

**BAA 04-03**  
**Proposer Information Pamphlet (PIP)**

for

**Defense Advanced Research Projects Agency**  
**(DARPA)**

**Optical & RF Combined Link Experiment**  
**(ORCLE)**

POC: G. Duchak, DARPA/ATO

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This BAA will be open for **one (1) year** from the date of its publication in [www.fedbizopps.gov](http://www.fedbizopps.gov) and [www.fedgrants.gov](http://www.fedgrants.gov).

NOTE: Although this BAA will be open for one (1) year from the date of its publication in [www.fedbizopps.gov](http://www.fedbizopps.gov) and [www.fedgrants.gov](http://www.fedgrants.gov), the government anticipates that the majority of funding for this program will be committed during the first selections phase. To be considered for funding during the first selections phase, proposals must be submitted to DARPA no later than **12:00pm local time on 19 December 2003**.

A Proposer's Day Conference will be held on 19 Nov 2003 to discuss the information contained in this PIP and BAA, encourage discussion and teaming, and address any questions proposers may have about this PIP and BAA. Questions and Answers will subsequently be posted to <http://www.darpa.mil/ato/solicit/ORCLE/index.htm> for Proposer review.

NOTE: It is not mandatory to attend the Proposer's Day Conference to respond to this BAA.

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## 1. INTRODUCTION

The Defense Advanced Research Projects Agency's (DARPA) Advanced Technology Office (ATO) is soliciting proposals under this BAA to investigate, prototype, and demonstrate an Air-to-Air-to-Surface hybrid [combined and simultaneous Free Space Optical (FSO) and Radio Frequency (RF)] link and networking concept that has a compact form factor, high availability, and high average data rate under all weather conditions.

Proposals may be submitted in any, all, or any combination thereof, of the following technical topic areas:

- (1) Range and Flight Demonstration Systems Integration
- (2) Technology Maturation
  - (a) Optical Channel Obscuration Mitigation (i.e. transmission through clouds)
  - (b) Common/Combined FSO/RF aperture
  - (c) Compact Optical Beam Steering
  - (d) Hybrid (FSO & RF) Router Technology

NOTE: The principal focus of this BAA will be on the Optical & RF Combined Link Experiment (ORCLE), identified as Technical Topic Area (1) above. However, Proposers may, and are encouraged to, respond to any, all, or any combination thereof, of the Technical Topic Areas noted above as may be appropriate under the circumstances. For purposes of this BAA, Technical Topic Areas (1) and (2) will run concurrently, but research results achieved under each area or subset area are not necessarily co-dependent. Specifically, Technical Topic Area (1) should achieve its objectives independent of the research conducted under Technical Topic Area (2). Technical Topic Area (2) research, however, should result in solutions that can be used as a basis to enhance the effort conducted under Technical Topic Area (1).

### 1.1. APPROACH

This BAA affords proposers the choice of submitting proposals for the award of a Grant, Cooperative Agreement, Technology Investment Agreement, Contract, or Other Transaction for Prototype Agreement, or any other appropriate award instrument. The type of award instrument is subject to negotiations.

### 1.2. PROPOSER'S DAY CONFERENCE

A Proposer's Day Conference will be held on 19 November 2003 at the George Mason University, Arlington Campus Professional Center, Ste 244, 3401 N. Fairfax Drive, Arlington, VA beginning at 8:30am, and anticipating to last until 4:30pm. The purpose of this conference is to discuss the information contained in this PIP and BAA, encourage discussion and teaming, and address any questions proposers may have about this PIP and BAA. Please contact Jennifer Mozie ([Jennifer.Mozie@sra.com](mailto:Jennifer.Mozie@sra.com)) not later than 13 November 2003 if you plan to attend. Please declare your citizenship in the e-mail. Foreign nationals should complete and return a DARPA Foreign National Visitor Request (DARPA Form 60) not later than 14 November 2003 if they wish to attend the conference. The DARPA Form 60 will be sent to you based on declaration of citizenship. The Proposer's Day Conference is voluntary. Attendance is not required to propose to this BAA. This information will also be available through the ORCLE website: <http://www.darpa.mil/ato/solicit/ORCLE/index.htm>.

After the conference, there will be an opportunity to meet individually with G. Duchak. Please contact Jennifer Mozie of SRA Inc., Adroit C4ISR Center ([Jennifer\\_Mozie@sra.com](mailto:Jennifer_Mozie@sra.com), (703)647-1175) or Vic Jaroch of DPM Consulting, Inc. ([vjaroch@snap.org](mailto:vjaroch@snap.org)) (703)967-9435 (contractors providing assistance with this PIP and BAA) to schedule an individual session.

Additionally, attendees who would like to present company overviews, discuss their technology expertise, and/or discuss teaming opportunities in scheduled presentations at the conference may request to do so. Presentations may contain 2-4 slides and are limited to five (5) minutes each (including logistical issues). It is the presenter's responsibility to ensure that all material they plan to present at the ORCLE Proposer's Day Conference is approved for presentation by the organization that originally funded the research. Additionally, all material to be displayed at the conference must be screened in advance by the DARPA Program Manager for sensitive, but unclassified material. The ORCLE Proposer's Day Conference will be open to the public. Proposers desiring to reserve a time to present at the Proposer's Day Conference, should contact Jennifer Mozie as soon as possible, but no later than when registering for the Proposer's Day Conference. An electronic copy of all material to be presented must be provided to the DARPA Program Manager for review by 12 November 2003.

### **1.3. PROPOSERS**

The government encourages proposals from non-traditional defense contractors, nonprofit organizations, educational institutions, small businesses, small disadvantaged business concerns, Historically-Black Colleges and Universities (HBCU), Minority Institutions (MI), large businesses and Government laboratories. Teaming arrangements between and among these groups is also encouraged. However, no portion of this BAA or PIP will be set aside for HBCU and MI participation due to the impracticality of preserving discrete or severable areas of research in the technologies sought. Government/National laboratory proposals may be subject to applicable direct competition limitations, though certain Federally Funded Research and Development Centers are excepted per P.L. 103-337 § 217 and P.L 05-261 § 3136. Any responsible and otherwise qualified proposer is encouraged to respond.

