Broad Agency Announcement

Resilient Anonymous Communication for Everyone (RACE)

HR001118S0052

July 20, 2018

Defense Advanced Research Projects Agency
Information Innovation Office
675 North Randolph Street
Arlington, VA 22203-2114

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PART I: OVERVIEW INFORMATION

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Information Innovation Office (I2O)

- **Funding Opportunity Title:** Resilient Anonymous Communication for Everyone (RACE)

- **Announcement Type:** Initial Announcement

- **Funding Opportunity Number:** HR001118S0052

- **Catalog of Federal Domestic Assistance Numbers (CFDA):** 12.910 Research and Technology Development

- **Dates**
  o Posting Date: July 20, 2018
  o Proposers Day: July 24, 2018
  o Abstract Due Date: August 14, 2018, 12:00 noon (ET)
  o Proposal Due Date: September 18, 2018, 12:00 noon (ET)
  o BAA Closing Date: September 18, 2018, 12:00 noon (ET)

- **Anticipated Individual Awards:** DARPA anticipates multiple awards for Technical Areas 1 and 2, and a single award each for Technical Areas 3 and 3.1.

- **Total Funding Available for Award:** $44 million

- **Types of Instruments that May be Awarded:** Procurement contracts or cooperative agreements

- **Agency Contacts**

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  o **I2O Solicitation Website:** http://www.darpa.mil/work-with-us/opportunities

PART II: FULL TEXT OF ANNOUNCEMENT

I.   Funding Opportunity Description

DARPA is soliciting innovative research proposals in the area of cryptographic and communication obfuscation techniques in order to build an anonymous, attack-resilient mobile communication system that can reside completely within a network environment. Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

This Broad Agency Announcement (BAA) is being issued, and any resultant selection will be made, using procedures under Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016. Any negotiations and/or awards will use procedures under FAR 15.4 (or 32 CFR § 200.203 for cooperative agreements). Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific review process.

DARPA BAAs are posted on the Federal Business Opportunities (FBO) website (https://www.fbo.gov/) and the Grants.gov website (http://www.grants.gov/).

The following information is for those wishing to respond to this BAA.

A.   Introduction

The Resilient Anonymous Communication for Everyone (RACE) program will research technologies for a distributed messaging system that a) can exist completely within a given network, b) provides confidentiality, integrity, and availability of messaging, and c) preserves privacy to any participant in the system. Compromised system data and associated networked communications should not be helpful for compromising any additional parts of the system. RACE advances will be based on rigorous security arguments, such as those found in the academic cryptography community or statistical arguments based on realistic simulations. RACE will create advances in communication protocol encapsulation methods as well as efficient, oblivious, distributed system tasking, possibly via secure multiparty computation, to build a system that cannot be compromised even with limited participant compromises and large-scale, real-time deep packet inspection. Approaches to preserving privacy are of interest, such as ubiquitous encryption, even during computation, and obfuscating communication protocols. Please note that ad hoc security arguments are not in scope for the program.

Proposers are highly encouraged to submit abstracts in order to ensure that their security regimes and other assumptions are deemed in scope for RACE. Proposers are also highly encouraged to read this BAA in its entirety; important information for all proposers may be found in all sections of this solicitation.

B.   Program Description and Scope

This effort will bring together advances in efficient, oblivious, distributed system tasking, possibly via secure multiparty computation, with communication protocol encapsulation methods to build a distributed system that cannot be compromised even with limited participant

compromises and large-scale, real-time deep packet inspection. It is assumed that the network environment is large enough that it is infeasible to actively monitor every, or even most, systems in the environment, but it is possible to monitor all inter-network traffic (traffic between significant groups of networked systems). As an example, we assume that inter-network traffic can be affected by filtering, monitoring, or injection via real-time deep packet inspection at scale.

The primary purpose of the RACE system is to avoid large-scale compromise. In particular, small compromises against the system should not be helpful to compromise the operation or security of the larger system. The system will avoid compromise in two primary ways: 1) preventing compromised information from being useful for identifying any of the system nodes because all such information is encrypted on the nodes at all times, even during computation; and 2) preventing communications compromise by virtue of obfuscating communication protocols.

RACE will focus on Internet Protocol communications, to include those coming from the mobile phones used to send messages to each other. Please note that wireless-based solutions (e.g., mobile ad hoc networks) are NOT in scope.

B.1 RACE Security Model and Assumptions

The security guarantees for the RACE system should correspond to the standard notions of confidentiality, integrity, and availability, as contained in Table 1.

Type of security	Attribute	Notes
Confidentiality	user messages	Only the sender and receiver of a message can see it[1]
	user message metadata	Confidentiality of who talks to who and when
	unobservable communication	The fact that Alice possesses and uses the mobile application should not be inferable unless Alice's mobile device is compromised.
	unobservable service node participation	The fact that Bob is running software to execute service node functionality should not be inferable unless Bob's system is compromised.
Integrity	user messages	User messages cannot be changed in transit
Availability	user messages	End-to-end communication time should be one minute

Table 1: Desired RACE System Security Properties

For the RACE program, security should be maintained even if its component systems and network traffic can be observed, and possibly selected for compromise, throughout the network environment. The RACE system should maintain the security properties outlined in Table 1[2]. It is assumed that the software for RACE mobile clients and server nodes are public knowledge, as well as technical specifications for the whole system. The network operator also should be assumed to have sufficient cyberspace operations capabilities that they are able to successfully exploit whatever systems that they deem of interest; however, they are not assumed to be resident on all systems. In particular, it is assumed that the vast majority of mobile devices

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[1] End-to-end encryption has become a standard feature in many mobile communication applications; the focus of RACE is not to develop breakthrough new means to achieve end-to-end encryption.
[2] Technologies that hide RACE applications on systems, including mobile devices, are out of scope.

within the network are not compromised at any one time.

The RACE system should function properly even in the presence of real-time, deep-packet inspection. This includes high-level analysis on network source/destination connections (netflows) in real time. The point-of-traffic-capture is assumed to be at inter-network points (i.e., between ISP, corporate gateway, etc.), not at every node in the network. In particular, RACE should not assume constant monitoring of every home or corporate network (though occasional, limited monitoring may occur if a particular subnetwork is of interest).

B.2 RACE System Architecture and Description

At a high level, the distributed RACE system will have two main components:[3]

1) a *client*, which should be viewed as a mobile application executed on a mobile device,
2) a distributed *server*, which consists of many *server nodes* that are executed in the network environment (e.g., by volunteers).

The mobile client will be an application for a version of the Android operating system, and the server nodes will be executable on specific versions of the Windows and/or Linux operating systems. The server nodes should be executable on a (possibly high-end) home computer. Network connectivity/bandwidth of server nodes should be assumed to be broadband (e.g., 20 Mbps+). Assume that there are many clients who can participate in the system at will, while server nodes participation must be curated, or "permissioned."

If a user, Alice, wishes to communicate the message *m* to another user, Bob, she would send the encrypted identity of the receiver (Bob[4]) together with the message, *m,* to the server. This may be broadcast to all server nodes, or perhaps only sent to some of them (at a high level, this should be done in such a way to leverage the cryptographic security achieved via fully distributed secure Multi-party Computation [MPC], even if in practice a fewer number of nodes perform the actual computation). The nodes then jointly compute on the encrypted receiver identity in order to task themselves to pass the encrypted message on to Bob.

RACE communication links should be designed to operate entirely within the network environment, because the system is expected to work even if the gateways between the network environment and the rest of the world are shut off. As a result, communication techniques that rely on specialized means to exit the environment, such as domain fronting, are NOT in scope.

There are two modes of communication that RACE will incorporate to avoid large-scale detection: 1) *client-server communication* and 2) *server-server communication*. Client-server communication, or "rendezvous," enables Alice to communicate to the server nodes in order to task the server to pass her message to Bob. Therefore, Alice transmits the encrypted message and identity of the receiver via this mode of communication. The primary purpose of this communication mode is to enable Alice to communicate with server nodes in a manner that is both unobservable but also does not enable Alice to be able to learn sufficient information that would enable compromising any particular server node (and vice versa).

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[3] In what follows, to give the reader intuition about the desired technical approach, we will discuss primarily a "push" architecture, where a message is directly passed from Alice to Bob; it may be more efficient and/or secure to use a "push/pull" architecture, where Alice stores her message in the server and Bob retrieves it.

[4] In reality, this identifier may be a pseudonym or some cryptographic key denoting Bob.

Server-server communications enable the server nodes to communicate with each other in order to accomplish secure MPC, as well as other tasks the server nodes may need to accomplish. Due to the underlying supported protocols such as MPC, the bandwidth of these channels must be higher and more consistently used than the client-server communication mode. In order to accomplish this, the RACE system will build communications channels[5] by embedding communications protocols within existing network services.

Table 2 contains desired *logical bandwidth* of each mode of communication. By *logical bandwidth,* we mean that, although the actual path from server node A to server node B may be indirect and will likely be embedded within higher-bandwidth links, the message capacity from A to B will appear to the users of the system to be 10 Mbps.

System Communication Mode	Logical Bandwidth	Frequency of Transmission
Client-server	<1Mbps	Infrequent (~50 transmissions/day)
Server-server	10Mbps	Near-constant

Table 2: RACE System Modes of Obfuscated Communication

Finally, the RACE system will not assume an app store will carry the RACE communication application, since the network environment could filter such applications. RACE will require a method for enabling users to obtain the app from the network environment without creating an opportunity for detection. This method must be capable of providing the app on short notice. Note that the server nodes that store these shards may be the same or different from the server nodes who accomplish distributed message passing above (but will still rely on the communications mechanisms described above).

C. Program Structure and Technical Areas

The program has been organized into three (3) phases. Phase 1 will be 18 months, followed by a 12-month Phase 2, and then concluded with Phase 3 at 18 months.

- Phase 1 will emphasize initial development of the tools and techniques needed to validate the individual components of the RACE system (MPC, obfuscated communications, resilient application distribution) at a moderate scale.
- Phase 2 will emphasize developing an initial integrated RACE system. The individual system components will also be refined to handle larger scales.
- Phase 3 will emphasize scaling techniques to demonstrate an integrated system at large scale (1,000 server nodes and 10,000 mobile client users).

The program will be divided into 4 technical areas (TA), with all performers coordinating with each other and in concert with the integrator:

- TA1: Cryptography, focused on MPC and other advanced cryptographic tasks.
- TA2: Obfuscated communications, in both the client-server and server-server modes.
- TA3: Integration of the RACE system.
- TA 3.1: Resilient application distribution

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[5] We refer to "channels" in an information-theoretic sense: the actual channel may be an amalgamation of various means of communication, and may rely on side channels such as timing.

Performers should be prepared to work closely with each other and be flexible in order to support integration and support system development needs that may arise as the RACE system becomes more mature. To facilitate the open exchange of information, performers will have Associate Contractor Agreement (ACA) language included in their award. See Section VIII.E for more information regarding an ACA.

C.1 Technical Area 1: Cryptography

Performers in this TA will develop techniques, protocols and prototype code to accomplish specific, efficient secure multiparty computation (MPC) task at thousand-party scale. For metrics, see Table 3. The overall desired functionality of such computation is to let users send and receive messages and to enable system nodes to jointly determine how to pass messages from one user to another without any server node understanding how the message is passed. Additional information that server nodes hold about each other that could be used to compromise larger groups of nodes should also be encrypted at all times, and computation will likely need to be performed on such encrypted information in order to keep it secure at all times. TA1 performers will work with TA3 performers to identify and secure such information.

The end-to-end task of passing a message should be performed in minutes (e.g., from the time the initial communication of the sender to the time the receiver obtains the message)[6]. From the perspective of TA1 performers, they should simply assume 10 Mbps point-to-point channels. It may be that TA1 performers have limited access to the broadcast channel used for client-server communications as described in Section 1.B.2 and below in Section 1.C.2, but TA1 performers should recognize that this may not be a channel designed for persistent use (and therefore may only be usable for very limited purposes).

The desired outcome from TA1 is *efficient MPC implementations*. Proposals that only demonstrate asymptotic (i.e., complexity theoretic) efficiency are not of interest. It is anticipated that concrete efficiency will be the primary challenge of this TA. TA1 proposers should describe in detail methods for demonstrating the concrete performance of their solutions over the course of the program.

Proposers to TA1 should describe a viable MPC architecture (e.g., whether a message is actively pushed from Alice to Bob or if Bob will retrieve the message from the server). There may also be server nodes with different purposes (e.g., some nodes may only perform specific subtasks, such as message receipt from Alice or passing to Bob, or may perform particular MPC subtasks so TA1 proposers should be careful to justify why such specialization does not reduce the security of the system (e.g., that more than 20% of the system must be corrupted to break its security). In addition, for architectures where the receiver must retrieve a message from the server, the distributed, resilient storage issues must be addressed.

The metrics for this program stipulate correct system operation at a 20% node corruption rate. TA1 proposers should note that this rate is *epoch-based*, where the security model should be assumed to be able to support security up to this threshold over the course of, for example, a

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[6] If a mechanism is proposed where a receiver must actively retrieves the message, this time assumes that the receiver attempts to receive the message as soon as it is stored.

month. TA1 proposers should describe how the system can incorporate new nodes (and kick out corrupted nodes) over time (see Table 3 for more details).

