

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GLENN RESEARCH CENTER (GRC)
CLEVELAND, OHIO**

**JUSTIFICATION FOR AN EXCEPTION TO FAIR OPPORTUNITY
PR 4200532814**

I. Description of Requirement

I recommend that GRC issue a task order on a noncompetitive basis to Lockheed Martin (LM) under the Research and Technologies for Aerospace Propulsion Systems (RTAPS) contract Technology Area 2, for a parametric design study to establish the viability of a Turbine Based Combined Cycle (TBCC) Propulsion system consisting of integrating several combinations of near-term turbine engine solutions and a very low Mach ignition Dual Mode RamJet (DMRJ) in the SR-72 vehicle concept. The SR-72 is a hypersonic vehicle concept that has been developed through a series of competitively awarded Department of Defense (DoD) contracts to Lockheed Martin. Defense Advanced Research Projects Agency (DARPA) will use the study results to determine their path forward on a major SR-72 development program. NASA will use the results of this study to develop its own TBCC vision vehicle for civilian applications for point-to-point transport and eventually Space Access.

The estimated value of this procurement is \$ 1,000,000.00 and it is anticipated that a firm fixed price will be negotiated with LM under Contract NNC10BA08B, Task Order NNC15TA03T.

II. Regulatory Basis for Exception to Fair Opportunity

The regulatory exception permitting other than fair opportunity is 10 USC 2304 c (b) (2), FAR 16.505(b)(2)(i)(B).

Only the aforementioned contractor is capable of providing the necessary supplies or services at the level of quality required because the supplies or services are unique or highly specialized.

III. Rational in Support of Statutory Authority

LM is the only U.S. Company that has been actively developing an air-breathing hypersonic vehicle that utilizes a TBCC propulsion system namely the SR-72. They accomplished this through IRAD and a series of competitively selected DoD contracts throughout the past decade. As the direct result of this government and IRAD investment, the SR-72 concept is a high fidelity model that would be both cost and schedule prohibited for NASA to duplicate. LM has the aerothermal flight database, a highly developed integrated inlet system, a high speed DMRJ test data from the FALCON program, and most importantly an integrated flight model with outer mold lines defined. As such LM is the only U.S. Company that has a high fidelity vehicle design to conduct a parametric study of this nature for NASA.

The contracts of record where LM was competitively selected to develop the SR-72 vehicle and the TBCC propulsion system concept are: i) 2006-2009 DARPA FALCON contract # HR0011-04-9-0010 sub task for \$40M, ii) 2009-2010 DARPA/AFRL Mode Transition Demonstration (MoTr) Program under AFRL VAATE Task 2 contract # FA8650-09-D-2926 0002 for \$8.4 M, and iii) 2012-2013 AFRL Air Vehicle Integration and Technology Research (AVIATR) Task Order 0031 contract # FA8650-08-D-3858-0031 for \$0.7M.

In all of these previous government design studies, LM was directed to use advanced high speed turbine engines that were either under development or were just conceptual designs. In other words, the advanced turbines were non-existent. For this study, in an apples-to-apples comparison, NASA will have LM utilize the SR-72 models and design methods that were developed from the previous studies but this time they will use Commercial off the shelf (COTS) turbines that are already deployed in military aircraft along with a low Mach ignition DMRJ. Therefore, based on the above, LM is the only U.S. Company that can effectively and economically provide NASA with the data and knowledge being requested in this task order.

IV. Determination of Fair and Reasonable Cost

The Contractor will be required to submit adequate cost support data, and an analysis will be performed to determine the costs as fair and reasonable.

V. Actions to Remove or Overcome Barriers to Competition

The results and understanding from this study will be protected under export control but will be available to all U.S. industry and other government agencies. Dissemination will be accomplished via exported controlled reports and conference proceedings such as Joint Army Navy NASA Air Force (JANNAF) symposiums, thus providing others in this small community the opportunity to benefit from the knowledge that was generated by this investment of the U.S. government.