### **1.4. PERIOD OF PERFORMANCE**

While the earliest anticipated award is planned to occur in the second quarter of fiscal year 2004, the government may select for funding, subject to successful conclusion of negotiations, a proposer's entire proposal or portions thereof at any time. The total period of performance for the effort, both for Technical Topic Areas (1) and (2) as described below, is anticipated to be 30 months as follows:

- (1) Technical Topic Area (1) – Range and Flight Demonstration System Integration
  - a. Base Effort: Effective date of award through 18 months
  - b. Option 1 Effort: Effective date of option exercise through 12 months
- (2) Technical Topic Area (2) – Technology Maturation\*
  - a. Base Effort: Effective date of award through 18 months
  - b. Option 1 Effort: Effective date of option exercise through 12 months

\*NOTE: As indicated above, proposers may choose to respond to any one, all, or any combination thereof, of the subset Technology Maturation areas identified herein, as well as choose to respond to Technical Topic Area (1), as may be appropriate under the circumstances.

The Government may incrementally fund any awards under this BAA and PIP.

## 1.5. PROGRAM SCOPE AND FUNDING

For Technical Topic Areas (1) and (2), it is anticipated that the research effort will continue through FY 2006. Proposers should propose a complete solution for the entire program (base effort and option). Within each Technical Topic Areas, tasks are not severable.

Government Funding Estimate for Technical Topic Area (1): The government anticipates two (2) awards under Technical Topic Area (1). Proposers should offer the best possible solutions bringing together the best possible talent, technology, and techniques to prototype, flight demonstrate and assess the performance of a family of hybrid FSO/RF terminals under varying environmental conditions (optical turbulence and cloud obscuration). For the two (2) anticipated awards anticipated under Technical Topic Area (1), the government anticipates total program funding of approximately \$55,000,000 over 30 months as follows:

BASE Effort (Months 1 thru 18):	Approximately \$30,000,000*
Option 1 Effort (Months 19 thru 30):	Approximately \$25,000,000*
TOTAL:	Approximately \$55,000,000*

NOTE: The government reserves the right to change some, all, or none of these values, as it deems necessary.

Government Funding Estimate for Technical Topic Area (2): The Government anticipates multiple awards under Technical Topic Area (2). Proposers should offer the best possible solutions bringing together the best possible talent, investigative research effort, and techniques to offer Technology Maturation solutions that may be used to enhance the outcome of Technical Topic Area (1). There is currently no stipulated dollar value associated with the awards contemplated under this technical topic area. Funding will be established based on accepted proposals.

## 1.6. INCENTIVE FEE and/or AWARD FEE STRUCTURE

Technical Topic Area (1) - For this BAA, although not mandatory, proposers are encouraged to submit proposals including an Incentive Fee and/or Award Fee Structure for Technical Topic Area (1), representing no less than 5% of the value of the proposal as calculated under the various Incentive Fee and/or Award Fee rules. Specifically, the government contemplates an arrangement that will encourage proposers to achieve results early and beyond expectations. The government initially contemplates an incentive fee and/or award fee structure that will be tied to the Go/No-Go Decision Criteria established in this PIP. The Incentive Fee and/or Award Fee structure should be substantiated by clearly defined, detailed, and quantifiable metrics that will assist the DARPA Program Manager, and other applicable Government Evaluation Personnel as

may be appropriate, in making Incentive Fee and/or Award Fee decisions that are directly tied to and support the goals of the program. Proposed structures tied to Go/No Go Decision Criteria should contemplate an arrangement that not only incentivizes the proposer to achieve the Go/No Go Decision, but also rewards the performer for results that are above and beyond the expectation of achieving and passing through the milestone gate. Factors for contemplation might include an arrangement tied to achieving the following:

- small systems form factor
- early flight demonstration
- level of hybridization, or other critical performance goals
- techniques that build in security to the physical layer
- demonstration of multiple ports (links) per air node
- multiple air node demonstration that highlights airborne switching and add/drop capability
- achieving or presenting a compact size, weight and power of the system
- innovation in achieving high link and network availability as well as high average data rates
- an integrated FSO and RF aperture
- an integrated FSO and RF phased array aperture

Proposers are encouraged, however, to offer creative, unique, and or innovative Incentive Fee and/or Award Fee Arrangements that they feel will best motivate them, and be mutually satisfiable to the government, in maximizing opportunities to achieve the research effort. For informational purposes, proposers are encouraged to review the Acquisition, Technology, and Logistics (AT&L) Knowledge Sharing System web site found at <http://deskbook.dau.mil/jsp/default.jsp>. Proposers can then click on the Guidebooks and Handbooks link, and review the Guide to Incentive Strategies for Defense Acquisitions, and the Air Force Award-Fee Guide, as a reference and starting point for offering an appropriate Incentive and/or Award Fee Structure as part of their proposal. Proposers are completely free, however, to offer any incentive fee and/or award fee structure that might be appropriate under the circumstances. All arrangements, however, are subject to negotiations. Proposals will be evaluated in accordance with the evaluation criteria contained in this PIP and BAA.

Technical Topic Area (2) - No Incentive Fee and/or Award Fee Structure is contemplated for those proposals received in response to Technical Topic Area (2), however, proposers are free to offer such an arrangement in accordance with the guidelines established above. Any such arrangements offered are subject to negotiations and all proposals will be evaluated in accordance with the evaluation criteria established in this PIP.