TA1 proposers should not expect that the graph of logical connections between server nodes be a complete graph. As a result, proposers should address how internode connectivity might affect the security and efficiency of their solutions. While TA1 proposals do not need to be explicitly topology hiding or support deniable communications, stronger proposals will reinforce the system security goals of the RACE program.

TA1 performers will be the cryptographic experts for RACE system development. For example, to the extent that advanced cryptographic means are required, TA1 performers will also be responsible for key management and/or distribution in the RACE system (e.g., MPC, identity- or attribute-based encryption).

While standard cryptographic security models revolve around security definitions such as "honest but curious" and "malicious" (referred to as "passive" and "active", respectively, in Table 3), proposers should describe how they will achieve whatever security is desired in order to create the desired security properties as outlined in Section 1.B.1. Proposers should indicate the extent to which they believe non-standard security models are more appropriate, and their implications (e.g., for efficiency).

TA1 performers will be expected to work with TA3 integrators to determine desired code format and other interoperability issues. TA1 performers will be required to periodically deliver and integrate their code within a framework that the TA3 integrator specifies. TA1 proposals should discuss their experience creating code to implement advanced cryptographic protocols (e.g., MPC). TA1 proposals should fully explain why they will be able to work seamlessly with other performers.

Topics of research that are specifically OUT OF SCOPE for TA1 include:

- Reliance on specialized or secure hardware;
- Cryptanalysis (other than security proofs for provided systems); and
- Cryptographic protocols based on non-standard or not commonly accepted cryptographic hardness assumptions.

Metric	Phase 1 (18 mo)	Phase 2 (12 mo)	Phase 3 (18 mo)
Nodes: users/server	10 / 100	100 / 1k	10k / 1k
Crypto adversary / corruption level	Passive / 20%	Active / 10%	Active / 20%
Crypto key infrastructure	Assumed	Not assumed	Not assumed
msg/day / size / delay	500 / 140B / 5 min latency	5k / 140B / 1 min latency	500k / 1MB / 1 min latency
Node refresh	Demonstrate	1/month	1/week

Table 3: TA1 Metrics

C.2 Technical Area 2: Obfuscated Communication

Performers in this TA should develop a communications toolbox that enables users to evade automated protocol identification via stateful deep packet inspection capabilities across the network environment where the toolbox is deployed. This toolbox should create a means by which the RACE system can embed desired communications protocols within particular channels that reside completely within the network environment. Proposals for this TA that require exiting the network environment are not of interest. A minimal amount of external communications is allowed for initializing the system.

The fundamental goal of TA2 is to achieve undiscoverable communications even where real-time, deep packet inspection (DPI) is possible. Further, such DPI could be leveraged via traffic filtering, manipulation or injection, again possibly in real time, and at network scale.

The fundamental security approach of RACE to obfuscated communications is through rigorous security arguments, essentially a Kerckhoffs' principle for communications systems.[7] The means of obfuscated communication, other than specific keys or initialization values, should be assumed to be publically known.

There are three capabilities that TA2 performers will need to develop:

1) the means to encapsulate desired communications within targeted channels that exist within the network environment (here, a channel is an information-theoretic construct and could entail numerous concrete communications channels and phenomenologies);
2) the means to measure targeted normal channels in order to understand their baseline statistics with respect to how the protocol encapsulation will modify them; and
3) the means of rigorously demonstrating, ideally via proof, that the statistical distance of the distributions that model the targeted channel with and without encapsulated communications will be close. TA2 technologies should maintain security (that is, statistical closeness to normal communications) even when their methods are publically known.

Within TA2, there are two primary modes of communication: 1) server-server communication and 2) client-server communication. Server-server communication is the mode that system nodes will use to communicate with each other. Client-server communication is the mode by which the mobile app should communicate with the server nodes. It is anticipated, but not required, that server-server communications should target channels associated with point-to-point-based network services while client-server communications will target broadcast-based network services. TA2 proposals may address both or just one of these modes of communication, however, proposals should clearly and conspicuously state which mode(s) of communication their proposal addresses.

The channels targeted by TA2 solutions may be very specific. As a result, it is acceptable for a TA2 proposal to only be appropriate for specific environments due to their use of specific technologies (e.g., the targeted channel will leverage traffic from technology X, in environment Y, or both). TA2 proposals should clearly specify these constraints and discuss why they are

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[7] Auguste Kerckhoffs, "La cryptographie militaire" Journal des sciences militaires, vol. IX, pp. 5–83, January 1883, pp. 161–191, February 1883.; Shannon, Claude. "Communication Theory of Secrecy Systems". Bell System Technical Journal. 28: 662.

appropriate. TA2 proposals should discuss how their technologies might work in environments that don't satisfy these constraints. Strong TA2 proposals will clearly discuss the limitations of how their proposed approach would work in a real network environment.

Because a critical approach to the RACE system is testability, proposals should discuss the elements required to test their technologies within a simulated network environment. There are two primary components of this testability requirement. First, TA2 performers should plan on holding regular discussions with the Government provided Test and Evaluation (T&E) team in order to help increase the realism of the network environment. The relationship between TA2 performers and the T&E team will be collaborative rather than adversarial. Second, TA2 technologies must be testable. For the purposes of planning and cost estimation, proposers should assume that the test environment will be implemented within Amazon Web Services. Accordingly, TA2 proposals should discuss how their solutions could be implemented and tested within a commercial cloud environment. For instance, solutions that require special hardware (e.g., gaming computers) or software (e.g., popular applications and their related back-end infrastructure) should explain how such systems could be either implemented or realistically simulated within such a commercial cloud environment in order to realistically test their proposed technology. Proposals should make clear their assumptions about the test environment, and propose mitigations in case their assumptions do not hold. Strong TA2 proposals should fully explain the testability of their solutions.

Strong TA2 proposals should justify their targeted channels within the objectives of the RACE program and TA2. Choosing too-rich channels within which to encapsulate can be nearly impossible to realistically model.[8]

Strong TA2 proposal should explain how their channel is measurable by the T&E team, testable, and there is reason to believe that statistical closeness can be demonstrated with respect to encapsulated communications within the channel. Strong proposals will also discuss how possibly unrelated network effects and traffic may affect proposed TA2 statistical models.

Strong TA2 proposals should explain why the targeted channel is such that it would be undesirable to simply filter out the entire channel in order to broadly filter the RACE system as well. Note that in-depth economic or other analysis of the value of the targeted channel is not required within this TA, however this motivation will help the proposer argue the applicability of their proposed solution.

Strong TA2 proposals should discuss how TA2 solutions can resist manipulation of the network environment. For instance, if a timing side-channel solution is proposed, why will this be resilient against the active introduction of random timing jitter across the network?

Strong TA2 proposals should discuss how TA2 solutions can retain the RACE TA2 security and functionality objectives even in the face of successful compromise of server nodes, clients, and their respective systems (to include TA2-related settings).

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[8] See, for instance: Amir Houmansadr, Chad Brubaker, and Vitaly Shmatikov. The Parrot Is Dead: Observing Unobservable Network Communications. In Proceedings of the 2013 IEEE Symposium on Security and Privacy (SP '13). IEEE Computer Society, Washington, DC, USA, 65-79.

All TA2 proposals should discuss what, if any, communication is <u>ever</u> needed outside of the network environment (e.g., for initial setup).

TA2 proposers should discuss their experience creating code to obfuscated communication/protocol encapsulation technologies. TA2 proposers should fully explain why they will be able to work seamlessly with other RACE performers.

TA2 performers will be expected to work with TA3 integrators, as well as the T&E team, to determine desired code format and other interoperability issues. TA2 performers will be expected to regularly discuss range realism issues with the T&E team, particularly as it may relate to any data TA2 may gather in order to increase their understanding of targeted channel statistics. TA2 performers will be required to periodically deliver and integrate their code within a framework that the TA3 integrator specifies.

Metric	Phase 1 (18 mo)	Phase 2 (12 mo)	Phase 3 (18 mo)
Nodes: users/server	10 / 100	100 / 1k	10k / 1k
Crypto key infrastructure	Assumed	Not assumed	Not assumed
Security	Quantitative/ simulated evaluation	Statistical distance proof sketch	Statistical distance full proof
Adversary	Passive	Active link inject	Link+node inject
Logical bandwidth (server-server)	5 Mbps	10 Mbps	10 Mbps
Logical bandwidth (client-server broadcast)	100 kbps outgoing	500 kbps outgoing	500 kbps outgoing
Channel Model	Simulation evaluation	Proof (passive adversary)	Proof (active adversary)

Table 4: TA2 Metrics

Please note that topics of research that are specifically OUT OF SCOPE for TA2 include:
- RF-based communication (other than IP-based mobile communication); and
- Techniques that are untestable other than by deployment in an actual network environment.

C.3 Technical Area 3: Integration

The primary objective of TA3 is the creation of a working RACE system prototype that maintains RACE security objectives listed in Table 1 (i.e., user metadata and "fact of" communication confidentiality, confidentiality of system node identity, etc.). It is anticipated this TA will also address initial system configuration/setup including implementation of key distribution methods required by TA1 teams. TA3 will develop the prototype RACE system, which includes a mobile application for communications, the software application for the system nodes, as well as integrate the application distribution approach from TA3.1 (discussed below). TA3 will develop the system by incorporating technologies from the TA1 and TA2 teams into an integrated software suite.

As mentioned in Section B.2, TA3 will develop the mobile client for a version of the Android operating system and the server nodes as an application on specific versions of the Windows and/or Linux operating systems. The server nodes should be executable on a (possibly high-end) home computer. Network connectivity/bandwidth of these systems should be assumed to be broadband (e.g. 20 Mbps+).

In the first phase of the program, it is anticipated the TA3 performer will design and develop a messaging architecture with a plugin interface for TA1 and TA2 technologies. As part of this initial capability, the TA3 performer will build an integration specification for the software suite which TA1 and TA2 teams will comply in Phase 2. It is expected that during the initial PI and integration meetings that the TA3 team will drive discussion of requirements from TA1, TA2, and TA3.1 teams in order to reach a design consensus.

In the second and third phases, it is anticipated the TA3 performer will create an integrated RACE system prototype. A large part of this task is to ensure that the overall RACE system that TA3 develops does not introduce attack surfaces that TA1, TA2, and TA3.1 have specifically been designed to reduce. Therefore, TA3 proposals should explain how they will integrate TA1, TA2, and TA3.1 technologies in such a manner that still maintains the larger RACE security and functionality goals. As an example, if TA3 creates fixed identities for server nodes that enable the compromise of many nodes once a single node is successfully compromised, such an outcome would run entirely counter to the design philosophy of RACE.

It is TA3's responsibility to bridge the capability gap between the underlying TA1 and TA2 technologies and the needs of the integrated RACE system. Accordingly, TA3 proposals should discuss what additional capabilities they think need to be developed to enable the creation of a prototype RACE system. Such capabilities may include:

- Networking technologies that can be built on top of TA2 communications links;
- Technologies to counter denial of service attacks (e.g., by downloading many copies of the client system in order to overwhelm RACE server node capacity);
- Technical mechanisms, to include mechanisms for trusted introduction, to help enable the introduction of new server nodes; and
- Technical mechanisms to leverage TA3.1 technologies to create (possibly trusted) introductions to help spread the mobile application to potential users.

The TA3 performer will lead bi-weekly telecons amongst the various other RACE performers. The TA3 performer will lead quarterly integration meetings with all other RACE performers starting at the first PI meeting in Month 6. Every other such meeting will coincide with the bi-annual PI meetings. The TA3 team will host a shared, program-only software repository for TA1, TA2, and TA3.1 teams to deliver modules and for the T&E team to obtain artifacts to run their version of the messaging system infrastructure. This repository should support a shared workspace area (e.g. wiki, docs) as well. The TA3 performer will ensure that this repository incorporates appropriate cybersecurity controls (e.g., ensure latest system/security updates installed, multi-factor authentication to access the repository, etc.). The TA3 team should also maintain the ability to validate their system (though the most extensive testing, especially from an adversarial perspective, will likely only be doable within the T&E team's environment).

Strong TA3 proposals should address how they will work to integrate TA1, TA2, and TA3.1 technologies from a software development perspective. Proposals should mention previous

experience, if any, in managing diverse teams of academics and companies to develop complex systems. Proposals should discuss their approach to the design of the RACE system architecture and integration API/plugin system

Strong TA3 proposals should describe what additional capabilities will be needed on top of TA1, TA2 and TA3.1 technologies to build a useful, prototype RACE system and how the TA3 team will develop those capabilities. Strong proposals should discuss how their integrated system will achieve the needed RACE functionality and security objectives. In particular, proposals will discuss how their integration will maintain the security delivered by individual TA technologies.

