (LCAT) arc jet test facility. This proposed task order work would be in conjunction with a currently funded test effort being conducted at the LCAT through SMAAART Contract NNL10AA05B, Task Order NNL11AD16T, entitled "Boeing LCAT Arc-Jet Test in Support of Flexible TPS Evaluation and Development." The current established test series is a basis for the critical advancement of the next generations of FTPS development. The testing described by this task will augment this crucial advancement by building upon the database of results already obtained. Further testing is needed to compare more advanced materials and layups with previously tested coupons and to test over an extended heat flux and pressure range, simulating harsher atmospheric reentry flight environments.

Boeing is the sole source capable of performing the required effort because it is the only contractor capable of providing relevant heating, pressure, and shear for the required range of test conditions; the only source facility that can meet relevant flight conditions for heat fluxes greater than 25W/cm² and greater than 4kPa pressure; and the only contractor with readily available trajectory simulation capability over the required range of Hypersonic Inflatable Aerodynamic Decelerator (HIAD) FTPS testing.

Purchase Request (PR) 4200476031 has been generated for this proposed task order and includes a Total Estimated Value of \$775K and a Total Committed Amount of \$180K in incremental funding. LaRC plans to utilize the SMAAART contract, which is a multiple award, indefinite delivery/indefinite quantity (IDIQ), cost plus fixed fee (CPFF) contract.

II. Background

The Hypersonic Inflatable Aerodynamic Decelerator (HIAD) Project is a technology development effort investigating the viability and survivability of inflatable aerodynamic decelerators at flight relevant environments for application to future planetary entry spacecraft. In order to evaluate a FTPS, which is the heat shield for the HIAD, the FTPS must be subjected to flight-relevant heating, pressures, and shearing environments experienced during reentry, and show margined performance and survival. In support of the HIAD Project's flexible systems technical development area, the LaRC engineering group is modeling, testing, and verifying modeling of FTPS layups in flight relevant reactive flow environments in order to establish a modeling paradigm and a more effective margin policy for inflatable and rigid reentry systems. Specific NASA provided specimens, (made up of various layup combinations of advanced flexible materials) are modeled and tested in flight relevant conditions for model verification and margin maturation.

This effort builds upon testing already conducted at the LCAT under an MSFC contract NNM08AA01B and subsequently under the Boeing's SMAAART Contract as mentioned previously. Over the past five years, hundreds of FTPS samples have been evaluated at several conditions of development interest, establishing a basis for the critical advancement of the successful flight of the Inflatable Reentry Vehicle Experiment (IRVE)-3 in July 2012 and advancing the development of the next generation of FTPS. Further testing is needed to continue this crucial advancement by building upon the database of results already obtained; to compare more advanced materials and layups with previously tested coupons; and to extend the heat flux and pressure test range, simulating harsher atmospheric reentry flight environments.

III. Nature and/or Description of Required Supplies/Services

This proposed task order is to ground test FTPS coupons in flight relevant conditions at Boeing's LCAT arc jet test facility. The LaRC engineering group has evaluated hundreds of FTPS samples at several conditions at the Boeing LCAT facility. The next step in the evaluation matrix is to test FTPS layups and materials at comparable or harsher simulated atmospheric reentry flight conditions and rigid deployable FTPS layups and materials at much harsher simulated atmospheric reentry flight conditions. The specific test points for this proposed task order are as follows:

- 1) FTPS layups and materials at simulated heat flux entry condition (square pulse or mission profile in stagnation or shear): Heat Flux between ~ 17 and < 50 W/cm², Pressure between ~ 1.7 and ~ 10 kPa
- 2) FTPS layups and materials at simulated heat flux entry condition (square pulse or mission profile in stagnation or shear): Heat Flux ~ 50 W/cm², Pressure ~ 6 kPa

- 3) FTPS layups and materials at simulated heat flux entry condition (square pulse or mission profile in stagnation or shear): Heat Flux $\sim 75\text{W/cm}^2$, Pressure $\sim 10\text{kPa}$
- 4) FTPS layups and materials at simulated heat flux entry condition (square pulse in stagnation): Heat Flux $\sim 130\text{ W/cm}^2$, Pressure between ~ 6 and $\sim 12\text{ kPa}$

IV. Identification of the Exception to Fair Opportunity and Supporting Rationale

FAR 16.505(b)(1)(i) requires the Contracting Officer provide each awardee under a multiple award contract, a fair opportunity to be considered for each order exceeding \$3,000 unless a statutory exception applies. Specifically, the exception that precludes the fair opportunity process for this acquisition is FAR 16.505(b)(2)(i)(B), which states that “Only one awardee is capable of providing the services or supplies at the level of quality required because the service or supplies ordered are unique or highly specialized.”