## **1.7. TECHNICAL SUPPORT**

It is the intent of this office to use contractor support personnel in the review and evaluation of all proposals submitted to this BAA. The Government intends to use employees and subcontractors of DPM Consulting, Burke, Virginia, and SRA International Inc. of Fairfax, Virginia to assist in the administration and evaluation of the proposals. These personnel will have signed and be subject to the terms and conditions of non-disclosure agreements. By submission of its proposal, a proposer agrees that its proposal information may be disclosed to

employees of these organizations for the limited purpose stated above. In the absence of any specific objections to this arrangement, the Government will assume proposers consent to the use of these subject personnel in review of proposals submitted under this BAA. Only Government evaluators, however, will make technical evaluations and award determinations under this BAA.

## **1.8. INSTRUCTIONS AND POINTS OF CONTACT**

Technical questions pertaining to this BAA and PIP may be submitted to DARPA at the following e-mail address: [BAA04-03@darpa.mil](mailto:BAA04-03@darpa.mil). DARPA may post updates to questions or comments periodically to the solicitation website: <http://www.darpa.mil/ato/solicit/ORCLE/index.htm>

For Contractual questions, please contact the following:

DARPA/CMO  
 Anthony E. Cicala, Contracting Officer  
 3701 North Fairfax Drive  
 Arlington, VA 22203-1714  
 Email: [acicala@darpa.mil](mailto:acicala@darpa.mil)

## **2. OVERVIEW OF OPTICAL & RF COMBINED LINK EXPERIMENT (ORCLE)**

### **2.1. PROGRAM OVERVIEW**

One of the tenets of Network Centric Warfare (NCW) is that a robustly networked force improves information sharing and leads to enhanced situational awareness, collaboration, synchronization and ultimately, mission effectiveness. To be “robust”, NCW requires high availability among fixed and mobile forces. To enable “sharing, collaborating, and synchronizing”, NCW requires high data rates and connectivity. The network is expected to operate under a variety of weather conditions and through atmospheric obscuration found on the battlefield.

Radio Frequency (RF) communications are generally reliable and well understood but cannot support emerging data rate needs unless they use a large portion of the precious radio spectrum. Free Space Optical (FSO) communications offer enormous data rates but operate much more at the mercy of the environment. The perennial limitations of FSO communications are manifested in the channel attributes of scintillation (optical turbulence) and path blocking (cloud obscuration). Both phenomena reduce the availability of the optical channel to support reliable communications. Since RF paths are relatively immune to the same phenomenology, combining the attributes of a high data rate but bursty link (FSO) with the attributes of a low data rate (by comparison) but reliable link (RF) could yield attributes better than either one alone: high availability with high data rates.

#### **2.1.1. Objective:**

The *military objective* of the program is to provide compact robust high bandwidth mobile communications to military forces. To achieve that objective, the ORCLE program incorporates two separate but concurrent paths.

The primary path is to prototype and flight demonstrate hybrid FSO/RF Air-to-Air-to-Surface links that combine the best attributes of both technologies. Innovative hybrid networking and link technologies that exploit FSO/RF channel diversity and synergy to yield higher performance than either FSO or RF alone will be the technical focus. Larger networks using ORCLE technologies will be simulated to assess protocols, scalability and performance of the hybrid FSO/RF concept. Additionally, high data rate modulating retro-reflector (MRR) technology will be incorporated into the planned range and flight demonstrations to expanded optical network connectivity.

The second path is to pursue concurrent Technology Maturation in areas that will improve ORCLE performance. System Integrators may accept these Technology Maturation efforts during their demonstrations phases.

The *programmatic objective* at the end of 30 months is to have:

- (1) Credibly demonstrated a hybrid FSO/RF link and networking scheme that yields high availability and high average data rate
- (2) Simulated the scalability of ORCLE networking technologies
- (3) Matured Size, Weight, and Power (SWaP) of the system to enable technology transition
- (4) Matured additional technologies that may be incorporated to improve ORCLE performance

### **2.1.2. System Integrators:**

System Integrators should propose a credible and comprehensive plan to flight demonstrate a hybrid FSO/RF link within 30 months of the commencement date of the effort. The flight demonstration should include at least two air nodes separated by 200 km at altitudes of between 8 and 20 kilometers linking to a surface node. System Integrators should plan for installation of ORCLE terminals in both conditioned and unconditioned aircraft locations. The ground node should demonstrate both active hybrid and passive optical (MRR) terminal concepts. The demonstration should show how combining FSO and RF links achieves high availability and high average data rates compared to either link alone. The resilience of the hybrid link will be in its ability to *Recognize, React, and Recover* to changing channel characteristics.

System Integrators should bid on the entire program. The range demonstration at 18 months and the flight demonstration at 30 months should be described separately.

Innovative proposals for ORCLE should offer the Government diverse experience and specialized skills including, but not limited to:

- Free space optical (FSO) link design, development and simulation
- Radio frequency (RF) link design, development and simulation
- RF & FSO propagation channel analysis, coding techniques and modeling to include weather, atmospherics and aero-optics
- Pointing, Acquisition, and Tracking (PAT)
- Protocol development, testing and simulation.
- Network simulation and modeling (terminal, channel, and network)

- Aircraft environment and integration
- Agile optical beams technologies (DARPA MTO heritage)
- Spatial Light Modulators (DARPA TTO heritage)
- High Power Laser Sources (DARPA SPO, TTO, ATO)
- Network system design
- Military CONOPS and methods of employment
- Manufacturing (including packaging and environmental design)
- Prototyping, demonstrating, and testing mobile FSO and RF communication systems

### **2.1.3. Other Technical Guidance for System Integration:**

Proposers are highly encouraged to:

- show the basic architecture and concept of employment and specifically cite the innovations at the system and subsystem level. Risk mitigation should be addressed to the extent possible with regard to Go/No-Go and Flight Demonstration.
- quantitatively illustrate the expected Hybrid FSO/RF network availability, data rates, and latencies under varying environmental conditions.
- describe how FSO & RF Hybrid will interoperate with current and emerging radio frequency protocols, standards, links and networks.
- indicate how their technical approach would interface with the envisioned Transformational Communications Architecture.
- propose to estimate at a Rough-Order-of-Magnitude (ROM): system life-cycle costs; payload initial acquisition cost and estimates in lots of 100; payload size, weight, and power; and payload reliability, maintainability, and availability. Initial estimates will be due at the first Go/No-Go event, refined estimates at the end of the flight demonstration.
- propose how they intend to manage the program and technical risk throughout the effort.
- propose to a demonstration and test plan that gives credence to the proposers payload designs and system architecture. These demonstrations are considered deliverable items and will be used to verify and validate proposer technical performance goals.

