

**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):**

NASA/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 Solar Window Assembly. L-3 SSG Tinsley of Wilmington, Massachusetts, a large 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:**

NASA/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 optical communications technology previously developed for NASA and the Department of Defense (DoD) by the 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. MIT/LL is the only U.S. organization with actual high-speed optical communications in space experience. GSFC will transfer technology, optical systems, and component designs developed at MIT/LL over the past decade from MIT/LL to NASA. GSFC will also procure optical systems and components that implement the heritage NASA/DoD design from industry sources. Specifically, the project will procure the Optical Module subassemblies developed at considerable cost over the past 5 years by MIT/LL for NASA and DoD.

MIT/LL, through their contract with the United States Air Force Electronic Systems Command (USAF/ESC), was directed by the USAF to procure the Optical Module designed jointly for NASA and DoD. This Optical Module was designed for NASA's Lunar Laser Communications Demonstration (LLCD) project and LCRD will fly as part of a hosted payload on a commercial communications satellite. MIT/LL procured from industry sources, on behalf of USAF, the following four (4) subassemblies:

- Optical Assembly
- Inertially Stable Platform
- Gimbal and Latch Assembly
- Solar Window Assembly

To fulfill LCRD requirements, all four subassemblies have to be procured and integrated together to form the NASA/DoD Optical Module. The baseline LCRD architecture reuses the LLCD optical terminals. This Optical Module design is required to meet the LCRD performance specifications

and to ensure interoperability across the United States Government. This procurement is solely for the acquisition of the Solar Window Assembly (SWA) from L-3 SSG Tinsley.

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

NASA/GSFC requires a Solar Window Assembly for a space-qualified optical system. The main component of the Solar Window Assembly is the Solar Window, which acts as a mirror for most wavelengths of light. In doing so, the Solar Window provides significant thermal control for the optical system. A narrow band of infrared wavelengths pass through the Solar Window. This band contains the wavelengths used for communication. L-3 SSG Tinsley will provide all the resources required to fabricate, assemble, align and test the Solar Window Assembly. The vendor will be responsible for all assembly and test procedures. The vendor will deliver the Solar Window Assembly to NASA/GSFC.

The Government intends to issue a Firm-Fixed-Price contract with a ten (10) month delivery schedule. The vendor shall construct two (2) Solar Window Assemblies. The estimated value of this procurement is \$620,000.

**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 difficulty of producing a Solar Window Assembly lies within the assembly, alignment, and test of the hardware. Assembly, alignment and test will be done per vendor procedures. These vendor procedures are currently being developed and refined by L-3 SSG Tinsley in conjunction with MIT/LL. Through its current contract with MIT/LL, L-3 SSG Tinsley is an expert in the assembly, alignment and test of the Solar Window Assembly. This expertise will be verified by MIT/LL when it takes delivery of the SWAs. The Solar Window Assemblies will be tested at MIT/LL, first by themselves, then as part of assembled Optical Modules, under USAF leadership for the benefit of the United States Government. MIT/LL plans to complete testing of the first unit of each of the four subassemblies, and the Optical Module that they create, in late 2013. This is well before LCRD would take delivery of any of its subassemblies. L-3 SSG Tinsley is already uniquely qualified to supply this product to LCRD because of the knowledge gained from MIT/LL in developing its own set of alignment, assembly, and test procedures and from learning about the technical challenges of this specific design. Additionally, once testing of the first units at MIT/LL is complete, L-3 SSG Tinsley will have shown that it can produce a product independently verified as capable of performing both on its own and as part of a complete Optical Module.

MIT/LL is currently working on two units of the Optical Module which were built by MIT/LL – the Qualification Unit and the LLCD Flight unit. In their work with these units, MIT/LL is still encountering technical challenges with its design and the testing of that design, and determining how best to overcome them. As these challenges are overcome, the knowledge is passed directly from

MIT/LL, who has decades of experience, to the current subassembly vendors, making these vendors experts in assembly and test of their respective subassemblies. Utilizing the existing expertise of MIT/LL in optical communications in general, as well as their expertise in their own Optical Module design, is necessary for ensuring that the LCRD Optical Module subassemblies meet technical performance, schedule, and cost requirements. The only way to do this is to procure subassemblies from the same vendors that MIT/LL is working with. Using any vendor other than L-3 SSG Tinsley would add significant risk to the LCRD project.

The schedule for the LCRD project is being directed by 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 vendor (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 vendor to get the vendor up to speed on the assembly, alignment, and test of the Solar Window Assembly, there will be essentially no chance of meeting the delivery date of mid-2014 for both units. This delivery date is required in order to meet the 2017 launch date. Thus, the Government would face unacceptable delay in fulfilling its requirements.

**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, the procurement was synopsized on January 17, 2013 via 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 L-3 SSG Tinsley will be evaluated by the Contracting Officer's Technical 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 sold and determine if the data is adequate for evaluating the reasonableness of L-3 SSG Tinsley's 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 optical communications technology previously developed for NASA and the DoD by MIT/LL. As previously stated, GSFC will transfer technology, optical systems, and component designs developed at MIT/LL over the past decade from MIT/LL to NASA.

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

The added costs to LCRD and the Government if another vendor were selected would result in substantial duplication of costs that are not expected to be recovered through competition. As stated previously, the Optical Module was developed over the last five years at a considerable cost to NASA and the DoD. If the Government were to use another vendor, these years of knowledge, both in the field of optical communication and in the implementation of the Optical Module, would be lost. Many more problems will be expected, each one taking a long time to overcome. GSFC will have to pay for numerous months of extra testing and troubleshooting. Added to the non-recurring engineering that LCRD would have to pay for (such as facilities improvements, and designing and building Ground Support Equipment), the extra cost of using another vendor could be in excess of \$300,000. 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 Solar Window Assembly was published through NAIS to the Electronic Posting System and to the Federal Business Opportunities worldwide Web site on January 17, 2013. During the 15-day response period, there were three (3) companies expressed an interest in the acquisition. However, no company submitted a capability statement for the Solar Window Assembly 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. The LLCDC project will show that the MIT/LL Optical Module design is capable of surviving launch and operating on-orbit. However, the LLCDC Flight unit is only slated to operate intermittently over a short period of time. While this will be a significant step forward, it will likely not be enough to entice other programs to use optical communication as their primary means of communication. The LCRD mission has a two (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. The MIT/LL design has already been commercialized. It was procured in four subassemblies in order to allow a larger number of vendors to participate. NASA/GSFC will utilize a similar action. This sets the stage for industry supplying optical communication hardware. As LLCDC and LCRD show that the technology performs on orbit and performs for a long time, other companies will begin to make the internal investments necessary

for designing, building, and testing their own optical modules. In time, industry will be able to supply a variety of designs from a variety of vendors, and competitive awards for these systems will be the norm.

**JOFOC Signature Page for Solar Window Assembly  
Solicitation # NNG13459946R)**

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

Russell Bodin  
Signature

4/4/13  
Date

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

Ch. M. Reid  
Signature

4/8/13  
Date