



Broad Agency Announcement

Cornucopia

Defense Sciences Office

HR001122S0012

December 16, 2021

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BAA Attachments:

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PART I: OVERVIEW INFORMATION

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Defense Sciences Office (DSO)
- **Funding Opportunity Title:** Cornucopia
- **Announcement Type:** Amendment
- **Funding Opportunity Number:** HR001122S0012
- **Catalog of Federal Domestic Assistance (CFDA) Number(s):** 12.910 Research and Technology Development
- **Dates (All times listed herein are Eastern Time.)**
 - **Posting Date:** December 16, 2021
 - **Proposers Day:** December 15, 2021. See Section VIII.A.
 - **Abstract Due Date:** January 6, 2022, 4:00 p.m.
 - **FAQ Submission Deadline:** February 8, 2022, 4:00 p.m. See Section VIII.B.
 - **Full Proposal Due Date:** February 22, 2022, 4:00 p.m.
- **Types of Instruments that May be Awarded:** Procurement contracts, cooperative agreements, or Other Transactions. Award instruments will be limited to procurement contracts and Other Transactions for Proposers whose proposed solution includes Controlled Unclassified Information (CUI).
- **Agency contacts**
 - **Technical POC:** Molly Jahn, Program Manager, DARPA/DSO
 - **BAA Email:** Cornucopia@darpa.mil
 - **BAA Mailing Address:**

DARPA/DSO
ATTN: HR001122S0012
675 North Randolph Street
Arlington, VA 22203-2114
 - **DARPA/DSO Opportunities Website:** <http://www.darpa.mil/work-with-us/opportunities>
- **Teaming Information:** See Section VIII.C for information on teaming opportunities.
- **Frequently Asked Questions (FAQ):** FAQs for this solicitation may be viewed on the DARPA/DSO Opportunities Website. See Section VIII.B for further information.
- **Security:** Cornucopia is an UNCLASSIFIED program. If proposers would like to work with Controlled Unclassified Information (CUI) or classified information, please specify so in the abstract and proposal and refer to section IV.B.4.

PART II: FULL TEXT OF ANNOUNCEMENT

I. Funding Opportunity Description

This Broad Agency Announcement (BAA) constitutes a public notice of a competitive funding opportunity as described in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016 as well as 2 C.F.R. § 200.203. Any resultant negotiations and/or awards will follow all laws and regulations applicable to the specific award instrument(s) available under this BAA, e.g., FAR 15.4 for procurement contracts.

A. Introduction

The Defense Sciences Office (DSO) at the Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals to develop capabilities for field-deployable, on demand production of a range of nutritious, palatable foodstuffs from engineered microbes, air, water, and electricity. Proposed research will investigate innovative approaches and drive revolutionary advances in science, devices, and/or systems to enable production of nutrition on demand, at the point of consumption within parameters associated with two DARPA-defined use cases. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

B. Background

Today's Class I (food) supply chains are lengthy, resource intensive, and known targets of adversaries. In addition, the primary source of nutrition in many military operations abroad, Meals Ready to Eat (MREs), are not recommended as a sole source of nutrition for long duration missions (>21 days), not approved for civilian use, and not tailored for age/sex differences that are needed in Humanitarian Assistance/Disaster Relief (HADR) missions supporting distressed civilian populations.

Capacity to produce palatable food from microbial biomass starting from minimal inputs, including air, water, and electricity at the point of consumption could have significant benefits to nutrition of U.S. and allied forces, especially under stress, exertion, or injury, as well as to civilian populations in contexts such as HADR missions. Such a capability could also improve supply chain security and resilience, relieving the need for lengthy transport, protection, preparation, service, and waste management, allowing more flexibility in allocation of military resources, including labor and fuel. Companies at the forefront of microbial-origin food are achieving success with food products that are primarily protein, but face an array of hard technical problems to break through to products that more fully meet human nutritional requirements, and report no market drivers for mobile production, nutritionally complete foodstuffs, or tailorable outputs.