Additionally, proposals may employ multiple FSO channels to deliver the desired end-to-end data rate. Examples include (but are not restricted to) wavelength, polarization, or time diversity.

### **2.1.4. Concurrent Technology Maturation:**

A supporting technical topic area is to separately investigate and mature technology that will enhance the performance of Optical & RF Combined Link Experiment (ORCLE). This includes:

- (a) Optical Channel Obscuration Mitigation (i.e. transmission through clouds)
- (b) Common/Combined FSO/RF aperture
- (c) Compact Optical Beam Steering
- (d) Hybrid (FSO & RF) Router Technology

This concurrent technology maturation effort to further enhance the ORCLE concept should be bid under this BAA as a stand-alone 18-month effort with a 12-month option. Awards will be considered for innovative approaches to these *long-term* problems.

The Government views the System Integration prototype and flight demonstration efforts under this BAA and described in this PIP to be separate from the Technology Maturation efforts. Proposers should note that any dependency on award of, or results from, these Technology Maturation efforts for successful completion of the prototype and flight demonstration program would be viewed as high risk to the Government.

## 2.2. GO/NO-GO CRITERIA

In order for the Government to evaluate the effectiveness of a proposer's offered solution in achieving the stated program objectives, proposers should note that the Government hereby promulgates the specified Go/No-Go Decision Criteria points described in this PIP that may serve as the basis for determining whether satisfactory progress is occurring to warrant continued funding of the program. The Go/No-Go Decision Criteria are specified with the intention of bounding the scope of the effort, while affording proposers the maximum flexibility, creativity, and innovation in proposing solutions to the stated problem. Three Go/No-Go Decision Criteria are of special interest to the government:

- (1) Goodput Transfer Time
- (2) Mean Data Rate,
- (3) Link/Channel Availability

The Government anticipates providing a Test Plan eight months after commencement of the effort. The Test Plan will provide the details for the range demonstration, such as what will be tested and how. The purpose of the Test Plan will be to quantitatively measure the *improvements* in Goodput, Transfer Time Mean Data Rate, and Link/Channel Availability offered by a combined FSO/RF link *over* a FSO or RF link alone. In general, the following schema may be used to assess the performance of the ORCLE technologies:

- The FSO segment of the link will be measured for a prescribed offered load.
- The RF segment of the link will be measured for a prescribed offered load.
- The RF and FSO segments will be combined to form the hybrid link.
- The delta improvement (FSO compared to FSO+RF, RF compared to FSO+RF) will be measured.

The Government anticipates a month of Range Testing for both Systems Integrators to include 80 hours of test time for each awardee. Within this 80 hour test period, it is anticipated that each System Integrator will have time to conduct its tests. For the Flight Demonstration, the Government anticipates 80 hours of flight test time over a month test window for one awardee. For the Range Test, the baseline performance of the FSO and RF links will be established for each test period and channel conditions will be measured. The System Integrator will then conduct the same experiment using the **combined** FSO/RF hybrid link and performance as well as channel conditions will be measured. Using performance results, the System Integrator will simulate a multi-node network performance for a scenario to be supplied by the government. The criteria of Goodput Transfer Time, Mean Data Rate, and Link/Channel Availability are of special interest to government since they capture link performance, link robustness, and implementation performance during operation. The definitions and assessment approach are as follows:

Goodput Transfer Time (GTT) is defined as the elapsed time required to transfer a large amount of “bulk data” error free over the link at best effort rate. Bulk data is defined as a test data set that is 10 times the base rate of the system. A 2.5 Gbps system would require a test bulk data set that is 25Gbits, likewise a 20Mbps system would be 200Mbits. Two relative measures of merit are acquired by using this technique. When comparing RF, FSO, and FSO/RF using the Bulk Data for a 2.5Gbps FSO system (i.e. 25Gbits of data) a measure of the relative improvement in data transfer capability is obtained. Since the bulk data must be packaged, transferred, parity bits added, correction scheme added, etc. the actual data rates will be lower than the base system rate. The overall transfer times will be longer than 10seconds and depending on the robustness and elegance of the implementation it is expected RF times >> FSO > FSO/RF times. This will provide a relative measure of the improvement between the various link types. Another relative measure of system performance is also obtained using this technique. Using the different bulk data sizes based on the different base data rates of the different link types we can determine link robustness. Using an extreme example, a FSO/RF system with a 2.5Gbps rate will have a 25Gbit bulk data transfer set, a FSO system with 50Mbps rate will have a 500Mbit bulk data transfer set, and a RF system with a 50Kbps rate will have a 500Kbit bulk data transfer set. All of these systems should ideally take 10seconds to transfer their bulk data sets. However, they will not because of variations in link implementation and robustness of the various systems to channel characteristics. The different times provide a relative measure of robustness between the various systems. Therefore, depending on the bulk data size reference used during the test the GTT obtains two relative measures of system performance.

Mean Data Rate (MDR) is defined as the mean data rate achieved over an extended period of operation. MDR should be measured for all channels and total link MDR calculated/measured. The extended period of operation is the same as that used for calculating LCA. Bit Error Rate should also be measured during MDR testing.

Link/Channel Availability (LCA) is defined as the fraction of time the link is operating (uptime) divided by the summation of uptime plus the time the link is not operating (downtime) over an extended period of time. Downtime does not include time lost due to hardware failures. For the purposes of ground testing, the LCA will be measured over a solar scintillation cycle for the optical channel. A solar scintillation cycle begins before the night calm air becomes turbulent due to heating and ends when day turbulent air becomes calm. RF system availability should be calculated for Crane Region D. The goal of the ORCLE program is 95% LCA.