The HIAD Project continues to investigate the viability and survivability of FTPS at flight relevant environments. In order to evaluate a given FTPS, the FTPS must be subjected to flight-relevant heating, pressures, and shearing environments experienced during reentry, and show margined performance and survival. Over the past several years, the LaRC engineering group has evaluated several potential heating facilities, including the LaRC 8-foot High Temperature Tunnel (8’HTT), the ARC Panel Test Facility (PTF, arc-jet), JSC Test Position 2 (TP2, arc-jet) facility, Wright-Patterson Air Force Base Laser-Hardened Materials Evaluation Laboratory (LHMEL), and the Boeing LCAT arc jet test facility. A cost/benefit analysis was conducted and while each facility has benefits for testing, only the Boeing LCAT facility affords the largest range of potential flight relevant options and reentry test scenarios. The Boeing LCAT facility is the only facility, Government or commercial, that can provide relevant heating, pressure, and shear for the required range of test conditions; it is the only facility that can meet relevant flight conditions for heat fluxes greater than 25W/cm^2 and greater than 4kPa pressure; and Boeing is the only contractor with readily available trajectory simulation capability over the required range of HIAD FTPS testing.

Boeing’s extensive experience with this effort’s configuration design and development is critical to continue the characterization required to meet HIAD FTPS development objectives. Since NASA has invested a substantial amount of money (i.e., over a million dollars to date), time, and effort in the above-mentioned contract with Boeing, and given that the LCAT is the only option for a facility to simulate flight-like conditions needed to progress the FTPS, it is not feasible to award this task order to a different contractor. As such, it is in the Government’s best interest to award this task order to Boeing.

VII. Determination by the Contracting Officer That The Anticipated Cost to the Government Will Be Fair and Reasonable

The CPFF amount for this acquisition will be determined fair and reasonable by the Contracting Officer prior to award of the task order. Actions anticipated to ensure reasonableness will be accomplished using the procedures and criteria contained in the Federal Acquisition Regulation (FAR), NASA FAR Supplement (NFS), and other regulatory documents as applicable.

IX. Other Facts Supporting the Justification

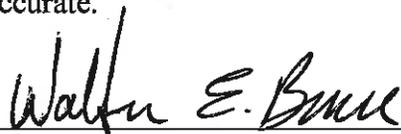
None.

XI. Actions the Agency May Take to Remove or Overcome Any Barriers To Increasing Fair Opportunity Before Any Subsequent Acquisition For the Supplies or Services

NASA may have future requirements that can only be met by Boeing. However, the Contracting Officer will continue to scrutinize all SOWs received to ensure fair opportunity is appropriately given. NASA typically looks for proactive steps that can be taken to eliminate barriers to competition for future requirements and will do so should future requirements arise.

Technical Certification:

I certify that to the best of my knowledge and belief, the data furnished above is complete and accurate.



 Walter E. Bruce
 Lead AST, Heat Transfer
 Technical POC
 4-7024

7-1-2013
 Date

Contracting Officer Certification:

I hereby certify that the above justification is accurate and complete, to the best of my knowledge and belief, and the anticipated cost to the Government will be fair and reasonable.



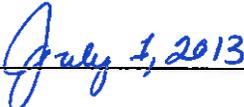
 C. Lynn Jenkins
 Contracting Officer

7-1-13
 Date

Concurrence:



Roberta I. Keeter
Acting Head, Research and Development Contracting
Branch, Office of Procurement



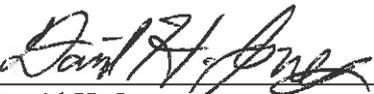
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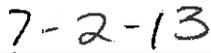
Michael I. Mark
Office of Chief Counsel



Date

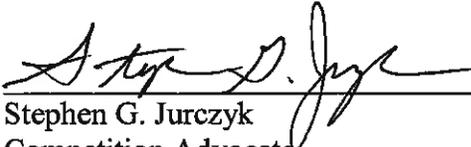


David H. Jones
Acting Procurement Officer

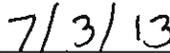


Date

Approval:



Stephen G. Jurczyk
Competition Advocate



Date

cc:
12/OP
30/OCC
12/C. L. Jenkins
431/W. E. Bruce

12/CLJenkins:bt 7/1/13 (43284)