Cornucopia will develop capabilities for field-deployable, on demand production of a range of nutritious, palatable foodstuffs from engineered microbes, air, water, and electricity. To adequately address the critical vulnerabilities faced in food supply chains across a variety of operational and humanitarian scenarios, Cornucopia will demonstrate capacity to produce all four human dietary macronutrients (protein, carbohydrate, fat, dietary fiber) in multiple food formats (e.g., shake, bar, gel, jerky) that meet military nutritional standards and palatability requirements in a system minimizing inputs, handling, and footprint. Cornucopia will exploit

advances in chemistry, microbial engineering, and synthetic biology to enable production of highly nutritious, palatable, microbial-origin foodstuffs within thresholds associated with DARPA-defined use cases that frame military and humanitarian missions.

To demonstrate success across the mission sets of interest, DARPA has developed two use cases that will drive technology development and demonstration. Cornucopia goals are bounded by Military Dietary Reference Intake (MDRI) requirements for Nutritional Standards for Operational Rations (NSOR) and Nutritional Standards for Restricted Rations (NSRR).¹ The program and its efforts will demonstrate the ability to (1) meet daily NSOR specifications for a small forward-operating unit comprised of 14 males, due to higher caloric intake requirements, deployed in austere conditions for 45 days; and (2) meet daily NSRR specifications for 100 civilians in the context of a HADR mission for 21 days.

C. Program Description/Scope

Cornucopia will enable the capability to produce nutritionally complete, microbial-origin foodstuffs at the point of consumption, consistent with military nutritional standards, starting with air (CO₂, N₂), water, electricity, and microbes. The term “microbe” refers to bacteria, archaea, fungi, protozoa, or microalgae. Out of scope is any approach that cultivates animal- or higher plant-derived cells or organisms. Cornucopia aims to design and test systems that are capable of producing highly nutritious, palatable microbial-origin food to enhance force readiness and operational resilience, prolong mission endurance, defend against supply chain disruptions, support disaster relief and influence operations, and mitigate cascading vulnerabilities in the face of an attack or disaster.

Cornucopia seeks to leverage breakthroughs from academia and industry to produce desirable flavors from processed microbial biomass containing human dietary macronutrients (protein, carbohydrate, fat, dietary fiber) in multiple food formats (e.g., shake, gel, bar, jerky). Cornucopia will enable future microbial food production systems that meet food quality, safety, and palatability needs, while critically ensuring the absence of food- and water-borne pathogens and minimizing overall production footprint as indicated by the two program use cases.

Proposals should present integrated, multi-disciplinary teams to pursue concepts that meet all program metrics derived from the two program use cases. Teams are required to address both use cases, emphasizing solutions that generalize where possible but focusing where necessary to achieve specific use case targets. The system must be robust enough to be operated and maintained for the duration of each test period by a trained warfighter. The end-to-end system for the small unit system, to include bioreactors, or other large equipment, should meet the size, weight, and power (SWaP) constraints of a High Mobility Multipurpose Wheeled Vehicle (a.k.a., Humvee) payload at no more than 4400 lb. total weight excluding a generator up to 10 kW, fuel and water. For the HADR use case, the end-to-end system including all equipment (i.e., including generator) but excluding water and fuel must be deployable in no more than four Quadcon containers.

Cornucopia is a 48-month program, comprising three concurrent research focus areas (FAs) that integrated teams will pursue through three phases. Each phase is associated with a set of program metrics detailed in Table 1 that guide the rate of technology development. **Proposals must**

¹ Army Regulation 40-25 OPNAVINST 10110.1/MCO 10110.49 AFI 44-141

address both use cases in all three FAs through all three phases. This structure will guide performer effort toward achieving interim and final program goals that assure levels of performance necessary to meet military use cases. Proposals must include consideration of risks in their technical approaches and strategies for risk mitigation.

FA1: Domestication of Microbes for Human Consumption

FA1 primary technical objectives include the following:

- Produce all four human dietary macronutrients from microbes, air, water, and electricity with minimal to no supplementation.
- Develop control of both macronutrient and micronutrient composition in system output in shake format (10-15% solids) to meet use case specifications.