All measures shall be obtained during ground- and flight-testing under test conditions representative of those to be encountered during operational use. It is anticipated that measurements taken during ground testing will be accomplished with terminals mounted on Government Furnished Equipment (GFE) motion platforms providing base disturbances representative of those to be found during flight test. Proposals should cite the quantitative and qualitative success criteria that the proposed effort will achieve by the first Go/No-Go event, first flight demonstration, and final flight demonstration.

The success criteria should be comprehensive, addressing operational, network and physical layer considerations. The table below lists notional time/performance criteria.

System Integrators and Technology Maturation proposers are encouraged to bid additional Go/No-Go criteria if such other criteria might serve to foster the research goals of the program. The government reserves the right to accept or decline any additional Go/No-Go criteria proposed.

Months After Award	Event	Go /No-Go Criteria
18	Range Demo [Anticipate White Sands Missile range, Government Furnished]	<ul style="list-style-type: none"> <li>✓ RANGE DEMO of HYBRID FSO/RF Link</li> <li>✓ Mountain top to Mountain top as surrogate Air-to-Air (notional goal of ~50 km separation)</li> <li>✓ Mountain Top to Ground as surrogate Air-to-Ground Link (notional goal of ~12 km separation)                             <ul style="list-style-type: none"> <li>✓ Measure GTT</li> <li>✓ LCA (Notional Goal &gt;95%)</li> <li>✓ MDR (Notional Goal &gt;2.0 Gbps)</li> </ul> </li> <li>✓ MRR MDR (Notional Goal &gt;45Mbps at 12 km)</li> <li>✓ Pointing, Acquisition, &amp; Tracking operational, Terminals mounted on motion platforms (anticipated motion platforms GFE)</li> <li>✓ Model performance for conditions in Korea during July (Notional goal for a 10 node hybrid network over a 400 km area with 2 ground nodes)</li> </ul>
30	Flight Demo [Range TBD, Government Furnished]	<ul style="list-style-type: none"> <li>✓ FLIGHT DEMO – Ground-to-Air-to-Air of HYBRID FSO/RF Link                             <ul style="list-style-type: none"> <li>✓ Measure GTT</li> <li>✓ LCA (Notional Goal &gt;95%)</li> <li>✓ MDR (Notional Goal &gt;2.0 Gbps)</li> </ul> </li> <li>✓ FLIGHT DEMO – Mobile Ground-to-Air</li> <li>✓ Model performance for conditions in Korea during July (Notional goal for a 20 node hybrid network over a 1000 km area with 2 ground nodes)</li> <li>✓ MRR MDR (Notional Goal &gt;45Mbps at 20 km)</li> </ul>

### 3. GENERAL INFORMATION

#### 3.1. ELIGIBILITY

This BAA solicits proposals from all interested and qualified sources. Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Laws, and other governing statutes applicable under the circumstances.

### 3.2. LIMITATIONS ON OTHER TRANSACTION AUTHORITY FOR PROTOTYPE PROJECTS

Proposers that submit an Other Transaction (OT) for Prototype Agreement for consideration, are advised that an OT for Prototype Agreement may be awarded if the following is applicable:

1. There is at least one nontraditional defense contractor participating to a significant extent in the prototype project, or
2. No nontraditional defense contractor is participating to a significant extent in the prototype project, but at least one of the following circumstances exists:
  - a. At least one third of the total cost of the prototype project is to be paid out of funds provided by the parties to the transaction other than the federal Government. The cost share should generally consist of labor, materials, equipment, and facilities costs (including allocable indirect costs).
  - b. Exceptional circumstances justify the use of a transaction that provides for innovative business arrangements or structures that would not be feasible or appropriate under a procurement contract.

NOTE: For purposes of determining whether or not a participant may be classified as a nontraditional defense contractor and whether or not such entity is participating to a significant extent in the prototype project, the following definitions and guidelines are provided:

“Nontraditional defense contractor” means a business unit that has not, for a period of at least one year prior to the date of the OT agreement, entered into or performed on:

- (3) any contract that is subject to full coverage under the cost accounting standards prescribed pursuant to section 26 of the Office of Federal Procurement Policy Act (41 U.S.C. 422) and the regulations implementing such section; or
- (4) any other contract in excess of \$500,000 to carry out prototype projects or to perform basic, applied, or advanced research projects for a Federal agency that is subject to the Federal Acquisition Regulation

“Participating to a significant extent in the prototype project” means that the nontraditional defense contractor is supplying a new key technology or product, is accomplishing a significant amount of the effort wherein the role played is more than a nominal or token role in the research effort, or in some other way plays a significant part in causing a material reduction in the cost or schedule of the effort or an increase in performance of the prototype in question.

NOTE: Proposers are cautioned that if they are classified as a traditional defense contractor, and propose the use of an OT for Prototype Agreement, the government reserves the right to require submittal of both a cost proposal under the guidelines of the FAR/DFARS, in addition to any cost proposal submitted in support of the use of an OT for Prototype Agreement, so that an evaluation may be made with respect to the cost tradeoffs applicable under both situations. Furthermore, the government reserves the right to negotiate either a FAR based procurement contract, or Other Transaction for Prototype Agreement as it deems is warranted under the circumstances.

**3.3. PROCUREMENT INTEGRITY, STANDARDS OF CONDUCT, ETHICAL CONSIDERATIONS**

Certain post-employment restrictions on former federal officers and employees may exist, including special Government employees (Section 207 of Title 18, United States Code). If a prospective proposer believes that a conflict of interest exists, the situation should be raised to the DARPA Contracting Officer specified in Section 1.8 before time and effort are expended in preparing a proposal. All proposers and proposed sub-contractors must therefore affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5.) must be disclosed. The disclosure shall include a description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict.