Because a critical approach to the RACE system is testability, TA3 proposals should discuss the elements required to test their technologies within a simulated network environment. TA3 performers should assume that TA2 technologies are testable per the discussion in Section 1.C.2. TA3 proposals should discuss how the integrated RACE system could be implemented and tested within a commercial cloud environment (e.g., Amazon Web Services), following the same line of issues outlined above in Section 1.C.2. TA3 proposals should make clear their assumptions about the test environment, and propose mitigations in case their assumptions do not hold. Strong TA3 proposals should fully explain the testability of their solutions.

TA3 proposals should discuss their experience developing systems relevant to the RACE server node and mobile application architecture.

TA3 performers will be expected to work with other TA teams well as the T&E team to determine desired code format and other interoperability issues. TA3 performers will be required to periodically release their system to the T&E team.

Metric	Phase 1 (18 mo)	Phase 2 (12 mo)	Phase 3 (18 mo)
Nodes: users/server	10 / 100	100 / 1k	10k / 1k
System	Architecture	Full prototype integration	Full demo system
Adversarial exploitation	Passive	Active node exploitation	Full spectrum exploitation
Communications channels	Mock channel	Single TA 2 (server-server and client-server) channel	Switch between channels

Table 5: TA3 Metrics

C.4 Technical Area 3.1: Resilient Application Distribution

Performers in this TA will develop techniques as well as associated software to enable a distributed storage and reconstruction functionality for the RACE mobile app (and potentially for other RACE-relevant software). The goal is to distribute an application so that many RACE system nodes hold random-appearing data "shards" that can be used to reconstruct the application, and only after sufficient shards are collected will the application be recoverable. Not all shards are needed to accomplish reconstruction (the percentage of shards needed is a tunable parameter; for concrete performance metrics, see Table 6). The primary goal of this task is

enable application sharding, shard storage, and reconstruction via shards. The challenge is to enable application sharding and reconstruction that supports immediate execution of the reconstructed output.

Any proposer can bid on this TA, not just TA3 proposers. For TA1 and TA3 proposers, TA3.1 may be bid as part of a combined proposal, but TA3.1 must be bid as a separable option. It is anticipated that there will be a single performer for this TA, but its selection determination may be separate from the other TA proposed and not being selected as the single TA3.1 performer does not automatically disqualify the remaining portion of your proposal from being potentially selected. This TA3.1 team will work closely with the main TA3 team to ensure the techniques developed are able to be integrated quickly into mobile app distribution.

The TA3.1 performer should create three functionalities: 1) take as input an application and split it into shards; 2) store and maintain these shards across service nodes; and 3) upon appropriate command (which will be determined by TA3.1 performers), reconstruct the application at a desired service node and/or mobile device. The TA3.1 performer will work carefully with the larger RACE team to ensure that these functionalities seamlessly integrate within the larger RACE system. This includes the fact that TA3.1-related communications must go over TA2 communications links (and therefore TA3.1 should assume a maximum communication bandwidth of 10 Mbps).

Just as for TA1, the TA3.1 performer should assume that server nodes may be compromised at a given rate. Proposers should describe how they will be able to add new app shards as server nodes are added or removed.

Strong TA3.1 proposals should be able to accomplish sharding such that the underlying identity of the sharded application cannot be determined. What is desired is that the "splitting" functionality described above first splits the application into underlying innocuous "gadgets" that, even if reconstructed, would not reveal the underlying functionality of the overall software functionality. These gadgets are then in turn cryptographically secret-shared.

Server nodes responsible for app shard storage and reconstruction may be the same or different from those required for message passing. The actual architecture will be determined in conjunction with TA3 and the larger RACE performer base.

The TA3.1 performer should be able to support Android, Windows, or Linux application splitting. The TA3.1 performer should be able to support server nodes that run either the Windows or Linux operating system. Proposers should assume that the Android device has sufficient permissions to download and install an application outside of the standard app store.

The main challenge for TA3.1 is the combination of the cryptographic sophistication combined with the need to create a concretely usable technological output. TA3.1 is an optional TA precisely because some TA1 proposers may not have the required software development experience, while some TA3 proposers may not have the required cryptographic experience.

TA3.1 will be expected to work with TA3 integrators to determine desired code format and other interoperability issues. The TA3.1 performer will be required to periodically deliver and integrate their code within a framework that the TA3 integrator specifies. TA3.1 proposals should discuss their experience creating code to implement cryptographic protocols (e.g., secret

sharing) as well as application splitting and recombination. TA3.1 proposals should fully explain why they will be able to work seamlessly with other RACE performers.

Metric	Phase 1 (18 mo)	Phase 2 (12 mo)	Phase 3 (18 mo)
Crypto adversary / corruption level	Passive / 20%	Active / 10%	Active / 20%
Crypto key infrastructure	Assumed	Not assumed	Not assumed
Node refresh	Demonstrate	1/year	1/month
Logical sharding	Demonstrate	Atomic functionalities	Innocuous "gadgets"
Nodes: total that hold shards/needed to reconstruct a single app	50/10	250/30	1000/50
App reconstruction	10 min	5 min	5 min
App size	1MB	10 MB	50 MB

Table 6: TA3.1 Metrics

C.5 RACE Performer Collaboration Summaries

The following table outlines the expected collaboration efforts between the various TA teams:

TA	(Bidirectional) Collaboration Required
TA1	• Work within the TA3-provided system development framework to transition code to perform MPC and/or other cryptographic technologies. Aid the TA3 team in constructing distributed system architectures and/or hierarchies that correspond to those required by TA1-developed MPC protocols. • Work with TA2 team to support any cryptographic key generation and distribution that may be required for TA2 channels; communicate with TA2 team to ensure that MPC-related communication links correspond to those being developed within TA2
TA2	• Work within the TA3-provided system development framework to integrate TA2 communications capabilities into the RACE system architecture. Ensure that TA2 communications link security properties are maintained by TA3 implementations. • Work with TA3.1 team to ensure that communications links correspond with communications needs associated with resilient application distribution. • Work with T&E team to help ensure testing range realism; communicate desired capabilities the T&E environment should replicate in order to support TA2 technologies (but see also the testability requirements discussed in Section I.C.2).
TA3.1	• Work within the TA3-provided system development framework to integrate TA3.1 application distribution capabilities into the RACE system architecture. Work with the TA3 integrator to ensure that server node capabilities and architectures appropriately support TA3.1 technologies.

TA3	• Work with the T&E team to communicate desired capabilities that the T&E environment should replicate in order to support testing the integrated RACE system.

Table 7: Performer Collaboration Summary

D. Program Capability Demonstration

A key part of the RACE program is demonstration of capability in a realistic network environment. The T&E team will create a realistic environment within which to deploy and evaluate technologies built by the other RACE teams. The goal for the T&E team is to create environments that support both realistic scale and functionality of network environments. This testbed will be utilized for testing both large scale distributed computation tasks created by TA1 teams as well as modelling third party communications channels need by TA2 teams in order to obfuscation their communication within it. TA2 performers are in particular expected to work closely with the T&E team in order to help ensure network environment realism. The T&E team will participate in the quarterly integration meetings to cover testbed-specific matters, to include measures to ensure testbed realism. The T&E team will run the main test environment which will scale up to support testing within the metrics for each TA. This includes hosting virtual clients, compute nodes, network infrastructure (routers, firewalls, taps), storage (e.g. for packet capture), and nodes required to implement TA2 channels as needed. The testbed will be instrumented to observe and capture network traffic as might happen in large network environments (e.g., at simulated ISP connection points, gateway routers, etc.). For the purpose of this BAA, proposers should assume that the T&E test environment will be implemented within Amazon Web Services.

Note that general functional testing is expected to be performed separately by individual TA teams and the integration team. In particular, the T&E-developed simulated environment will be used to test RACE performers; it is not a development or prototype testing environment. However, as the program progresses, performers will have the ability to periodically "scrimmage" within the T&E environment before each end-of-phase evaluation is conducted.

The T&E team will also act as the voice of the adversary. The primary focus of the voice of the adversary is to try to degrade or deny RACE system functionality and to try to turn small victories into larger ones. The two primary components of this effort will be: 1) evaluate RACE system communications traffic in order to try to violate the observability security properties (see Table 1) and/or to filter or otherwise manipulate RACE communications traffic; and 2) evaluate data resident on the RACE client application and system nodes in order to try to target other, not currently exploited RACE system participants. Actual exploitation of RACE system software, e.g., by developing implants and/or exploits, will not be a focus of the voice of the adversary effort; it will just be assumed that the adversary can successfully exploit RACE systems and software as desired.

From an overall system testing perspective, the T&E team will be testing increasingly complex variants and increasing the adversary's capabilities over the program lifetime. Table 8 shows the high level testing goals.

	Phase 1 (18 mo)	Phase 2 (12 mo)	Phase 3 (18 mo)
Testing emphasis and adversarial capabilities	Test unintegrated, individual TA technologies assuming a passive adversary	Test initial integrated RACE system prototype assuming an adversary who can 1) manipulate TA2 links in transit and 2) actively corrupt system nodes and users to try to break MPC-secured functionalities of TA1 and TA3.1 (but not to break TA2 links)	Test full RACE system via active link and node injection and manipulation for TA1, TA2, and TA3.1 technologies

Table 8: Test and Evaluation Progression

It is intended that the T&E team will consist of FFRDC and/or UARC participants. As a result, DARPA is not soliciting proposals for the T&E team under this BAA.

E. Schedule and Milestones

DARPA anticipates a March 2019 start date for the RACE program. The program will run for 48 months and has been organized into three (3) phases. Phase 1 will be 18 months, followed by a 12-month Phase 2, and then concluded with Phase 3 at 18 months. See Figure 1 for details. There will be biannual PI meetings held in conjunction with demonstrations to review technical progress and provide an opportunity for face-to-face collaboration. T&E system evaluations will be conducted three months prior to each PI meeting starting in month 9 in order for results to be available for review and discussion.
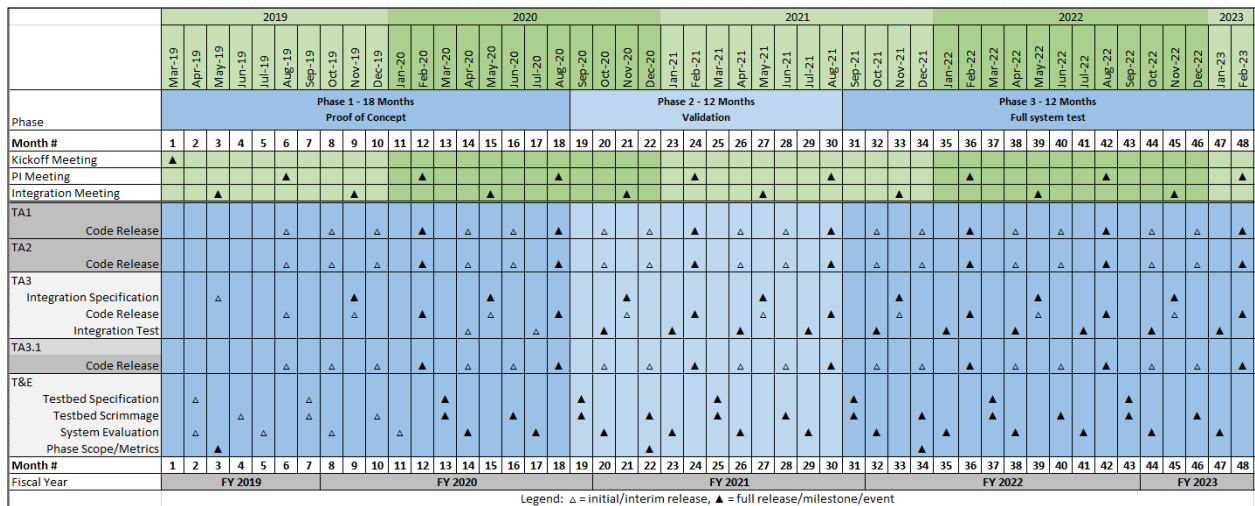
Figure 1: RACE Program Schedule

Phase 1 will emphasize initial development of the tools and techniques needed to validate the individual components of the RACE system (MPC, obfuscated communications, resilient application distribution) at a moderate scale. The system integrator will also develop the architecture through which the RACE system will be developed building on these system

components. No actual integration of components will be formally tested in Phase 1. TA1, TA2, and TA3.1 teams will make initial code releases to the shared repository starting at month 6 with a goal of working initial demo by month 12. After that, teams will release regular snapshots every two months. The T&E team will work on testbed specification and environment during this phase as well as lead the development of phase and scope metrics for all teams. The T&E team will evaluate the system at end of phase assessing whether concrete program metrics have been achieved (months 15-18).

Phase 2 will emphasize developing an initial integrated RACE system prototype. The individual RACE system components will also be refined to handle larger scales. At the end of Phase 2, the test and evaluation team will test this initial integrated system in the RACE test environment. Schedule-wise, proposers should recognize that Phase 2 is shorter than Phase 1 and requires at least an order of magnitude increase in complexity. Therefore, planning should be done *during Phase 1* in order to accomplish Phase 2 metrics for an initial integrated system.