Proposals must present a strategy to simultaneously produce protein, carbohydrates, fats, and dietary fiber suitable for human sustenance from microbes, air, water, and electricity with minimal to no supplementation in both use case contexts. This may require domestication of microbes in order to meet recommended dietary allowances for military operational and restricted rations. Electrochemical synthesis of molecules such as formate or acetate may expand the range of microbes that can be considered. Proposers must describe strategies to address rate-limiting steps, exclude known food-borne pathogens and microbial-origin anti-nutritional compounds including toxins, and select for rapid growth rates within the envelopes prescribed by the two program use cases. Excluded are additional ingredients other than those that may be synthesized from air, water, and electricity or processes that are incompatible with the needs and constraints of the use cases.

FA2: Tailorability of Microbial-Origin Food

FA2 primary technical objectives include the following:

- Impart three desirable flavors via expression of molecules known to confer flavor in microbial-origin nutritionally complete shake or pudding/gel format.
- Impart a total of four flavors by demonstrating through chemical analysis the presence of molecules associated with a given flavor in two additional food formats selected from this set of formats, shake, pudding/gel, bar or jerky, that need not be nutritionally complete.
- Demonstrate test readiness to meet or exceed the rating of “like slightly” on a 9 point hedonic scale administered by the Natick Soldier Systems Center Combat Feeding Division for three flavors of shake or pudding, and four additional distinct food format/ flavor combinations in minimum of two additional food formats drawn from the list above for a total of seven distinct food format/ flavor combinations in at least three distinct food formats, three of which are nutritionally complete.

Proposals must present strategies to demonstrate the presence in system output of sufficient levels of molecules known to impart desirable flavor (see Table 1). For the nutritionally complete shake format, three distinct desirable flavors in a nutritionally complete shake must be demonstrated. In addition, four more distinct flavors must be demonstrated in the system by chemical analysis to confirm the presence of molecules known to impart that flavor in at least two more food formats designed to provide supplemental nutrition (less than complete nutrition,

e.g., protein bars). Proposals should employ chemical analyses to confirm presence of molecules known to impart flavor obviating the need for Human Subjects Research (HSR). HSR panels for sensory evaluation are out of scope. Further, performers will be required to demonstrate the ability to support a shift in production from one flavor/format to another within the context of both specified use cases.

FA3: Integrated System Demonstrations for Military Use Cases

FA3 primary technical objectives include the following:

- Demonstrate, on a lab benchtop, the integrated capability to produce foodstuffs from microbes, air, water, and electricity with minimal to no supplementation with proof that the processes could scale to meet production goals within the SWaP envelopes for each use case and a plan to demonstrate exclusion of disallowed food-borne pathogens .
- Demonstrate this integrated capability while meeting designated food safety requirements and use case driven SWaP specifications.
- Demonstrate system output at specified caloric density (kcal per kg processed system output) at rates of production (kg processed output/day) that meet both use case goals for daily per capita production and overall production per day (per capita production × number of people) for the performance period in question (45 or 21 days, respectively).

Proposals must include a detailed description of the planned technical approach to meet all program metrics, including incremental steps, and a final demonstration of an integrated, lab benchtop system that meets all Phase 3 objectives for each use case. While some commonality of approach is expected for the use cases, proposers may present distinct approaches for each use case as necessary. Proposers must describe their approaches to devise bioreactor designs, protocols, and operating conditions that meet the demands of both use cases, including mobile military environments. Proposers are encouraged to consider, as appropriate, low energy CO₂ capture, “green” NH₃ synthesis, and in-reactor hydrolysis to support microbial growth rates within mission-informed thresholds for SWaP, toxicity, food quality, and food safety.

DARPA anticipates that selected Cornucopia efforts will be in line with existing regulatory requirements. Proposals should include a discussion and justification for how the proposed approach will ultimately be in line with all such standards.

Proposals that do not address all three FAs will be considered to be non-compliant and may not be reviewed. Proposer teams should submit a single, integrated proposal led by a single Principal Investigator, Program Integrator/Manager, under a single prime contractor that addresses all program phases, as applicable.