**3.4. INTELLECTUAL PROPERTY**

**3.4.1. NONCOMMERCIAL ITEMS: (Technical Data and Computer Software)**

Proposers responding to this BAA shall identify all noncommercial technical data, and noncommercial computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights, and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that proposers do not submit the list, the Government will assume that it automatically has “government purposes rights” for a period of five (5) years from the date of award, to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless otherwise agreed to by the parties. Additionally it is understood that such rights will convert automatically to “unlimited rights” after such five (5) year period, notwithstanding any period of performance extensions that may result after the award instrument is executed, unless otherwise agreed to by the parties. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.”

A sample format for complying with this request is as follows:

NONCOMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions (LIST)	Basis for Assertion (LIST)	Asserted Rights Category (LIST)	Name of Person Asserting Restrictions (LIST)

**3.4.2 COMMERCIAL ITEMS: (Technical Data and Computer Software)**

Proposers responding to this BAA shall identify all commercial technical data, and commercial computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government’s use of such commercial technical data and/or commercial computer software. In the event that proposers do not submit the list, the Government will assume that there are no restrictions on the Government’s use of such commercial items. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.”

A sample format for complying with this request is as follows:

COMMERCIAL			
Technical Data Computer Software to be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

**3.5. REPORT REQUIREMENTS**

The number and types of reports will be specified in the award document. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

**3.6. REQUIRED REVIEW AND INTERCHANGE MEETINGS**

Awardees under this BAA will be required to present an overview of their proposed work at a Program Kick-off Meeting. For the Technical Topic Area 1 (System Integration), reviews will be held every 4 months. For Technical Topic Area 2, reviews will be held every three months. In addition, attendance at biannual Principal Investigator Meetings may be required. It is expected that all key personnel will attend the Principal Investigator meetings.

**3.7. SUBCONTRACTING**

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. 637(d)), it is the policy of the Government to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to contractors performing work or rendering services as prime contractors or subcontractors under Government contracts, and to assure that prime contractors and subcontractors carry out this policy. Each proposer who submits a proposal under the FAR/DFARS and includes subcontractors, is required to submit a subcontracting plan IAW FAR 19.702(a) (1) and (2). The plan format is outlined in FAR 19.704.

## 4. PROPOSAL PREPARATION

### 4.1. GENERAL GUIDANCE

All proposals submitted must follow the instructions in this Proposer Information Pamphlet (PIP) and include only the information requested to avoid delays in evaluation or disqualification. It is anticipated that within 30 days of completing the evaluation, proposers will be notified that: 1) its proposal has been accepted for negotiation, or 2) its proposal has not been accepted. Proposals not accepted will be destroyed; however, one copy of non-accepted proposals will be retained and filed.

#### 4.1.1. Restrictive Markings on Proposals

All proposals should clearly indicate limitations on the disclosure of their contents. Additionally, proposers should mark the specific information that requires limited disclosure, vice marking the entire document for limited disclosures. Applicable sections should be marked as "Proprietary" or words to that effect. Markings like "Company Confidential" or other phrases that may be confused with national security classifications shall be avoided.

#### 4.1.2. Confidentiality

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. The original of each proposal received will be retained at DARPA and all other copies destroyed.

#### 4.1.3. Submission Timelines

This BAA shall remain open for one (1) year from the date of publication in [www.fedbizopps.gov](http://www.fedbizopps.gov) and [www.fedgrants.gov](http://www.fedgrants.gov). Although the Government may select proposals for award at any time during this period, it is anticipated that the majority of funding for this program will be committed during the First Selections Phase as stipulated on the first page of this Proposer Information Pamphlet (PIP). Proposer's may submit proposals in accordance with the instructions provided herein at any time up to the proposal due date.

All submitted proposals will be reviewed. In order to be considered during the initial round of funding, proposals must be submitted to DARPA, 3701 North Fairfax Drive, Arlington, VA 22203-1714 (Attn.: BAA 04-03) **on or before 12:00pm local time, 19 December 2003**. Proposals submitted after the due date for first selections as specified herein may be selected contingent upon the availability of funds. As already stated, however, it is anticipated that the majority of available funds for this program will be committed during the initial round.

Proposals submitted under this BAA may be either mailed or hand-delivered.

Mailing address:     DARPA  
                          ATTN: BAA 04-03  
                          3701 North Fairfax Drive  
                          Arlington, VA 22203-1714

For hand deliveries, the courier shall deliver the package to the DARPA Visitor Control Center at the address specified above. The outer package, as well as the cover page of the proposal, must be marked "BAA 04-03."

#### 4.1.4. Formatting Characteristics

All proposals must be in the following format—nonconforming proposals may be rejected without further review. Proposals must be on single-sided pages, written in English, with fonts no smaller than 12 point and with 1-inch margins (left, right, top, and bottom) in each page. A page is defined as being no larger than 8.5” by 11.0”. (Accordion-style foldouts will be counted as multiple pages equivalent to the expanded size.) Paper copies of proposals should be stapled or submitted in a loose-leaf binder, not bound.

#### 4.2. PROPOSAL FORMAT:

Proposals shall consist of two volumes. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished), which document the technical ideas and topic area upon which the proposal is based. Copies of not more than three (3) relevant papers can be included with the submission. The bibliography and attached papers (in Section III of Volume I) are not included in the page counts given below. The submission of other supporting materials along with the proposal is strongly discouraged and will not be considered for review. Sections I and II of Volume I shall not exceed 153 pages. The page limitation for proposals includes all figures, tables, and charts. Restrictions on the page length of any specific section are shown in braces { } below. All pages that exceed the maximum page limit specified may be removed and not be reviewed or considered during evaluations.