Phase 3 will emphasize scaling techniques to demonstrate an integrated RACE system prototype at a larger scale (1,000 server nodes and 10,000 mobile client users). To the extent that multiple possible architectures were considered in Phase 2, the RACE system will be implemented for the architecture assessed to best meet the RACE functionality and security goals. At the end of Phase 3, the T&E team will test the final integrated system in the RACE test environment.

F. Deliverables

All performers will be required to provide, at a minimum, the following deliverables:

- Any technical papers derived from work funded by RACE;
- Commented source code, any other necessary data and documentation (including at minimum user manuals and a detailed software design document) for all software developed under this program;
- For all performers developing software, code releases will be provided to the System Evaluator at least every six months but preferably more frequently (e.g., two month snapshots), to include all source code, build scripts, test harnesses, development environments, unit tests and system tests;
- For all performers developing software, no later than week 9 after the start of each phase, a document defining metrics for testing and evaluation and discussing a concept of operations for conducting evaluations of any software that requires user interaction, to be produced in collaboration with the System Evaluator;
- Annotated slide presentations must be submitted within one month after the program kickoff meeting and after each program event (program reviews, PI meetings, and technical interchange meetings);
- Monthly technical status reports detailing progress made, tasks accomplished, major risks, planned activities, trip summaries, changes to key personnel, and any potential issues or problem areas that require the attention of the Government Team must be provided within 10 days of the end of each calendar month;
- Monthly financial status reports must be provided within 10 days of the end of each calendar month; and
- A final phase report for each program phase that concisely summarizes the effort conducted, technical achievements, and remaining technical challenges will be due 30

days after the end of each phase; and a Final Report at the end of the overall period of performance that summarizes the entire project.

G. Intellectual Property

One of the primary goals of the RACE program is to make the technology developed over the course of the program available to the broader community. Accordingly, performers would be expected to open-source their technologies by the end of the program. Intellectual property rights asserted unless otherwise directed by proposers are strongly encouraged to be aligned with open source regimes. Teams that do not intend to open-source their technologies developed in this program may be judged less favorably. At an absolute minimum, noncommercial software and technical data are encouraged to be delivered under this program with Government Purpose Rights (GPR). See Section VI.B.1 for more details on intellectual property.

H. Abbreviations

ACA	Associate Contractor Agreement
COTS	Commercial off-the-shelf
CTI	Controlled Technical Information
CUI	Controlled Unclassified Information
DPI	Deep packet inspection
FOSS	Free and open-source
GOTS	Government off-the-shelf
GPR	Government Purpose Rights
ISP	Internet Service Provider
MPC	(Secure) Multi-party Computation
TA	Technical area

II.   Award Information

A. Awards

Multiple awards are anticipated. The level of funding for individual awards made under this solicitation has not been predetermined and will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work, overall funding strategy, and availability of funding. See Section V for further information.

The Government reserves the right to:
– select for negotiation all, some, one, or none of the proposals received in response to this solicitation;
– make awards without discussions with proposers;
– conduct discussions with proposers if it is later determined to be necessary;
– segregate portions of resulting awards into pre-priced options;
– accept proposals in their entirety or to select only portions of proposals for award;
– fund proposals in increments and/or with options for continued work at the end of one or more phases;
– request additional documentation once the award instrument has been determined (e.g., representations and certifications); and
– remove proposers from award consideration should the parties fail to reach agreement on award terms within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

Proposals selected for award negotiation may result in a procurement contract or a cooperative agreement depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. Grants will NOT be awarded under this program.

In all cases, the Government contracting officer shall have sole discretion to select award instrument type, regardless of instrument type proposed, and to negotiate all instrument terms and conditions with selectees. DARPA will apply publication or other restrictions, as necessary, if it determines that the research resulting from the proposed effort will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program. For more information on publication restrictions, see the section below on Fundamental Research.

B. Fundamental Research

It is DoD policy that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. National Security Decision Directive (NSDD) 189 defines fundamental research as follows:

‘Fundamental research’ means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development,

design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

As of the date of publication of this BAA, the Government expects that program goals as described herein may be met by proposers intending to perform fundamental research and proposers not intending to perform fundamental research or the proposed research may present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Based on the nature of the performer and the nature of the work, the Government anticipates that some awards will include restrictions on the resultant research that will require the awardee to seek DARPA permission before publishing any information or results relative to the program.

Proposers should indicate in their proposal whether they believe the scope of the research included in their proposal is fundamental or not. While proposers should clearly explain the intended results of their research, the Government shall have sole discretion to select award instrument type and to negotiate all instrument terms and conditions with selectees. Appropriate clauses will be included in resultant awards for non-fundamental research to prescribe publication requirements and other restrictions, as appropriate. This clause can be found at http://www.darpa.mil/work-with-us/additional-baa.

For certain research projects, it may be possible that although the research being performed by the awardee is restricted research, a subawardee may be conducting fundamental research. In those cases, it is the awardee's responsibility to explain in their proposal why its subawardee's effort is fundamental research

C. Disclosure of Information and Compliance with Safeguarding Covered Defense Information Controls

The following provisions and clause apply to all solicitations and contracts; however, the definition of "controlled technical information" clearly exempts work considered fundamental research and therefore, even though included in the contract, will not apply if the work is fundamental research.

DFARS 252.204-7000, "Disclosure of Information"
DFARS 252.204-7008, "Compliance with Safeguarding Covered Defense Information Controls"
DFARS 252.204-7012, "Safeguarding Covered Defense Information and Cyber Incident Reporting"

The full text of the above solicitation provision and contract clauses can be found at http://www.darpa.mil/work-with-us/additional-baa#NPRPAC.

Compliance with the above requirements includes the mandate for proposers to implement the security requirements specified by National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171, "Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations" (see https://doi.org/10.6028/NIST.SP.800-171r1) that are in effect at the time the BAA is issued.

For awards where the work is considered fundamental research, the contractor will not have to implement the aforementioned requirements and safeguards; however, should the nature of the

work change during performance of the award, work not considered fundamental research will be subject to these requirements.

III.   Eligibility Information

A. Eligible Applicants

DARPA welcomes engagement from all responsible sources capable of satisfying the Government's needs, including academia (colleges and universities); businesses (large, small, small disadvantaged, etc.); other organizations (including non-profit); entities (foreign, domestic, and government); FFRDCs; minority institutions; and others.

DARPA welcomes engagement from non-traditional sources in addition to current DARPA performers.

1. Federally Funded Research and Development Centers (FFRDCs) and Government Entities

a. FFRDCs

FFRDCs are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless they meet the following conditions: (1) FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter on official letterhead from their sponsoring organization citing the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and their compliance with the associated FFRDC sponsor agreement's terms and conditions. This information is required for FFRDCs proposing to be awardees or subawardees.

b. Government Entities

Government Entities (e.g., Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations. Government entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority and contractual authority, if relevant, establishing their ability to propose to Government solicitations.

c. Authority and Eligibility

At the present time, DARPA does not consider 15 U.S.C. § 3710a to be sufficient legal authority to show eligibility. While 10 U.S.C.§ 2539b may be the appropriate statutory starting point for some entities, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility. DARPA will consider FFRDC and Government entity eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

2. Foreign Participation

Non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security regulations, export control laws, and other governing statutes applicable under the circumstances.

B. Organizational Conflicts of Interest

FAR 9.5 Requirements
In accordance with FAR 9.5, proposers are required to identify and disclose all facts relevant to potential OCIs involving the proposer's organization and *any* proposed team member (subawardee, consultant). Under this Section, the proposer is responsible for providing this disclosure with each proposal submitted to the BAA. The disclosure must include the proposer's, and as applicable, proposed team member's OCI mitigation plan. The OCI mitigation plan must include a description of the actions the proposer has taken, or intends to take, to prevent the existence of conflicting roles that might bias the proposer's judgment and to prevent the proposer from having unfair competitive advantage. The OCI mitigation plan will specifically discuss the disclosed OCI in the context of each of the OCI limitations outlined in FAR 9.505-1 through FAR 9.505-4.

Agency Supplemental OCI Policy
In addition, DARPA has a supplemental OCI policy that prohibits contractors/performers from concurrently providing Scientific Engineering Technical Assistance (SETA), Advisory and Assistance Services (A&AS) or similar support services and being a technical performer. Therefore, as part of the FAR 9.5 disclosure requirement above, a proposer must affirm whether the proposer or *any* proposed team member (subawardee, consultant) is providing SETA, A&AS, or similar support to any DARPA office(s) under: (a) a current award or subaward; or (b) a past award or subaward that ended within one calendar year prior to the proposal's submission date.

If SETA, A&AS, or similar support is being or was provided to any DARPA office(s), the proposal must include:

- The name of the DARPA office receiving the support;
- The prime contract number;
- Identification of proposed team member (subawardee, consultant) providing the support; and
- An OCI mitigation plan in accordance with FAR 9.5.

Government Procedures
In accordance with FAR 9.503, 9.504 and 9.506, the Government will evaluate OCI mitigation plans to avoid, neutralize or mitigate potential OCI issues before award and to determine whether it is in the Government's interest to grant a waiver. The Government will only evaluate OCI mitigation plans for proposals that are determined selectable under the BAA evaluation criteria and funding availability.

The Government may require proposers to provide additional information to assist the Government in evaluating the proposer's OCI mitigation plan.

If the Government determines that a proposer failed to fully disclose an OCI; or failed to provide the affirmation of DARPA support as described above; or failed to reasonably provide additional information requested by the Government to assist in evaluating the proposer's OCI mitigation plan, the Government may reject the proposal and withdraw it from consideration for award.

C. Cost Sharing/Matching

Cost sharing is not required; however, it will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., OTs under the authority of 10 U.S.C. § 2371).

D. Other Eligibility Requirements

1. Ability to Receive Awards in Multiple Technical Areas - Conflicts of Interest

Proposers may submit separate proposals to one or more technical areas. However, if a TA3 proposer or one of their subcontractors are also proposing either as a prime or subcontractor to either TA1 or TA2, their TA3 proposal should include a plan to maintain objectivity in the integration of other teams' technology if selected for TA3 and either TA1 or TA2. As an example, one manner to maintain objectivity could be to maintain a division of labor whereby the PI for TA3 and for TA1 and/or TA2 were separate and did not work on each other's efforts. TA3 proposals that do not mitigate conflict of interest concerns may be deemed not selectable.

2. Ability to Support Classified Development

It is not anticipated that RACE technologies will be classified (or be considered Controlled Technical Information; see RACE Controlled Unclassified Information Guide, which can be found at http://www.darpa.mil/work-with-us/opportunities, for further details). However, some transition-related discussions may be classified. As a result, it is desired, but not required, that either the PI or key technical personnel for TA3 hold a Top Secret clearance and be eligible for Sensitive Compartmented Information (SCI) in order to carry out these discussions. TA3 proposers must provide their CAGE code and security point(s) of contact in their proposals, if applicable. Proposers for TA1, TA2 and TA3.1 are not required to hold or obtain security clearances; however, they should identify in their proposals whether the PI and/or any key personnel hold clearances (and if so, at what level). Facilities for the storage and processing of classified information are not necessary for RACE; however, TA3 proposers should identify if they have such facilities (other proposers can include such information if they desire to).

Academic, non-profit, and small company participation is explicitly encouraged, regardless of possession of a security clearance.

IV. Application and Submission Information

A. Address to Request Application Package

This document contains all information required to submit a response to this solicitation. No additional forms, kits, or other materials are needed except as referenced herein. No request for proposal (RFP) or additional solicitation regarding this opportunity will be issued, nor is additional information available except as provided at the Federal Business Opportunities website (https://www.fbo.gov), the Grants.gov website (http://www.grants.gov/), or referenced herein.

B. Content and Form of Application Submission

1. Abstracts

Proposers are highly encouraged to submit an abstract in advance of a proposal to minimize effort and reduce the potential expense of preparing an out of scope proposal. The abstract provides a synopsis of the proposed project, including brief answers to the following questions:

- What is the proposed work attempting to accomplish or do?
- How is it done today, and what are the limitations?
- Who will care and what will the impact be if the work is successful?
- How much will it cost, and how long will it take?

DARPA will respond to abstracts with a statement as to whether DARPA is interested in the idea. If DARPA does not recommend the proposer submit a full proposal, DARPA will provide feedback to the proposer regarding the rationale for this decision. Regardless of DARPA's response to an abstract, proposers may submit a full proposal. DARPA will review all full proposals submitted using the published evaluation criteria and without regard to any comments resulting from the review of an abstract.

Abstract Format: Abstracts shall not exceed a maximum of 5 pages including the cover sheet and all figures, tables, and charts. The page limit does not include a submission letter (optional).

As a reminder, each abstract submitted in response to this BAA shall address only one TA. Organizations may submit multiple abstracts to any one TA, or they may submit abstracts to multiple TAs.

All pages shall be formatted for printing on 8-1/2 by 11 inch paper with 1-inch margins and font size not smaller than 12 point. Font sizes of 8 or 10 point may be used for figures, tables, and charts. Document files must be in .pdf, .odx, .doc, .docx, .xls, or .xlsx formats. Submissions must be written in English. All pages should be numbered.

