

JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION (JOFOC)
(In accordance with Federal Acquisition Regulation (FAR) 6.3 – Other than Full and Open Competition)

1. This document is a justification for other than full and open competition prepared by NASA's Goddard Space Flight Center (NASA's GSFC):

GSFC has a requirement to demonstrate optical communications relay services between geosynchronous orbit and Earth over an extended period, and gain knowledge and experience that will enable NASA to design, procure, and operate cost-effective future optical communications systems and relay networks. To support this effort, the Government requires a Space Digital Processor Assembly. SEAKR Engineering, Inc. (SEAKR) of Centennial, Colorado, a small business, is the only responsible source that can satisfy Agency requirements. This document justifies the determination for using other than full and open competition.

2. The nature and/or description of the action being approved:

GSFC is managing the Laser Communications Relay Demonstration (LCRD) for NASA's Office of the Chief Technologist (OCT) and NASA's Space Communications and Navigation Office (SCaN). LCRD leverages technology previously developed for NASA and the Department of Defense (DoD) by Massachusetts Institute of Technology (MIT) Lincoln Laboratory (MIT/LL). MIT/LL is a Federally Funded Research and Development Center (FFRDC), created in 1951, for the purposes of applying science and advanced technology, including space communications technology, to address critical problems of national security. GSFC will transfer technology from MIT/LL to NASA that is surrounding the high speed data switching systems developed at MIT/LL over the past decade. GSFC will procure from industry a high speed data switching system that implements the heritage MIT/LL/DoD design. Specifically, the LCRD project will procure unit(s) developed at considerable cost over the years by MIT/LL for DoD.

The LCRD project plans to make use of the existing MIT/LL design, and the previous investment made by the United States (US) Government, to satisfy the High Speed Data Switching requirements on the LCRD project. This High Speed Digital Switching system design is required to meet the LCRD performance specifications and to ensure interoperability across the US Government.

3. Description of the supplies or services required, including an estimated value:

GSFC requires a Space Digital Processor Assembly for space-based digital data transfer and/or processing. A high speed data switching system is required in order to facilitate high-speed optical relay communications on orbit during the LCRD mission. SEAKR will provide the labor, materials, and facilities to fabricate, assemble, and test the Space Digital Processor. These resources shall include, but not be limited to, fixtures, test equipment, and procedures specifically intended for the manufacturing, assembly, testing, and delivery of the Space Digital Processor Assembly.

The Government intends to issue a Firm-Fixed-Price contract with a 24-month delivery schedule. The contractor shall construct and test one Engineering Model Space Digital Processor and one Flight Unit Space Digital Processor. The estimated value of this procurement is \$3,800,000.

4. Statutory authority permitting other than full and open competition:

The statutory authority for this procurement is 10 U.S.C. 2304 (c) (1), Only One Responsible Source.

5. A demonstration that the proposed contractor's unique qualifications or the nature of the acquisition requires use of the authority cited:

The LCRD optical communications platform requires specialized high speed data transfer and switching capabilities. Through its current contract with MIT/LL, SEAKR is an expert in the assembly, alignment, and test of the Space Digital Processor Assembly that performs a high speed data switching function for high speed data interfaces. This expertise will be verified by MIT/LL when it takes delivery of the first Space Digital Processor unit. The Space Digital Processor will be tested at MIT/LL, first by itself, then as part of an integrated data system, under US Air Force leadership for the benefit of the US Government. SEAKR is already uniquely qualified to supply this product to LCRD because of the knowledge gained from MIT/LL in developing its own hardware, firmware, and test procedures, and from learning about the technical challenges of this specific design.

MIT/LL, which has decades of data system experience, is closely involved with SEAKR and directing the design of the SEAKR hardware based on specific requirements needed for their high speed data system. There is a very closely coupled relationship between MIT/LL and SEAKR during the design, fabrication, and test process, and an agreed upon giver-receiver list exists between them. Some of these interdependencies between SEAKR and MIT/LL involve Intellectual Property firmware and software generated by both parties. This Intellectual Property is required to functionally test and operate the designed unit. As design issues are discovered, MIT/LL is feeding design change requests, resolutions, and specifications to SEAKR. SEAKR, in turn, is also feeding such details to MIT/LL. Due to this closely coupled relationship between MIT/LL and SEAKR, and the knowledge transfer resulting from this interaction, SEAKR is in a unique position to react and accommodate specific technology requirements needed for high speed data communications. Utilizing the existing expertise of MIT/LL in high speed data switching is an absolute necessity for ensuring that the Space Digital Processor meets technical performance, schedule, and cost requirements. The only way to do this is to procure the Space Digital Processor from the same contractor with which MIT/LL is working. Using any contractor other than SEAKR would add significant risk to the LCRD project.

Additionally, the LCRD payload will be required to interface with partner data systems during the 2-year LCRD mission. This drives LCRD to implement compatible design

solutions that are in some cases software and hardware implementations proprietary to MIT/LL and its existing corporate partners, such as SEAKR. This approach also leverages development efforts previously funded by NASA and other government agencies. The cost for LCRD to independently develop a compatible Space Digital Processor solution would be tens of millions of dollars, and would not be cost effective for the project. This would result in substantial duplication of costs that are not expected to be received through competition.