Total effort, including options, shall terminate in FY 2006. In order that ATO may have programmatic and procurement flexibility, all proposers must segment their cost and technical proposals into the BASE Effort and Option Effort for evaluation as follows:

Research Area			Culminating Event
Technical Topic Area 1			
	BASE	18 months after award	Range Demo
	OPTION	30 months after award	Flight Demo
Technical Topic Area 2			
	BASE	18 months after award	Technology Validation*
	OPTION	30 months after award	Technology Validation*

\*NOTE: Technology Validation can be by lab, range, or flight demo, depending upon the maturity of the work and the applicability of the effort as offered in the proposers submittal.

Proposers must submit a total of five (5) copies of their proposal as follows:

- 1) One (1) original copy, and
- 2) Three (3) copies of their proposal, and

3) One (1) electronic copy of the proposal [in MS-Word readable, on a single 3.5 inch High Density MS-DOS formatted 1.44 Megabyte (MB) diskette, a single 100 MB Iomega Zip (registered) disk, or a CD-ROM].

(Exceptions: the three relevant papers may be in .pdf format. Cost spreadsheets should be submitted in an MS Excel-readable format.) Each disk must be clearly labeled with BAA 04-03, proposer organization, proposal title (short title recommended), and which technical topic area is being pursued (system integration, technology maturation, or both.)

#### **4.2.1. Volume I, Technical and Management Proposal**

##### 4.2.1.1 Section I. Administrative

1. {1} Cover sheet to include:
  - a. BAA number (BAA04-03)
  - b. Lead Organization Submitting proposal
  - c. Type of business, selected among the following categories: "LARGE BUSINESS," "SMALL DISADVANTAGED BUSINESS," "OTHER SMALL BUSINESS," "HBCU," "MI," "OTHER EDUCATIONAL," or "OTHER NONPROFIT"
  - d. Contractor's reference number (if any)
  - e. Other team members (if applicable) and type of business for each
  - f. Proposal title
  - g. Technical Topic area (System Integration, Technology Maturation, or both)
  - h. Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
  - i. Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
  - j. Funds requested from DARPA for the Base Effort, each option and the total proposed cost; and the amount of cost share (if any)
  - k. Date proposal was prepared.
2. {1} Official transmittal letter.
3. {No page limit} Table of Contents. The Table of Contents should be keyed to the page numbers of the proposal sections.
4. {1} A one slide summary, i.e. quad chart format, of the proposal in PowerPoint that quickly and succinctly indicates the main objective, key innovations, expected impact, cost, and other unique aspects of the proposal.

##### 4.2.1.2. Section II. Detailed Proposal Information [150-page limit]:

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA. There are no sub-sectional page restrictions in this section. Proposers are strongly encouraged to give sufficient space to fully articulate their plan for each area below, generating sufficient documentation as may be necessary to support each area herein, but not exceeding the total 150 page limit for all areas herein combined.

1. Executive Summary of the proposal: This section should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art and alternate approaches. Define the problem/challenge that this innovative claim will address and the effort's technical goals. Explain how this proposal addresses this problem differently than current approaches and the significant gains due to its uniqueness.
2. Innovative claims for the proposed research. This section is the centerpiece of the proposal. It should succinctly describe the uniqueness and benefits of the proposed approach relative to current state-of-the-art and alternate approaches.
3. Deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization will clearly address how the proposed effort will meet the goals of the program. Description of the results, products, transferable technology, and expected technology transfer path. Include in this section all proprietary claims to results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the re-search, results, and/or prototype. If there are no proprietary claims, this should be stated.
4. Statement of Work (SOW) written in plain English, outlining the scope of the effort and citing specific tasks and requirements to be accomplished by the proposer.
5. Cost, schedule and milestones for the proposed research, including estimates of cost for each task in each year of the effort, for each phase, and total cost and company cost share, as may be applicable.
6. Detailed technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production. Emphasis should be placed on the technical value of the development and experimentation. This section should clearly explain: What you are proposing (and how it works); why you are proposing this approach; why you believe it can be done now; and the importance or affect if successful (who will care and why).
7. Comparison with other ongoing research indicating advantages and disadvantages of the proposed effort.
8. Discussion of proposer's previous accomplishments and work in this or closely related research areas.
9. Description of the facilities that would be used for the proposed effort. If conducted with operational forces, what agreements/coordination has been made or will be required to meet this requirement.
10. Formal teaming agreements that are required to execute this program and a brief synopsis of all key personnel. A clearly defined organization chart for the program team that includes, as applicable the:
  - a. programmatic relationship of team members;
  - b. unique capabilities of team members;
  - c. task responsibilities of team members;
  - d. teaming strategy among the team members; and
  - e. key personnel along with the amount of effort to be expended by each person during each year.

#### 4.2.1.3. Section III. Additional Information

A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than three (3) relevant papers can be included in the submission.

#### 4.2.2. Volume II, Cost Proposal – {No page limit}

1. A cover sheet to include:
  - a. Name and address of proposer (include zip code);
  - b. Name, title, and telephone number of Proposer's point of contact;
  - c. (Award instrument requested: cost-plus-fixed-fee (CPFF), cost-contract--no fee, cost sharing contract--no fee, or other type of procurement contract (specify), grant, cooperative agreement, Technology Investment Agreement, Other Transaction for Prototype, or such other appropriate award instrument;
  - d. Place(s) and period(s) of performance;
  - e. Funds requested from DARPA for the Base Effort, each option and the total proposed cost; and the amount of cost share (if any)
  - f. Name, address, telephone number and Point of Contact (or other administrative office (if known) (i.e., Office of Naval Research) of the Proposer's cognizant Defense Contract Management Agency (DCMA) administration office (if known);
  - g. Name, address, telephone number, and Point of Contact of the Proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (if known);
  - h. Any Forward Pricing Rate Agreement information or other such Approved Rate Information or documentation that may assist in expediting negotiations (if available);
  - i. Contractor and Government Entity (CAGE) Code,
  - j. Dun and Bradstreet (DUN) Number;
  - k. North American Industrial Classification System (NAICS) Number [NOTE: This was formerly the Standard Industrial Classification (SIC) Number]; and,
  - l. Taxpayer Identification Number (TIN) .
  - m. All subcontractor proposal backup documentation to include items a. through l. above, as is applicable and available.
  