Abstracts must include the following components:

- **Cover Sheet**: Provide the administrative and technical points of contact (name, address, phone, email, lead organization). Include the BAA number, title of the proposed project,

primary subcontractors, estimated cost, duration of the project, and the label "Abstract."

- **Goals and Impact:** Describe what is being proposed and what difference it will make (qualitatively and quantitatively) if successful. Describe the innovative aspects of the project in the context of existing capabilities and approaches, clearly delineating the relationship of this work to any other projects from the past and present.

- **Technical Plan:** Outline and address all technical challenges inherent in the approach and possible solutions for overcoming potential problems. Provide appropriate specific milestones (quantitative, if possible) at intermediate stages of the project to demonstrate progress.

- **Capabilities/Management Plan:** Provide a brief summary of expertise of the team, including subcontractors and key personnel. Identify a principal investigator for the project and include a description of the team's organization including roles and responsibilities. Describe the organizational experience in this area, existing intellectual property required to complete the project, and any specialized facilities to be used as part of the project. List Government-furnished property, facilities, or data assumed to be available. If desired, include a brief bibliography with links to relevant papers, reports, or resumes of key performers. Do not include more than two resumes as part of the abstract. Resumes count against the abstract page limit.

- **Statement of Work, Cost and Schedule:** Provide a cost estimate for resources over the proposed timeline of the project, broken down by year. Provide cost estimates for each subcontractor. All costs may be a rough order of magnitude.

2. Proposals

Proposals consist of Volume 1: Technical and Management Proposal (including mandatory Appendix A and optional Appendix B); Volume 2: Cost Proposal; the Level of Effort Summary by Task Excel spreadsheet; and the PowerPoint summary slide.

All pages shall be formatted for printing on 8-1/2 by 11-inch paper with 1-inch margins, single-line spacing, and a font size not smaller than 12 point. Font sizes of 8 or 10 point may be used for figures, tables, and charts. Document files must be in .pdf, .odx, .doc, .docx, .xls, or .xlsx formats. Submissions must be written in English. All pages of Volume 1 should be numbered.

A summary slide of the proposed effort, in PowerPoint format, should be submitted with the proposal. A template slide is provided as an attachment to the BAA. Submit this PowerPoint file in addition to Volumes 1 and 2 of your full proposal, and the Level of Effort Summary by Task Excel spreadsheet. This summary slide does not count towards the total page count.

Each proposal submitted in response to this BAA shall address only one TA. Organizations may submit multiple proposals to any one TA, or they may propose to multiple TAs. The sole exception to this rule is for TA3.1 proposers. In this case, proposers may provide a single proposal addressing TA1 with TA3.1 **or** TA3 together with TA3.1. TA3.1 must be proposed as a separable option (for each phase) for such a combined proposal.

Proposals not meeting the format prescribed herein may not be reviewed.

a. Volume 1: Technical and Management Proposal

The maximum page count for Volume 1 is 36 pages, including all figures, tables and charts but not including the cover sheet, table of contents or appendices. Proposals that also include TA3.1 as an option will have a Volume 1 page count limit of 42 pages. A submission letter is optional and is not included in the page count. Appendix A does not count against the page limit and is mandatory.

Appendix B does not count against the page limit and is optional. Additional information not explicitly called for here must not be submitted with the proposal, but may be included in the bibliography in Appendix B. Such materials will be considered for the reviewers' convenience only and not evaluated as part of the proposal.

Volume 1 must include the following components:

i. Cover Sheet: Include the following information.

- Label: "Proposal: Volume 1"
- BAA number (HR001118S0052)
- Technical Area
- Proposal title
- Lead organization (prime contractor) name
- Type of organization, selected from the following categories: Large Business, Small Disadvantaged Business, Other Small Business, HBCU, MI, Other Educational, or Other Nonprofit
- Technical point of contact (POC) including name, mailing address, telephone, and email
- Administrative POC including name, mailing address, telephone number, and email address
- (If proposing to TA3, please provide)
  Security POC including name, mailing address, telephone number, and email address (classified and unclassified)
- Award instrument requested: procurement contract (specify type) or cooperative agreement.[9]
- Total amount of the proposed effort
- Place(s) and period(s) of performance
- Other team member (subcontractors and consultants) information (for each, include Technical POC name, organization, type of organization, mailing address, telephone number, and email address)
- Proposal validity period (minimum 120 days)
- Data Universal Numbering System (DUNS) number[10]

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[9] Information on award instruments can be found at http://www.darpa.mil/work-with-us/contract-management.
[10] The DUNS number is used as the Government's contractor identification code for all procurement-related activities. Go to http://fedgov.dnb.com/webform/index.jsp to request a DUNS number (may take at least one

- Taxpayer identification number[11]
- Commercial and Government Entity (CAGE) code[12]
- Proposer's reference number (if any)

ii. Table of Contents

iii. Executive Summary:
Provide a synopsis of the proposed project, including answers to the following questions:

- What is the proposed work attempting to accomplish or do?
- How is it done today, and what are the limitations?
- Who or what will be affected and what will be the impact if the work is successful?
- How much will it cost, and how long will it take?

The executive summary should include a description of the key technical challenges, a concise review of the technologies proposed to overcome these challenges and achieve the project's goal, and a clear statement of the novelty and uniqueness of the proposed work.

iv. Innovative Claims and Deliverables:
Describe the innovative aspects of the project in the context of existing capabilities and approaches, clearly delineating the uniqueness and benefits of this project in the context of the state of the art, alternative approaches, and other projects from the past and present. Describe how the proposed project is revolutionary and how it significantly rises above the current state of the art.

Describe the deliverables associated with the proposed project and any plans to commercialize the technology, transition it to a customer, or further the work. Discuss the mitigation of any issues related to sustainment of the technology over its entire lifecycle, assuming the technology transition plan is successful.

If proposers desire to use proprietary software or technical data or both as the basis of their proposed approach, in whole or in part, they should: (1) clearly identify such software/data and its proposed particular use(s); (2) explain how the Government will be able to reach its program goals (including transition) within the proprietary model offered; and (3) provide possible nonproprietary alternatives in any area that might present transition difficulties or increased risk or cost to the Government under the proposed proprietary solution. Proposers must also submit a detailed plan for mitigating the impact of proprietary software or technical data on the required program collaboration as outlined in Table 7.

v. Technical Plan:
Outline and address technical challenges inherent in the approach

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business day). For further information regarding this subject, please see www.darpa.mil/work-with-us/additional-baa for further information.
[11] See http://www.irs.gov/businesses/small/international/article/0,,id=96696,00.html for information on requesting a TIN. Note, requests may take from 1 business day to 1 month depending on the method (online, fax, mail).
[12] A CAGE Code identifies companies doing or wishing to do business with the Federal Government. For further information regarding this subject, please see www.darpa.mil/work-with-us/additional-baa.

and possible solutions for overcoming potential problems. Demonstrate a deep understanding of the technical challenges and present a credible (even if risky) plan to achieve the project's goal. Discuss mitigation of technical risk. Provide appropriate measurable milestones (quantitative if possible) at intermediate stages of the project to demonstrate progress, and a plan for achieving the milestones.

vi. Management Plan: Provide a summary of expertise of the proposed team, including any subcontractors/consultants and key personnel who will be executing the work. Resumes count against the proposal page limit so proposers may wish to include them in Appendix B below. Identify a principal investigator (PI) for the project. Provide a clear description of the team's organization including an organization chart that includes, as applicable, the relationship of team members; unique capabilities of team members; task responsibilities of team members; teaming strategy among the team members; and key personnel with the amount of effort to be expended by each person during the project. Provide a detailed plan for coordination including explicit guidelines for interaction among collaborators/subcontractors of the proposed project. Include risk management approaches. Describe any formal teaming agreements that are required to execute this project. List Government-furnished materials or data assumed to be available.

If the proposal is for TA3 and proposers submit bids for other TAs, the TA3 proposal must include a conflict of interest discussion per Section III.D.1.

vii. Personnel, Qualifications, and Commitments: List key personnel (no more than one page per person), showing a concise summary of their qualifications, discussion of previous accomplishments, and work in this or closely related research areas. Indicate the level of effort in terms of hours to be expended by each person during each contract year and other (current and proposed) major sources of support for them and/or commitments of their efforts. DARPA expects all key personnel associated with a proposal to make a substantial time commitment to the proposed activity and the proposal will be evaluated accordingly. It is DARPA's intention to put key personnel conditions into the awards, so proposers should not propose personnel that are not anticipated to execute the award.

If applicable, indicate whether key personnel have a security clearance (and at what level).

Include a table of key individual time commitments as follows:

Key Individual	Project	Status (Current, Pending, Proposed)	Hours on Project		
			Phase 1	Phase 2	Phase 3
Name 1	**RACE**	Proposed	x	x	x
	Project Name 1	Current	x	x	n/a
	Project Name 2	Pending	n/a	x	x
Name 2	**RACE**	Proposed	x	x	x
	Project Name 3	Proposed	x	x	x

viii. Capabilities: Describe organizational experience in relevant subject area(s), existing intellectual property, or specialized facilities. Discuss any work in closely related research areas and previous accomplishments.

ix. Statement of Work (SOW): The SOW must provide a detailed task breakdown, citing specific tasks and their connection to the interim milestones and metrics, as applicable. Each year of the project should be separately defined. The SOW must not include proprietary information. For each defined task/subtask, provide:

- A general description of the objective.
- A detailed description of the approach to be taken to accomplish each defined task/subtask.
- Identification of the primary organization responsible for task execution (prime contractor, subcontractor(s), consultant(s)), by name.
- A measurable milestone, (e.g., a deliverable, demonstration, or other event/activity that marks task completion).
- A definition of all deliverables (e.g., data, reports, software) to be provided to the Government in support of the proposed tasks/subtasks.
- Identify any tasks/subtasks (by the prime or subcontractor) that will be accomplished at a university and believed to be fundamental research.

x. Schedule and Milestones: Provide a detailed schedule showing tasks (task name, duration, work breakdown structure element as applicable, performing organization), milestones, and the interrelationships among tasks. The task structure must be consistent with that in the SOW. Measurable milestones should be clearly articulated and defined in time relative to the start of the project.

xi. Appendix A: This section is mandatory and must include all of the following components. If a particular subsection is not applicable, state "NONE".

(1). **Team Member Identification:** Provide a list of all team members including the prime, subcontractor(s), and consultant(s), as applicable. Identify specifically whether any are a non-US organization or individual, FFRDC and/or Government entity. Use the following format for this list:

Individual Name	Role (Prime, Subcontractor or Consultant)	Organization	Non-US?		FFRDC or Govt?
			Org	Ind.	

(2). **Government or FFRDC Team Member Proof of Eligibility to Propose**: If none of the team member organizations (prime or subcontractor) are a Government entity or FFRDC, state "NONE".

If any of the team member organizations are a Government entity or FFRDC, provide documentation (per Section III.A.1) citing the specific authority that establishes the applicable team member's eligibility to propose to Government solicitations to include: 1) statutory authority; 2) contractual authority; 3)

supporting regulatory guidance; and 4) evidence of agency approval for applicable team member participation.

(3). **Government or FFRDC Team Member Statement of Unique Capability:** If none of the team member organizations (prime or subcontractor) are a Government entity or FFRDC, state "NONE".

If any of the team member organizations are a Government entity or FFRDC, provide a statement (per Section III.A.1) that demonstrates the work to be performed by the Government entity or FFRDC team member is not otherwise available from the private sector.

(4). **Organizational Conflict of Interest Affirmations and Disclosure:** If none of the proposed team members is currently providing SETA or similar support as described in Section III.B, state "NONE".

If any of the proposed team members (individual or organization) is currently performing SETA or similar support, furnish the following information:

Prime Contract Number	DARPA Technical Office supported	A description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate the conflict

(5). **Intellectual Property (IP):** If no IP restrictions are intended, state "NONE". The Government will assume unlimited rights to all IP not explicitly identified as having less than unlimited rights in the proposal.

For all noncommercial technical data or computer software that will be furnished to the Government with other than unlimited rights, provide (per Section VI.B.1) a list describing all proprietary claims to results, prototypes, deliverables or systems supporting and/or necessary for the use of the research, results, prototypes and/or deliverables. Provide documentation proving ownership or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) to be used for the proposed project. Use the following format for these lists:

NONCOMMERCIAL				
Technical Data and/or Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(List)	(Narrative)	(List)	(List)	(List)
(List)	(Narrative)	(List)	(List)	(List)

COMMERCIAL				
Technical Data and/or Computer Software To	Summary of Intended Use in	Basis for Assertion	Asserted Rights	Name of Person Asserting Restrictions

be Furnished With Restrictions	the Conduct of the Research		Category	
(List)	(Narrative)	(List)	(List)	(List)
(List)	(Narrative)	(List)	(List)	(List)

(6). Human Subjects Research (HSR): If HSR is not a factor in the proposal, state "NONE".

If the proposed work will involve human subjects, provide evidence of or a plan for review by an institutional review board (IRB). For further information on this subject, see Section VI.B.2.