The schedule for LCRD project is being directed by the OCT and SCaN Office, based in part on a future use need for the Tracking and Data Relay Satellite System (TDRSS). Any delays to the procurement schedule from using a new contractor (due to facilities upgrades, learning the design, or troubleshooting problems already overcome by MIT/LL's vendor) would delay the LCRD schedule and adversely impact the technology roadmap laid out by OCT and SCaN, which requires that LCRD launch by the end of 2017. If GSFC works with another contractor to get the contractor up to speed on the design, assembly, alignment, and test of the Space Digital Processor designs, there will be essentially no chance of meeting the dates for first unit delivery (late 2014) or second unit delivery (mid-2015), meaning the government would face an unacceptable delay in fulfilling its mission requirements. After these units are delivered, they will be tested and integrated into the LCRD system. The flight unit will be launched into orbit to support a 2-year demonstration mission. It is critical that the LCRD project demonstrates two years of operation prior to the TDRSS future need date.

6. Description of the efforts made to ensure that offers are solicited from as many potential sources as practicable, including whether a notice was or will be publicized as required by Federal Acquisition Regulation (FAR) 5.2:

In accordance with FAR Part 5.2, this procurement was synopsized on February 5, 2013, on NASA's Acquisition Internet Services (NAIS) Business Opportunities web site. The results of the synopsis are included in Section 10 below.

7. A determination by the contracting officer that the anticipated cost to the Government will be fair and reasonable:

The proposed price by SEAKR will be evaluated by the Contracting Officer's Representative and the Contracting Officer to determine if the price is fair and reasonable. The Contracting Officer will obtain the appropriate data on the price at which the same item has previously been developed/acquired by DoD, and determine if the data is adequate for evaluating the reasonableness of the proposed price. Also, the Government will compare the proposed price with the independent Government Estimate.

8. Description of the market research conducted, and the results, or a statement of the reasons market research was not conducted:

Market research was not conducted as LCRD is leveraging technology previously developed for NASA and the DoD by MIT/LL. As previously stated, GSFC will transfer

technology from MIT/LL to NASA that is surrounding the high speed data switching systems developed at MIT/LL over the past decade.

9. Other facts supporting the use of other than full and open competition:

As stated previously, the added costs to LCRD and the Government if another contractor were selected would result in substantial duplication of costs that are not expected to be recovered through competition. The Space Digital Processor was developed through significant time spent, and at a considerable cost to DoD. If GSFC were to use another contractor, these years of knowledge, both in the field of data transfer systems and in the implementation of the Space Digital Processor, would be lost. Many more problems would be expected, each one taking a long time to overcome. GSFC will have to pay for numerous months of extra testing and troubleshooting. Additional non-recurring engineering (NRE) costs will result from choosing a vendor other than SEAKR, and will be crippling to the LCRD budget as LCRD assumes little to no re-design or development NRE costs associated with the Space Digital Processor. Additionally, the risk that the hardware would fail to meet performance requirements would increase greatly, as would the risk of LCRD missing its program milestones.

10. Sources, if any, that expressed an interest, in writing, in the acquisition:

In accordance with the requirements of FAR 5.203(a), a notice of NASA's intent to acquire a Space Digital Processor was published through NAIS to the Electronic Posting System and to the Federal Business Opportunities worldwide Web site on February 5, 2013. During the 15-day response period there were two companies that expressed interest, however, after being provided the Statement of Work, they decided not to submit their capability statements. To date, no companies submitted capability statements for the Space Digital Processor procurement.

11. The actions the Agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required:

Optical communication technology has been on the cusp of wide-spread use for years. The advantage of the technology is very appealing. Spacecraft can achieve much higher data rates, with lower power and lower mass than existing communication systems. However, the design and implementation of an optical communication system is very difficult. Spacecraft designers are extremely hesitant to use new technology for subsystems where heritage hardware exists, such as propulsion, communication, or guidance, navigation and control, because of the decrease in overall mission reliability. Another existing NASA program (Lunar Laser Communications Demonstration (LLCD)) will demonstrate the ability to transmit data over optical communications for short periods of time. However, LLCD will not be demonstrating the capabilities of relaying data between multiple optical links at very high data rates over a long period of time. The LCRD mission has a 2-year lifetime requirement. During those two years, high speed communication will be available almost all the time. Seeing this performance from an optical communication system should be enough to create demand for the hardware from

other missions. With the risk of using the hardware sharply reduced, programs will want to take advantage of the high data rates, low mass, and low power.

In order to satisfy demand, there must be supply. As the technology to support high speed optical communications relay capabilities on-orbit is demonstrated over time, the risk in developing and operating such systems will be demonstrated as reduced risk. As LCRD completes its successful demonstration of the technology, along with the MIT/LL demonstration efforts on LLCD, the industry will more readily be able to satisfy that demand by supplying commercialized optical communications systems.

JOFOC Signature Page for Space Digital Processor
Solicitation # NNG13462250R

TECHNICAL DIRECTORATE: I certify that the facts presented in this justification are accurate and complete.

Kenneth Munkie
Signature

1-22-13
Date

CONTRACTING OFFICER: I certify that this justification is accurate and complete to the best of my knowledge and belief.

Kelly J. Soren
Signature

1-22-13
Date

J PROCUREMENT OFFICER:
(CONCURRENCE)

Thomas S. Bell
Signature

6/14/13
Date

GSFC COMPETITION
ADVOCATE:
(APPROVAL)

Arthur F. O'Connell
Signature

6/21/13
Date