2. Detailed cost breakdown as follows:
  - a. total program cost broken down by fiscal year and Base and Option 1; further broken down by major cost items (direct labor, subcontracts, materials, travel, other direct costs, overhead charges, etc.);
  - b. major program tasks by year;
  - c. an itemization of major subcontracts (labor, travel, materials and other direct costs) and equipment purchases;
  - d. a summary of projected funding requirements by month; and
  - e. the source, nature, and amount of any industry cost sharing. Where the effort consists of multiple phases that could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each.

3. Supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates above. Include a description of the method used to estimate costs and supporting documentation. Provide the basis of estimate for all proposed labor rates, indirect costs, overhead costs, other direct costs and materials, as applicable.

## **5. PROPOSAL EVALUATION**

### **5.1. EVALUATION CRITERIA**

The criteria to be used to evaluate and select proposals for this project are described in the following paragraphs. Each proposal will be evaluated on the merit and relevance of the specific proposal as it relates to the program rather than against other proposals for research in the same general area, since no common work statement exists. Agency evaluators will consider technical factors (Overall Scientific and Technical Merit and Contribution to DARPA/ATO Mission) as more important than non-technical factors (Proposer's Capabilities and Related Experience, Approach/Ability to Transition Technology, Cost Realism). In accordance with FAR 35.016(e) the primary basis for selecting proposals for award shall be technical, importance to agency programs, and funds availability. Cost realism and reasonableness shall also be considered to the extent appropriate as described herein.

#### **5.1.1. Overall Scientific and Technical Merit**

The objective of this criterion is to establish the technical worthiness of the proposed effort. To be considered are technical worthiness, sufficient technical payoff to warrant risk, long-term effects of this research including the long-term impacts to technology.

#### **5.1.2. Contribution to DARPA/ATO Mission**

The objective of this criterion is to establish a strong link between this work and the DoD mission. It is NOT necessary that the proposed work be immediately usable in the military systems. It is only necessary that this work contribute to technical areas of need by the DoD. Dual use of technology enabling DoD systems to ride on commercial development practice is a key factor in keeping the cost of DoD systems low.

#### **5.1.3. Proposer's Capabilities and Related Experience**

The objective of this criterion is to establish that the proposer has had credible capability, experience, and technological maturity to complete the proposed work. Technical milestones and level of planning at each stage of the project must be appropriate to the proposed research.

#### **5.1.4. Approach/Ability to Transition Technology**

The objective of this criterion is to establish that the proposer has the capability to assist in transitioning the technology to the research, industrial, and operational military communities in such a way as to enhance U.S. defense.

#### **5.1.5. Cost Realism**

The objective of this criterion is to establish that the proposed costs are reasonable and realistic for the technical and management approach offered, as well as to determine the proposer's practical understanding of the effort. This will be principally measured by cost per labor-hour

and number of labor-hours proposed. The evaluation criteria recognize that undue emphasis on cost may motivate bidders to propose low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead.

NOTE: PROPOSERS ARE CAUTIONED THAT EVALUATION SCORES MAY BE LOWERED AND/OR PROPOSALS REJECTED SHOULD SUBMITTAL INSTRUCTIONS NOT BE FOLLOWED

## 6. SECURITY INFORMATION

NOTE: The Government anticipates that proposals submitted under this BAA will be unclassified. In the event that a proposer chooses to submit a classified proposal or submit any documentation that may be classified, the following information is applicable.

Security classification guidance on a DD Form 254 will not be provided at this time since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information, a DD Form 254 will be issued and attached as part of the award. Proposers choosing to submit a classified proposal must first receive permission from the Original Classification Authority to use their information in replying to this BAA. Applicable classification guide(s) should be submitted to ensure that the proposal is protected appropriately.

Classified submissions shall be in accordance with the following guidance:

Collateral Classified Data: Use classification and marking guidance provided by previously issued security classification guides, the Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another original classification authority. Classified information at the Confidential and Secret level may only be mailed via U.S. Postal Service (USPS) Registered Mail or U.S. Postal Service Express Mail (USPS only; not DHL, UPS or FedEx). All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both the sender and addressee. The inner envelope shall be addressed to:

Defense Advanced Research Projects Agency (DARPA)  
ATTN: BAA 04-03, DARPA/ATO, G. Duchak  
3701 North Fairfax Drive, Suite 832  
Arlington, VA 22203-1714

The outer envelope shall be sealed with no identification as to the classification of its contents and addressed to:

Defense Advanced Research Projects Agency (DARPA)  
Security & Intelligence Directorate, Attn: CDR

3701 North Fairfax Drive, Suite 832  
Arlington, VA 22203-1714

All Top Secret materials should be hand carried via an authorized, two-person courier team to the DARPA CDR.

Special Access Program (SAP) Information: Contact the DARPA Program Security Support Center (PSSC) at (703)812-1962/1970 for further guidance and instructions prior to transmitting to DARPA. All Top Secret SAP, must be transmitted via approved methods for such material. Consult the DoD Overprint to the National Industrial Security Program Operating Manual for further guidance. It is strongly recommended that you coordinate the transmission of SAP material and information with the DARPA PSSC prior to transmission.

Sensitive Compartmented Information (SCI) Data: Contact the DARPA Special Security Contact Office (SSCO) at (703)812-1993/1994 for the correct SCI courier address and instructions. All SCI should be transmitted through your servicing Special Security Officer (SSO) / Special Security Contact Officer (SSCO). All SCI data must be transmitted through your servicing Special Security Officer (SSO) / Special Security Contact Officer (SSCO). All SCI data must be transmitted through SCI channels only (i.e., approved SCI Facility to SCI facility via secure fax).

Proposers must have existing and in-place prior to execution of an award, approved capabilities (personnel and facilities) to perform research and development at the classification level they propose.