(7). Animal Use: If animal use is not a factor in the proposal, state "NONE".

If the proposed research will involve animal use, provide a brief description of the plan for Institutional Animal Care and Use Committee (IACUC) review and approval. For further information on this subject, see Section VI.B.2.

(8). Representations Regarding Unpaid Delinquent Tax Liability or a Felony Conviction under Any Federal Law: For further information regarding this subject, please see www.darpa.mil/work-with-us/additional-baa.

Please also complete the following statements.

(1) The proposer is [   ] is not [   ] a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability,

(2) The proposer is [   ] is not [   ] a corporation that was convicted of a felony criminal violation under a Federal law within the preceding 24 months.

(9). Cost Accounting Standards (CAS) Notices and Certification: For any proposer who submits a proposal which, if accepted, will result in a CAS-compliant contract, must include a Disclosure Statement as required by 48 CFR 9903.202. The disclosure forms may be found at http://www.whitehouse.gov/omb/procurement_casb.

If this section is not applicable, state "NONE". For further information regarding this subject, please see www.darpa.mil/work-with-us/additional-baa.

xiv. Appendix B: If desired, include a brief bibliography to relevant papers, reports, or resumes. Do not include technical papers. This section is optional, and the materials will not be evaluated as part of the proposal review.

b. Volume 2 - Cost Proposal

This volume is mandatory and must include all the listed components. No page limit is specified for this volume.

The cost proposal should include a working spreadsheet file (.xls or equivalent format) that provides formula traceability among all components of the cost proposal. The spreadsheet file should be included as a separate component of the full proposal package. Costs must be traceable between the prime and subcontractors/consultants, as well as between the cost proposal and the SOW.

Pre-award costs will not be reimbursed unless a pre-award cost agreement is negotiated prior to award.

i. Cover Sheet: Include the same information as the cover sheet for Volume 1, but with the label "Proposal: Volume 2."

ii. Cost Summary Tables: Provide a single-page summary table broken down by fiscal year listing cost totals for labor, materials, other direct charges (ODCs), indirect costs (overhead, fringe, general and administrative [G&A]), and any proposed fee for the project. Include costs for each task in each fiscal year of the project by prime and major subcontractors, total cost and proposed cost share, if applicable. Provide a second table containing the same information broken down by project phase.

iii. Cost Details: For each task, provide the following cost details by month. Include supporting documentation describing the method used to estimate costs. Identify any cost sharing.

> **(1) Direct Labor:** Provide labor categories, rates and hours. Justify rates by providing examples of equivalent rates for equivalent talent, past commercial or Government rates from a Government audit agency such as the Defense Contract Audit Agency (DCAA), the Office of Naval Research (ONR), the Department of Health and Human Services (DHHS), etc.

> **(2) Indirect Costs**: Identify all indirect cost rates (such as fringe benefits, labor overhead, material overhead, G&A, or F&A, etc.) and the basis for each.

> **(3) Materials:** Provide an itemized list of all proposed materials, equipment, and supplies for each year including quantities, unit prices, proposed vendors (if known), and the basis of estimate (e.g., quotes, prior purchases, catalog price lists, etc.). For proposed equipment/information technology (as defined in FAR 2.101) purchases equal to or greater than $50,000, include a letter justifying the purchase. Include any requests for Government-furnished equipment or information with cost estimates (if applicable) and delivery dates.

> **(4) Travel:** Provide a breakout of travel costs including the purpose and number of trips, origin and destination(s), duration, and travelers per trip.

> **(5) Subcontractor/Consultant Costs:** Provide above info for each proposed subcontractor/consultant. Subcontractor cost proposals must include interdivisional work transfer agreements or similar arrangements. If the proposer has conducted a cost or price analysis to determine reasonableness, submit a copy of this along with the subcontractor proposal.

The proposer is responsible for the compilation and submission of all subcontractor/consultant cost proposals. At a minimum, the submitted cost volume must contain a copy of each subcontractor or consultant non-proprietary cost proposal (i.e. cost proposals that do not contain proprietary pricing information such as rates, factors, etc.) Proprietary subcontractor/consultant cost proposals may be included as part of Volume 2. Proposal submissions will not be considered complete unless the Government has received all subcontractor/consultant cost proposals.

If proprietary subcontractor/consultant cost proposals are not included as part of Volume 2, they may be emailed separately to RACE@darpa.mil. Email messages must include "Subcontractor Cost Proposal" in the subject line and identify the principal investigator, prime proposer organization and proposal title in the body of the message. Any proprietary subcontractor or consultant proposal documentation which is not uploaded to BAAT as part of the proposer's submission or provided by separate email shall be made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the proposer or by the subcontractor/consultant organization.

Please note that a ROM or similar budgetary estimate is not considered a fully qualified subcontract cost proposal submission. Inclusion of a ROM or similar budgetary estimate, or failure to provide a subcontract proposal, will result in the full proposal being deemed non-compliant.

(6) ODCs: Provide an itemized breakout and explanation of all anticipated other direct costs.

iv. Proposals Requesting a Procurement Contract: Provide the following information where applicable.

(1) Proposals exceeding the Certified Cost or Pricing threshold defined in the FAR/DFARS: Provide "certified cost or pricing data" (as defined in FAR 2.101) or a request for exception in accordance with FAR 15.403.

(2) Proposals for $700,000 or more: Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)), it is Government policy to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to organizations performing work as prime contractors or subcontractors under Government contracts, and to ensure that prime contractors and subcontractors carry out this policy. In accordance with FAR 19.702(a)(1) and 19.702(b), prepare a subcontractor plan, if applicable. The plan format is outlined in FAR 19.704.

(3) Proposers without an adequate cost accounting system: If requesting a cost-type contract, provide the DCAA Pre-award Accounting System Adequacy Checklist to facilitate DCAA's completion of an SF 1408. Proposers without an accounting system considered adequate for determining accurate costs must

complete an SF 1408 if a cost type contract is to be negotiated. To facilitate this process, proposers should complete the SF 1408 found at http://www.gsa.gov/portal/forms/download/115778 and submit the completed form with the proposal. To complete the form, check the boxes on the second page, then provide a narrative explanation of your accounting system to supplement the checklist on page one.

c. Level of Effort Summary by Task Spreadsheet

Provide a one-page table summarizing estimated level of effort per task (in hours) broken out by senior, mid-level, and junior personnel, in the format shown below in Figure 2. Also include dollar-denominated estimates of travel, materials, and equipment. For this table, consider materials to include the cost of any data sets or software licenses proposed. For convenience, an Excel template is available for download along with the BAA. Submit the Level of Effort Summary Excel file (do not convert the Excel file to pdf format) in addition to Volumes 1 and 2 of your full proposal. This Excel file does not count towards the total page count.

SOW Task	Duration (months)	Intensity (hrs/mo)	Sr	Skill set(s)	Mid	Skill set(s)	Jr	Skill set(s)	Total	SubC-Sr	Skill set(s)	SubC-Mid	Skill set(s)	SubC-Jr	Skill set(s)	Conslt	Total
1.1.0 <Phase 1 Task 1 name>	7	135	240		680		24		944	-						200	1,144
1.1.1 <Subtask 1.1.1 name>	4	90	80		280		-		360	-						200	560
1.1.2 <Subtask 1.1.2 name>	3	195	160		400		24		584	-						-	584
1.2.0 <Phase 1 Task 2 name>	6	385	108		400		1,800		2,308	1,400						-	3,708
1.2.1 <Subtask 1.2.1 name>	3	656	48		320		1,600		1,968	600						-	2,568
1.2.2 <Subtask 1.2.2 name>	3	113	60		80		200		340	800						-	1,140
:	:	:	:		:		:		:	:						:	:
Phase 1 Total Hours			348		1,080		1,824		3,252	1,400						200	4,652
Phase 1 Costs *First column is prime, second is*					Travel				$ 44,000	$ 12,000						$ 2,000	$ 58,000
total subcontractor, third is total consultant, fourth is total					Materials & Equipment				$ 8,000	$ -						$ -	$ 8,000
2.1.0 <Phase 2 Task 1 name>	8	100	176		560		64		800	100						100	1,000
2.1.1 <Subtask 2.1.1 name>	7	51	96		240		24		360	100						100	560
2.1.2 <Subtask 2.1.2 name>	4	110	80		320		40		440	-						-	440
2.2.0 <Phase 2 Task 2 name>	6	417	180		520		1,800		2,500	1,240						-	3,740
2.2.1 <Subtask 2.2.1 name>	4	435	140		400		1,200		1,740	400						-	2,140
2.2.2 <Subtask 2.2.2 name>	4	190	40		120		600		760	840						-	1,600
:	:	:	:		:		:		:	:						:	:
Phase 2 Total Hours			356		1,080		1,864		3,300	1,340						100	4,640
Phase 2 Costs *First column is prime, second is*					Travel				$ 47,000	$ 12,000						$ 2,000	$ 61,000
total subcontractor, third is total consultant, fourth is total					Materials & Equipment				$ 4,000	$ -						$ -	$ 4,000
3.1.0 <Phase 3 Task 1 name>	9	71	120		400		120		640	100						100	840
3.1.1 <Subtask 3.1.1 name>	3	93	40		200		40		280	100						100	480
3.1.2 <Subtask 3.1.2 name>	6	60	80		200		80		360	-						-	360
3.2.0 <Phase 3 Task 2 name>	6	460	160		800		1,800		2,760	1,200						-	3,960
3.2.1 <Subtask 3.2.1 name>	4	370	80		400		1,000		1,480	600						-	2,080
3.2.2 <Subtask 3.2.2 name>	3	427	80		400		800		1,280	600						-	1,880
:	:	:	:		:		:		:	:						:	:
Phase 3 Total Hours			280		1,200		1,920		3,400	1,300						100	4,800
Phase 3 Costs *First column is prime, second is*					Travel				$ 48,000	$ 12,000						$ 2,000	$ 62,000
total subcontractor, third is total consultant, fourth is total					Materials & Equipment				$ -	$ -						$ -	$ -
Project Total Hours			984		3,360		5,608		9,952	4,040						400	14,092
Total Project Costs *First column is prime, second is*					Travel				$ 139,000	$ 36,000						$ 6,000	$ 181,000
total subcontractor, third is total consultant, fourth is total					Materials & Equipment				$ 12,000	$ -						$ -	$ 12,000

Figure 2: Example level-of-effort summary table. Numbers illustrate roll-ups and subtotals. The SubC column captures all subcontractor hours and the Conslt column captures all consultant hours. The Skill set(s) columns should indicate an area of expertise (e.g., engineer, software developer, data scientist, subject matter expert).

d. Summary Slide

The submission of a PowerPoint slide summarizing the proposed effort is mandatory. A template PowerPoint slide will be provided on the Federal Business Opportunities

(FedBizOpps) website as an attachment. Submit the PowerPoint file (do not convert PowerPoint file to pdf format) in addition to Volumes 1 and 2 of your full proposal. This summary slide does not count towards the total page count.

3. Proprietary and Classified Information

DARPA policy is to treat all submissions as source selection information (see FAR 2.101 and 3.104) and to disclose the contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements.

a. Proprietary Information

Proposers are responsible for clearly identifying proprietary information. Submissions containing proprietary information must have the cover page and each page containing such information clearly marked.

b. Classified Information

Classified submissions (classified technical proposals or classified appendices to unclassified proposals) addressing TA1, TA2, TA3 or TA3.1 will not be accepted under this solicitation.

C. Submission Dates and Times

Proposers are warned that submission deadlines as outlined herein are strictly enforced. Note: some proposal requirements may take from 1 business day to 1 month to complete. See the proposal checklist in Section VIII.D for further information.

When utilizing the DARPA BAA Submission Website, as described below in Section IV.E.1 below, a control number will be provided at the conclusion of the submission process. This control number should be used in all further correspondence regarding your abstract/proposal submission.

For proposal submissions requesting cooperative agreements, Section IV.E.1.c, you must request your control number via email at RACE@darpa.mil. Please note that the control number will not be issued until after the proposal due date and time.

Failure to comply with the submission procedures outlined herein may result in the submission not being evaluated.

1. Abstracts

Abstracts must be submitted per the instructions outlined herein and received by DARPA no later than **August 14, 2018 at 12:00 noon (ET)**. Abstracts received after this date and time will not be reviewed.

2. Proposals

The proposal package -- full proposal (Volume 1 and 2) and, as applicable, proprietary subcontractor cost proposals, classified appendices to unclassified proposals -- must be submitted per the instructions outlined herein and received by DARPA no later than **September 18, 2018 at 12:00 noon (ET)**. Submissions received after this date and time will not be reviewed.

D. Funding Restrictions

Not applicable.

E. Other Submission Requirements

1. Unclassified Submission Instructions

Proposers must submit all parts of their submission package using the same method; submissions cannot be sent in part by one method and in part by another method nor should duplicate submissions be sent by multiple methods. Emailed submissions of abstracts or full proposals will not be accepted.

a. Abstracts

DARPA/I2O will employ an electronic upload submission system (https://baa.darpa.mil/) for all UNCLASSIFIED abstract responses under this solicitation.

