

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 an Optical Assembly. ITT Exelis of Rochester, New York, 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 Communication Demonstration (LLCD) Project, which will fly on the LADEE spacecraft. On LCRD, the Optical Module will fly as part of a hosted payload on a commercial communications satellite. MIT/LL procured from industry sources, on behalf of the USAF, the following four (4) subassemblies:

- Optical Assembly
- Inertially Stable Platform
- Gimbal and Latch
- 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 Optical Assembly from ITT Exelis.

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

NASA/GSFC requires an Optical Assembly for a space-qualified optical system. The Optical Assembly is comprised of a tri-wavelength Cassegrain telescope, small optical bench and flexure transition. ITT Exelis will provide the labor, materials, and facilities to fabricate, assemble, align and test the Optical Assemblies. Piece parts will be fabricated per drawings supplied to ITT Exelis by GSFC (via technology transfer from MIT/LL). The vendor will be responsible for all assembly and test procedures. The vendor will deliver the Optical Assembly to the NASA GSFC.

The Government intends to issue a Firm-Fixed-Price contract with a 14-month delivery schedule. The vendor shall construct two Optical Assemblies. The total estimated value of this procurement is \$3,500,000.

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 an Optical 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 ITT Exelis in conjunction with MIT/LL. Through its current contract with MIT/LL, ITT Exelis is an expert in the assembly, alignment and test of the Optical Assembly. As of January 2013, this expertise is being verified by MIT/LL, as they have taken delivery of the first unit. The Optical Assembly is being tested at MIT/LL, first by itself, then as part of an assembled Optical Module, 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 early 2013. This is well before LCRD would take delivery of any of its subassemblies. ITT Exelis 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, ITT Exelis 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 LLCDF 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 an absolute necessity 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 ITT Exelis would add significant risk to the LCRD project.

The schedule for the LCRD project is being directed by the OCT and the 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 a vendor who is unfamiliar with the assembly, alignment, and test of the Optical Assembly, there will be essentially no chance of meeting the dates for first unit delivery (late 2014) or second unit delivery (mid-2015). Those unit delivery dates are required in order to meet the 2017 launch date. Thus, the Government would face an unacceptable delay in fulfilling its requirement.

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 synopsisized 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 ITT Exelis 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 developed/acquired by DoD, and determine if the data is adequate for evaluating the reasonableness of the ITT Exelis' 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 Department of Defense (DoD) by MIT Lincoln Laboratory (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 is estimated to be in excess of \$500,000. 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 an Optical Assembly was published on February 5, 2013, through NAIS to the Electronic Posting System and to the Federal Business Opportunities worldwide Web site with a response date of February 20, 2013. During the 15-day response period, six companies expressed interest, however, after being provided the Statement of Work and Specifications, they decided not to submit their capability statements. To date, no companies submitted capability statements.

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 LLCD project will show that the MIT/LL Optical Module design is capable of surviving launch and operating on-orbit. However, the LLCD 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 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 LLCD 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.

