

AMENDMENT 0003 to BAA N00014-16-R-BA07
Communications and Interoperability of Integrated Fires (CIIF)

The purpose of this Amendment is to provide clarification on the submission and expectations of MiND product proposals by responding to a question and amending the solicitation.

1. The following question and response regarding Section I.F (specifically, paragraph 5 of page 5) is provided:

Question: Is the intent for the Contractor to bid over-the-air (OTA) waveform testing as part of the base contract, or should this be considered an option? If yes, can you provide more details on what is expected from the Contractor to support the OTA testing? What will the Government supply for OTA? What is the expected TRL before hardware implementation for OTA?

Response:

The Contractor doesn't need to bid (either in the base period or in an option period) for the OTA demo; however, they would have tested waveform ported on to requisite SW/FW units on a developmental HW platform (to be mutually agreed upon during program execution) in a simulated laboratory environment to satisfy TRL=6. Five such prototyped units would have to be furnished to the Government for a networked OTA demo. Some contractor support may be required during installation, integration, and test phases of the OTA demo. See paragraph 2 below.

2. Section I.F of the BAA is hereby amended as follows (excerpts with changes in **bold**):

F. Research Opportunity Description –

Synopsis:

The Communications and Interoperability for Integrated Fires (CIIF) Future Naval Capability (FNC) will develop networking and communications enhancements to enable next-generation sensor netting, electromagnetic maneuver warfare, and integrated fires across the force. The FNC is divided into two products: Communications-as-a-Service (CaaS) to enable data/information to be delivered via any combination of available data links and Mission-based Networking for Data Distribution Systems (DDS) [MiND] to increase the throughput and scalability of the Cooperative Engagement Capability (CEC) DDS. The Office of Naval Research (ONR) is interested in receiving proposals for innovative solutions for CaaS and/or MiND products for the

CIIF FNC.

CaaS Product

The concept of CaaS is to create an on-demand network for integrated fires via a combination of tactical data links. The intent is not to translate data into different formats but, through CaaS devices on various platforms, expose the topology/performance of the various data links and encapsulate the data appropriately to deliver it to the next hop. The challenge will be to perform these functions in manner such that critical data can be delivered to its destination within the specified Quality-of-Service (QoS) constraints (such as latency, jitter, etc.) required for both kinetic and non-kinetic (e.g., electronic warfare) fires. Some of the key technology areas to be developed for this CaaS concept include, but are not limited to:

1. Interface(s) for CaaS to various data link systems;
2. Mechanisms to sense topologies and performance (latency, loss rates, throughput, congestion) of various data links;
3. Multi-commodity optimization, distributed resource allocation / scheduling, coordinated quality of service, etc. to establish source-destination paths based on defined service levels (bounded latency, tolerance to loss of data, etc.);
4. Deterministic networking (intra- and inter-platform) to assure the delivery of the highest priority data within the specified level of service; and
5. Interface between CaaS and relevant applications (integrated fires, command and control, etc.) to request a specific level of service for the data.

Any innovative concepts / ideas relevant to the CaaS concept, not simply what has been outlined above, will be considered. A modeling/emulation environment will be used by both performers and the government team to assess performance, select the appropriate technology components, and integrate these components together to ensure performance objectives are met. An operational prototype will then be developed to evaluate the performance, utility, and capability provided by CaaS in an operationally relevant environment at the conclusion of the program. The government integration team will evaluate / select the technologies for the prototype and work with the relevant CaaS performers to integrate them into an operational system.

MiND Product

The CEC DDS is a networked, directional C-band communications system designed to provide dedicated support to the AN-USG 2/3/4/5(V) CEC system for integrated air and missile defense. The concept for MiND product is to enable the DDS to be flexibly employed in support of non-CEC missions. The challenge will be to prevent any adverse impact on the core CEC mission while the DDS is performing these other functions. Obviously, the CaaS concept and architecture will figure prominently in this mitigation. However, a number of other key technology areas under consideration for the MiND product include, but are not limited to:

1. New waveforms and coding, compatible with components of the CEC transmit/receive chain, to improve throughput, reduce latency, reduce losses, etc.;
2. Improved distributed resource allocation / scheduling algorithms for directional communications;
3. Mechanisms for backward compatibility to ensure that legacy DDS systems can interoperate with those DDS systems with the MiND enhancements;
4. Network management and quality of service mechanisms to appropriately handle the delivery of non-CEC data while also improving the efficiency of the delivery of CEC data; and
5. Interface with the CaaS device.

Again, any innovative concepts / ideas relevant to the MiND product, not simply what has been outlined above, that improve the performance, efficiency, and flexibility of the DDS will be considered. A modeling/emulation environment will be used by both performers and the government team to assess performance, select the appropriate technology components, and integrate these components together to ensure performance objectives are met. Once these components are mature, they will be implemented in hardware for over-the-air waveform testing to be conducted at Compact Antenna Range hosted by the CEC Design Authority. The government integration team will evaluate / select the technologies for the over-the-air testing and work with the relevant MiND performers to integrate them into an operational system. A key aspect of these tests will be to generate both new and legacy DDS waveforms to be sent and received over the DDS antennas at the range.

The OTA demonstration is not under the scope of the BAA; however, proposed efforts are expected to understand that the contractor must have tested waveform ported on to requisite SW/FW units on a developmental HW platform (to be mutually agreed upon during program execution) in a simulated laboratory environment to satisfy TRL=6. Five such prototyped units would have to be furnished to the Government for a networked OTA demo. Some contractor support may be required during installation, integration, and test phases of the OTA demo.

Government Approach:

ONR will employ the Office of Naval Research Laboratory (NRL) as Technical Lead and government/industry systems integrator (not part of this solicitation), in addition to other Navy SYSCOM labs/facilities, to combine individual vendor products and government-owned technologies into the CIIF capability. Successful vendors must allow the systems integrator to have access to their technology in order to have successful technology demonstrations. This access will likely require the systems integrator to view and work with designs, models, computer source code, and hardware devices that the vendor considers protected intellectual property or trade secrets. The government technical lead will be the Naval Research Laboratory,

which will also use selected subcontractors for the tasks required for review, analysis, integration, and testing. After reviewing and selecting successful industry efforts, the government team will perform all the remaining tasks to provide the CIIF capability that are not awarded to vendors under this program.

Additional Information:

1. **Separate Proposals:** Each proposal submitted must be targeted towards a specific product, CaaS or MiND. If an Offeror intends to submit a proposal for both of these products, these proposals need to be separated, not combined. An Industry Day will be held separately for the CaaS and MiND products.
2. **Sensitive Unclassified Information:** The ONR CIIF FNC program intends to provide sensitive unclassified information to potential Offerors prior to the two Industry Days, which will be held at a classified (secret) level. Details on how to obtain this additional information can be found in the Addendum published with this BAA.
3. All other terms and conditions remain unchanged.