First time users of the DARPA BAA Submission Website must complete a two-step account creation process at https://baa.darpa.mil/. The first step consists of registering for an Extranet account by going to the above URL and selecting the "Account Request" link. Upon completion of the online form, proposers will receive two separate emails; one will contain a user name and the second will provide a temporary password. Once both emails have been received, proposers must go back to the submission website and log in using that user name and password. After accessing the Extranet, proposers must create a user account for the DARPA BAA Submission Website by selecting the "Register Your Organization" link at the top of the page. The DARPA BAA Submission Website will display a list of solicitations open for submissions. Once a proposer's user account is created, they may view instructions on uploading their abstract.

Proposers who already have an account on the DARPA BAA Submission Website may simply log in at https://baa.darpa.mil/, select this solicitation from the list of open DARPA solicitations and proceed with their abstract submission. Note: Proposers who have created a DARPA BAA Submission Website account to submit to another DARPA Technical Office's solicitations do not need to create a new account to submit to this solicitation.

All submissions submitted electronically through DARPA's BAA website must be uploaded as zip files (.zip or .zipx extension). The final zip file should contain only the files requested herein and must not exceed 50 MB in size. Only one zip file will be accepted per submission. Note: Submissions not uploaded as zip files will be rejected by DARPA.

Please note that all submissions MUST be finalized, meaning that no further editing will be possible, when submitting through the DARPA BAA Submission Website in order for DARPA to be able to review your submission. If a submission is not finalized, the

submission will not be deemed acceptable and will not be reviewed.

Website technical support may be reached at Action@darpa.mil and is typically available during regular business hours (9:00 AM – 5:00 PM ET, Monday-Friday). Questions regarding submission contents, format, deadlines, etc. should be emailed to RACE@darpa.mil.

Since abstract submitters may encounter heavy traffic on the web server, they should not wait until the day abstracts are due to request an account and/or upload the submission.

Abstracts should not be submitted via Email or Grants.gov. Any abstracts submitted by Email or Grants.gov will not be accepted or reviewed.

b. Proposals Requesting a Procurement Contract

DARPA/I2O will employ an electronic upload submission system (https://baa.darpa.mil/) for UNCLASSIFIED proposals requesting award of a procurement contract under this solicitation.

First time users of the DARPA BAA Submission Website must complete a two-step account creation process at https://baa.darpa.mil/. The first step consists of registering for an Extranet account by going to the above URL and selecting the "Account Request" link. Upon completion of the online form, proposers will receive two separate emails; one will contain a user name and the second will provide a temporary password. Once both emails have been received, proposers must go back to the submission website and log in using that user name and password. After accessing the Extranet, proposers must create a user account for the DARPA BAA Submission Website by selecting the "Register Your Organization" link at the top of the page. The DARPA BAA Submission Website will display a list of solicitations open for submissions. Once a proposer's user account is created, they may view instructions on uploading their proposal.

Proposers who already have an account on the DARPA BAA Submission Website may simply log in at https://baa.darpa.mil/, select this solicitation from the list of open DARPA solicitations and proceed with their proposal submission. Note: Proposers who have created a DARPA BAA Submission Website account to submit to another DARPA Technical Office's solicitations do not need to create a new account to submit to this solicitation.

All submissions submitted electronically through DARPA's BAA website must be uploaded as zip files (.zip or .zipx extension). The final zip file should contain only the files requested herein and must not exceed 50 MB in size. Only one zip file will be accepted per submission. Note: Submissions not uploaded as zip files will be rejected by DARPA.

Please note that all submissions MUST be finalized, meaning that no further editing will be possible, when submitting through the DARPA BAA Submission Website in order for DARPA to be able to review your submission. If a submission is not finalized, the submission will not be deemed acceptable and will not be reviewed.

Website technical support may be reached at Action@darpa.mil and is typically available

during regular business hours (9:00 AM – 5:00 PM ET, Monday-Friday). Questions regarding submission contents, format, deadlines, etc. should be emailed to RACE@darpa.mil.

Since proposers may encounter heavy traffic on the web server, they should not wait until the day proposals are due to request an account and/or upload the submission. Full proposals should not be submitted via Email. Any full proposals submitted by Email will not be accepted or evaluated.

c. Proposals Requesting a Cooperative Agreement

Proposers requesting cooperative agreements must submit proposals through one of the following methods: (1) electronic upload per the instructions at https://www.grants.gov/applicants/apply-for-grants.html; or (2) hard-copy mailed directly to DARPA. If proposers intend to use Grants.gov as their means of submission, then they must submit their entire proposal through Grants.gov; applications cannot be submitted in part to Grants.gov and in part as a hard-copy. Proposers using Grants.gov do not submit hard-copy proposals in addition to the Grants.gov electronic submission.

Submissions: Proposers must submit the three forms listed below.

SF 424 Research and Related (R&R) Application for Federal Assistance, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_SF424_2_0-V2.0.pdf. *This form must be completed and submitted.*

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. A§ 1681 Et. Seq.), the Department of Defense is using the two forms below to collect certain demographic and career information to be able to assess the success rates of women who are proposed for key roles in applications in science, technology, engineering, or mathematics disciplines. Detailed instructions for each form are available on Grants.gov.

Research and Related Senior/Key Person Profile (Expanded), available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_2_0-V2.0.pdf. *This form must be completed and submitted.*

Research and Related Personal Data, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_PersonalData_1_2-V1.2.pdf. *Each applicant must complete the name field of this form, however, provision of the demographic information is voluntary. Regardless of whether the demographic fields are completed or not, this form must be submitted with at least the applicant's name completed.*

Grants.gov requires proposers to complete a one-time registration process before a proposal can be electronically submitted. If proposers have not previously registered, this process can take between three business days and four weeks if all steps are not completed in a timely manner. See the Grants.gov user guides and checklists at

http://www.grants.gov/web/grants/applicants/applicant-resources.html for further information.

Once Grants.gov has received an uploaded proposal submission, Grants.gov will send two email messages to notify proposers that: (1) their submission has been received by Grants.gov; and (2) the submission has been either validated or rejected by the system. It may take up to two business days to receive these emails. If the proposal is rejected by Grants.gov, it must be corrected and re-submitted before DARPA can retrieve it (assuming the solicitation has not expired). If the proposal is validated, then the proposer has successfully submitted their proposal and Grants.gov will notify DARPA. Once the proposal is retrieved by DARPA, Grants.gov will send a third email to notify the proposer. The proposer will then receive an email from DARPA acknowledging receipt and providing a control number.

To avoid missing deadlines, proposers should submit their proposals to Grants.gov in advance of the proposal due date, with sufficient time to complete the registration and submission processes, receive email notifications and correct errors, as applicable.

For more information on submitting proposals to Grants.gov, visit the Grants.gov submissions page at: http://www.grants.gov/web/grants/applicants/apply-for-grants.html.

Proposers electing to submit cooperative agreement proposals as hard copies must complete the SF 424 R&R form (Application for Federal Assistance, Research and Related) available on the Grants.gov website http://apply07.grants.gov/apply/forms/sample/RR_SF424_2_0-V2.0.pdf.

Proposers choosing to mail hard copy proposals to DARPA must include one paper copy and one electronic copy (e.g., CD/DVD) of the full proposal package.

Technical support for the Grants.gov website may be reached at 1-800-518-4726 and support@grants.gov. Questions regarding submission contents, format, deadlines, etc. should be emailed to RACE@darpa.mil.

V.   Application Review Information

A. Evaluation Criteria

Proposals will be evaluated using the following criteria listed in descending order of importance: Overall Scientific and Technical Merit; Potential Contribution and Relevance to the DARPA Mission; and Cost Realism.

–   *Overall Scientific and Technical Merit*:

The proposed technical approach is innovative, feasible, achievable, and complete.

The task descriptions and associated technical elements are complete and in a logical sequence, with all proposed deliverables clearly defined such that a viable attempt to achieve project goals is likely as a result of award. The proposal identifies major technical risks and clearly defines feasible mitigation efforts.

Proposer should also take note to the information provided in Section I, as DARPA will also look at how a proposer addresses the technical challenges relevant to each TA, as well as view how key personnel will work on those challenges.

–   *Potential Contribution and Relevance to the DARPA Mission:*

The potential contributions of the proposed effort are relevant to the national technology base. Specifically, DARPA's mission is to make pivotal early technology investments that create or prevent strategic surprise for U.S. National Security.

This includes considering the extent to which any proposed intellectual property restrictions will potentially impact the Government's ability to transition the technology.

–   *Cost Realism:*

The proposed costs are realistic for the technical and management approach and accurately reflect the technical goals and objectives of the solicitation. The proposed costs are consistent with the proposer's Statement of Work and reflect a sufficient understanding of the costs and level of effort needed to successfully accomplish the proposed technical approach. The costs for the prime proposer and proposed subawardees are substantiated by the details provided in the proposal (e.g., the type and number of labor hours proposed per task, the types and quantities of materials, equipment and fabrication costs, travel and any other applicable costs and the basis for the estimates).

B. Review and Selection Process

The review process identifies proposals that meet the evaluation criteria described above and are, therefore, selectable for negotiation of awards by the Government. DARPA policy is to ensure impartial, equitable, comprehensive proposal evaluations and to select proposals that meet DARPA technical, policy, and programmatic goals. If necessary, panels of experts in the appropriate areas will be convened. As described in Section IV, proposals must be deemed conforming to the solicitation to receive a full technical review against the evaluation criteria; proposals deemed non-conforming will be removed from consideration.

DARPA will conduct a scientific/technical review of each conforming proposal. Conforming proposals comply with all requirements detailed in this BAA; proposals that fail to do so may be deemed non-conforming and may be removed from consideration. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons.

Selections may be made at any time during the period of solicitation. Pursuant to FAR 35.016, the primary basis for selecting proposals for award negotiation shall be technical, importance to agency programs, and fund availability. Conforming proposals based on a previously submitted abstract will be reviewed without regard to feedback resulting from review of that abstract. Furthermore, a favorable response to an abstract is not a guarantee that a proposal based on the abstract will ultimately be selected for award negotiation. Proposals that are determined selectable will not necessarily receive awards.

For evaluation purposes, a proposal is defined to be the document and supporting materials as described in Section IV.B. Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements. No submissions, classified or unclassified, will be returned.

VI. Award Administration Information

A. Selection Notices

After proposal evaluations are complete, proposers will be notified as to whether their proposal was selected for award negotiation as a result of the review process. Notification will be sent by email to the technical and administrative POCs identified on the proposal cover sheet. If a proposal has been selected for award negotiation, the Government will initiate those negotiations following the notification.

B. Administrative and National Policy Requirements

1. Intellectual Property

Proposers should note that the Government does not own the intellectual property of technical data/computer software developed under Government contracts; it acquires the right to use the technical data/computer software. Regardless of the scope of the Government's rights, performers may freely use their same data/software for their own commercial purposes (unless restricted by U.S. export control laws or security classification). Therefore, technical data and computer software developed under this solicitation will remain the property of the performers, though DARPA desires to have a minimum of Government Purpose Rights (GPR) to technical data/computer software developed through DARPA sponsorship.

The program will emphasize creating and leveraging open source technology and architecture. Intellectual property rights asserted by proposers are strongly encouraged to be aligned with open source/open architecture regimes.

All references to "Unlimited Rights" or "Government Purpose Rights" are intended to refer to the definitions of those terms as set forth in the Defense Federal Acquisition Regulation Supplement (DFARS) Part 227.

a. Intellectual Property Representations

All proposers must provide a good faith representation of either ownership or possession of appropriate licensing rights to all other intellectual property to be used for the proposed project. Proposers must provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research. If proposers desire to use proprietary software or technical data or both as the basis of their proposed approach, in whole or in part, they should: (1) clearly identify such software/data and its proposed particular use(s); (2) explain how the Government will be able to reach its program goals (including transition) within the proprietary model offered; and (3) provide possible nonproprietary alternatives in any area that might present transition difficulties or increased risk or cost to the Government under the proposed proprietary solution.

b. Patents

All proposers must include documentation proving ownership or possession of appropriate licensing rights to all patented inventions to be used for the proposed project. If a patent application has been filed for an invention, but it includes proprietary information and is not publicly available, a proposer must provide documentation that includes: the patent

number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and summary of the patent title, with either: (1) a representation of invention ownership, or (2) proof of possession of appropriate licensing rights in the invention (i.e., an agreement from the owner of the patent granting license to the proposer).

c. Procurement Contracts

– **Noncommercial Items (Technical Data and Computer Software):** Proposers requesting a procurement contract must list all noncommercial technical data and computer software that it plans to generate, develop, and/or deliver, in which the Government will acquire less than unlimited rights and to assert specific restrictions on those deliverables. In the event a proposer does not submit the list, the Government will assume that it has unlimited rights to all noncommercial technical data and computer software generated, developed, and/or delivered, unless it is substantiated that development of the noncommercial technical data and computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and computer software generated, developed, and/or delivered, proposers should identify the data and software in question as subject to GPR. In accordance with DFARS 252.227-7013, "Rights in Technical Data - Noncommercial Items," and DFARS 252.227-7014, "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation," the Government will automatically assume that any such GPR restriction is limited to a period of 5 years, at which time the Government will acquire unlimited rights unless the parties agree otherwise. The Government may use the list during the 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. Failure to provide full information may result in a determination that the proposal is not compliant with the solicitation. A template for complying with this request is provided in Section IV.B.2.a.xi.(5).

– **Commercial Items (Technical Data and Computer Software):** Proposers requesting a procurement contract must list all commercial technical data and commercial computer software that may be included in any deliverables contemplated under the research project, and assert any applicable restrictions on the Government's use of such commercial technical data and/or computer software. In the event a proposer does not submit the list, the Government will assume there are no restrictions on the Government's use of such commercial items. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is not compliant with the solicitation. A template for complying with this request is provided in Section IV.B.2.a.xi.(5).

d. Other Types of Awards

Proposers responding to this solicitation requesting an award instrument other than a procurement contract shall follow the applicable rules and regulations governing those award instruments, but in all cases should appropriately identify any potential restrictions

on the Government's use of any intellectual property contemplated under those award instruments in question. This includes both noncommercial items and commercial items. The Government may use the list as part of the evaluation process to assess the impact of any identified restrictions, and may request additional information from the proposer, to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is not compliant with the solicitation. A template for complying with this request is provided in Section IV.B.2.a.xi.(5).

2. Human Research Subjects/Animal Use

Proposers that anticipate involving Human Research Subjects or Animal Use must comply with the approval procedures detailed at http://www.darpa.mil/work-with-us/additional-baa.

3. Electronic and Information Technology

All electronic and information technology acquired through this solicitation must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. § 794d) and FAR 39.2. Each project involving the creation or inclusion of electronic and information technology must ensure that: (1) Federal employees with disabilities will have access to and use of information that is comparable to the access and use by Federal employees who are not individuals with disabilities; and (2) members of the public with disabilities seeking information or services from DARPA will have access to and use of information and data that is comparable to the access and use of information and data by members of the public who are not individuals with disabilities.

4. System for Award Management (SAM) and Universal Identifier Requirements

All proposers must be registered in SAM unless exempt per FAR 4.1102. FAR 52.204-7, "System for Award Management" and FAR 52.204-13, "System for Award Management Maintenance" are incorporated into this BAA. See http://www.darpa.mil/work-with-us/additional-baa for further information.

International entities can register in SAM by following the instructions in this link: https://www.fsd.gov/fsd-gov/answer.do?sysparm_kbid=dbf8053adb119344d71272131f961946&sysparm_search=KB0013221.

Note that new registrations can take an average of 7-10 business days to process in SAM. SAM registration requires the following information:
- DUNS number
- TIN
- CAGE Code. If a proposer does not already have a CAGE code, one will be assigned during SAM registration.
- Electronic Funds Transfer information (e.g., proposer's bank account number, routing number, and bank phone or fax number).

C. Reporting

1. Technical and Financial Reports

The number and types of technical and financial reports required under the contracted

project will be specified in the award document, and will include, as a minimum, monthly financial status reports, monthly status summaries, and a yearly status summary. A phase report that summarizes the project and tasks will be required at the conclusion of each phase. A final report that summarizes the project and tasks will be required at the conclusion of the performance period for the award. The reports shall be prepared and submitted in accordance with the procedures contained in the award document.

2. Representations and Certifications

If a procurement contract is contemplated, prospective awardees will need to be registered in the SAM database prior to award and complete electronic annual representations and certifications consistent with FAR guidance at 4.1102 and 4.1201; the representations and certifications can be found at www.sam.gov. Supplementary representations and certifications can be found at http://www.darpa.mil/work-with-us/additional-baa.
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3. Wide Area Work Flow (WAWF)

Unless using another means of invoicing, performers will be required to submit invoices for payment directly at https://wawf.eb.mil. If applicable, WAWF registration is required prior to any award under this solicitation.

4. Terms and Conditions

A link to the DoD General Research Terms and Conditions for Grants and Cooperative Agreements and supplemental agency terms and conditions can be found at http://www.darpa.mil/work-with-us/contract-management#GrantsCooperativeAgreements.

5. FAR and DFARS Clauses

Solicitation clauses in the FAR and DFARS relevant to procurement contracts and FAR and DFARS clauses that may be included in any resultant procurement contracts are incorporated herein and can be found at www. darpa.mil/work-with-us/additional-baa.

See also Section II.C regarding the disclosure of information and compliance with safeguarding covered defense information controls (for FAR-based procurement contracts only).

6. i-Edison

Award documents will contain a requirement for patent reports and notifications to be submitted electronically through the i-Edison Federal patent reporting system at http://s-edison.info.nih.gov/iEdison.

7. Controlled Unclassified Information (CUI) on Non-DoD Information Systems

Further information on Controlled Unclassified Information on Non-DoD Information Systems is incorporated herein can be found at www.darpa.mil/work-with-us/additional-baa.

VII.   Agency Contacts

DARPA will use email for all technical and administrative correspondence regarding this solicitation.

- **Technical POC:** Dr. Joshua Baron, Program Manager, DARPA/I2O

- **Email:** RACE@darpa.mil

- **Mailing address**:

  DARPA/I2O
  ATTN: HR001118S0052
  675 North Randolph Street
  Arlington, VA 22203-2114

- **I2O Solicitation Website:** http://www.darpa.mil/work-with-us/opportunities

VIII.   Other Information

A. Frequently Asked Questions (FAQs)

Administrative, technical, and contractual questions should be sent via email to RACE@darpa.mil. All questions must be in English and must include the name, email address, and the telephone number of a point of contact.

DARPA will attempt to answer questions in a timely manner; however, questions submitted within 7 days of closing may not be answered. If applicable, DARPA will post FAQs to http://www.darpa.mil/work-with-us/opportunities.

B. Collaborative Efforts/Teaming

It is DARPA's desire to receive comprehensive, quality responses to this solicitation. To facilitate strong, collaborative teaming efforts and business relationships, a website (https://www.schafertmd.com/darpa/i2o/RACE/pd/?p=teaming) has been established. Specific content, communications, networking, and team formation are the sole responsibility of the participants. Neither DARPA nor the DoD endorses the destination web site or the information and organizations contained therein, nor does DARPA or the DoD exercise any responsibility at the destination. This website is provided consistent with the stated purpose of this solicitation.

C. Proposers Day

The RACE Proposers Day will be held on July 24, 2018, in Arlington, VA. The special notice regarding the RACE Proposers Day, DARPA-SN-18-63, can be found at https://www.fbo.gov/index.php?s=opportunity&mode=form&id=87c25134fd80f8180b6da32961 75f90f&tab=core&_cview=0.

For further information regarding the RACE Proposers Day, including slides from the event, please see http://www.darpa.mil/work-with-us/opportunities under HR001118S0052.

D. Submission Checklist

The following items apply prior to proposal submission. Note: some items may take up to 1 month to complete.

✔	Item	BAA Section	Applicability	Comment
	Abstract	IV.B.1	Optional, but recommended	Conform to stated page limit.
	Obtain DUNS number	IV.B.2.a.i	Required of all proposers	The DUNS Number is the Federal Government's contractor identification code for all procurement-related activities. See http://fedgov.dnb.com/webform/index.jsp to request a DUNS number. Note: requests may take at least one business day.
	Obtain Taxpayer Identification Number (TIN)	IV.B.2.a.i	Required of all proposers	A TIN is used by the Internal Revenue Service in the administration of tax laws. See http://www.irs.gov/businesses/small/international/article/0,,id=96696,00.html for information on requesting a TIN. Note: requests may take from 1 business day to 1 month depending on the method (online, fax, mail).
	Register in the System for Award	VI.B.4	Required of all proposers	The SAM combines Federal procurement systems and the Catalog of Federal Domestic Assistance into one system. See

	Item	BAA Section	Applicability	Comment

	Management (SAM)			www.sam.gov for information and registration. Note: new registrations can take an average of 7-10 business days. SAM registration requires the following information:
				  -DUNS number
				  -TIN
				  -CAGE Code. A CAGE Code identifies companies doing or wishing to do business with the Federal Government. If a proposer does not already have a CAGE code, one will be assigned during SAM registration.
				  -Electronic Funds Transfer information (e.g., proposer's bank account number, routing number, and bank phone or fax number).

	Ensure eligibility of all team members	III	Required of all proposers	Verify eligibility, as applicable, for in accordance with requirements outlined in Section 3.
	Register at Grants.gov	IV.E.1.c	Required for proposers requesting cooperative agreements	Grants.gov requires proposers to complete a one-time registration process before a proposal can be electronically submitted. If proposers have not previously registered, this process can take between three business days and four weeks if all steps are not completed in a timely manner. See the Grants.gov user guides and checklists at http://www.grants.gov/web/grants/applicants/applicant-resources.html for further information.

The following items apply as part of the submission package:

✔	Item	BAA Section	Applicability	Comment
	Volume 1 (Technical and Management Proposal)	IV.B.2	Required of all proposers	Conform to stated page limits and formatting requirements. Include all requested information.
	Appendix A	IV.B.2.a.xi	Required of all proposers	-Team member identification - Government/FFRDC team member proof of eligibility - Organizational conflict of interest affirmations - Intellectual property assertions - Human subjects research - Animal use - Unpaid delinquent tax liability/felony conviction representations -CASB disclosure, if applicable
	Volume 2 (Cost Proposal)	IV.B.2.b	Required of all proposers	- Cover Sheet - Cost summary - Detailed cost information including justifications for direct labor, indirect costs/rates, materials/equipment, subcontractors/consultants, travel, ODCs - Cost spreadsheet file (.xls or equivalent format) - Subcontractor plan, if applicable Subcontractor cost proposals - Itemized list of material and equipment items to be purchased with vendor quotes or engineering estimates for material and equipment more than $50,000 - Travel purpose, departure/arrival destinations, and sample airfare
	Level of Effort Summary by Task Excel spreadsheet	IV.B.2.c	Required of all proposers	A template LoE Excel file will be provided on the FedBizOpps website as an attachment. Submit the LoE Excel file (do not convert Excel file to pdf format).
	PowerPoint Summary Slide	IV.B.2.d		A template PowerPoint slide will be provided on the FedBizOpps website as an attachment. Submit the PowerPoint file (do not convert PowerPoint file to pdf format).

E. Associate Contractor Agreement (ACA)

This same or similar language will be included in contract awards against HR001118S0052. Awards other than FAR based contracts will contain similar agreement language:

(a) It is recognized that success of the RACE research effort depends in part upon the open exchange of information between the various Associate Contractors involved in the effort. This ACA is intended to insure that there will be appropriate coordination and integration of work by the Associate Contractors to achieve complete compatibility and to prevent unnecessary duplication of effort. By executing this contract, the Contractor assumes the responsibilities of an Associate Contractor. For the purpose of this ACA, the term Contractor includes subsidiaries, affiliates, and organizations under the control of the contractor (e.g. subcontractors).

(b) Work under this contract may involve access to proprietary or confidential data from an Associate Contractor. To the extent that such data is received by the Contractor from any Associate Contractor for the performance of this contract, the Contractor hereby agrees that any proprietary information received shall remain the property of the Associate Contractor and shall be used solely for the purpose of the RACE research effort. Only that information which is received from another contractor in writing and which is clearly identified as proprietary or confidential shall be protected in accordance with this provision. The obligation to retain such information in confidence will be satisfied if the Contractor receiving such information utilizes the same controls as it employs to avoid disclosure, publication, or dissemination of its own proprietary information. The receiving Contractor agrees to hold such information in confidence as provided herein so long as such information is of a proprietary/confidential or limited rights nature.

(c) The Contractor hereby agrees to closely cooperate as an Associate Contractor with the other Associate Contractors on this research effort. This involves as a minimum:

      (1) maintenance of a close liaison and working relationship;

      (2) maintenance of a free and open information network with all Government-identified associate Contractors;

      (3) delineation of detailed interface responsibilities;

      (4) entering into a written agreement with the other Associate Contractors setting forth the substance and procedures relating to the foregoing, and promptly providing the Agreements Officer/Procuring Contracting Officer with a copy of same; and,

      (5) receipt of proprietary information from the Associate Contractor and transmittal of Contractor proprietary information to the Associate Contractors subject to any applicable proprietary information exchange agreements between associate contractors when, in either case, those actions are necessary for the performance of either.

(d) In the event that the Contractor and the Associate Contractor are unable to agree upon any such interface matter of substance, or if the technical data identified is not provided as scheduled, the Contractor shall promptly notify the DARPA RACE Program Manager. The Government

will determine the appropriate corrective action and will issue guidance to the affected Contractor.

(e) The Contractor agrees to insert in all subcontracts hereunder which require access to proprietary information belonging to the Associate Contractor, a provision which shall conform substantially to the language of this ACA, including this paragraph (e).

(f) Associate Contractors for the RACE research effort include:

Contractor   Technical Area

(end of ACA)

For information concerning agency level protests see http://www.darpa.mil/work-with-us/additional-baa#NPRPAC.