D. Program Structure

Cornucopia is a 48-month program executed through three phases: Phase 1 Base period of 18 months; Phase 2 Option of 12 months; and Phase 3 Option of 18 months. Proposed performer teams are expected to be multi-disciplinary, as proposals must address all three FAs for both of the specified program use cases. In order to provide an appropriate scope for the program, DARPA has selected two program use cases to bracket a wide range of potential military applications and that represent contrasting stresses on the technologies in question. While some commonalities are expected in approaches to the two use cases, performers may propose divergent approaches where necessary to meet program metrics for each use case. Program

metrics, described below and outlined in Table 1, drive toward two distinct nutritional standards specified by the MDRI for operational rations specified in the NSOR, and restricted rations, likewise specified in the NSRR, provided in Appendix 1.

Proposals should be structured to show how the proposed research will achieve program metrics. Integration of the focus areas is critical, therefore performers should describe how their work in each focus area will be linked to progress in all focus areas. Likewise, proposals should describe risks, potential pitfalls and relevant uncertainties, and strategies to obviate technical risks and other concerns. Performers will be required to provide 100 g samples of their system output upon request to the Government Test and Evaluation (T&E) team for analyses.

Phase 1 Base (18 months)

Performer teams will demonstrate simultaneous production of all four classes of essential human macronutrients (protein, carbohydrates, fats, and dietary fiber) from edible microbial biomass, including integration of flavor and assembly of component processes.

- **FA1:** Demonstrate simultaneous production of all four classes of human macronutrients in any ratio and accurate measurement of micronutrients listed in the MDRI. Additional ingredients or processes that are incompatible with the two program use cases are excluded. Performers must provide 100 g of system output to the Government T&E team 15 months after the contract is initiated for an interim chemical analysis required for DARPA reporting.
- **FA2:** Demonstrate ability to synthesize molecules that confer one desirable flavor in a shake format. The flavor must be selected from those rated as “like slightly” or better on a 9-point hedonic scale as determined by the Natick Soldier Systems Center (NSSC) Combat Feeding Division (CFD). The CFD will provide a “table of preferences” based on past HSR surveys of specific flavors molecules that will define the list of flavors for performers to consider. Additional flavors that are not on the list may be presented for review by CFD prior to initiating work. Exploration of flavor chemistry is encouraged. Palatability in this program will be inferred from chemical analyses. No HSR will occur in this program. Performers will evaluate and select highest priority flavor candidates, those that are easily expressed in microbes, stable through processing, and easy to produce, for further development.
- **FA3:** Provide a benchtop demonstration of all processes envisioned for the overall system that will be necessary to meet the program metrics for both use cases in all focus areas, and provide proof that these processes could be scaled to meet use case objectives. The Government T&E and Independent Validation and Verification (IV&V) teams will conduct analyses of nutrient content in a 100g sample of system output collected over an unrestricted time interval for each use case according to current accredited military protocols² at 15 months after contract to evaluate progress against Phase 1 metrics.

² USAPHC Circular 40-1, Appendix O. All analytical testing is completed according to AOAC methods.

At the conclusion of Phase 1, the Government may fund the option for the Phase 2 effort on one, some, all, or none of the awards, based on funding availability and performance across the Phase 1 metrics.

Phase 2 Option (12 months)

Performer teams will demonstrate the ability to produce required macronutrient and micronutrient composition in shake or pudding format to meet restricted ration standards (MDRI NSRR) in processed microbial biomass within tolerances prescribed around the target metrics, and one additional food format of unrestricted macronutrient composition and one additional flavor.

- **FA1:** Produce a shake or pudding format in two distinct flavors determined by chemical analysis of molecules known to impart flavor with macronutrient composition (protein, carbohydrates, fats, and dietary fiber) and micronutrient content required by MDRI NSRR specifications within tolerances specified in Table 1. For as many micronutrients as possible, it should be demonstrated that the system output in the context of both use cases delivers at least 50% of the minimum daily NSRR requirement for that specific nutrient.
- **FA2:** Produce two flavors, as determined by chemical analyses, in a shake or pudding format that fully meets NSRR targets and one additional format that may not meet NSRR standards. Expand the flavor repertoire of the system by identifying and justifying additional candidate pathways/molecules.
- **FA3:** Develop and demonstrate an integrated system capability that can produce one day's worth of processed biomass output sufficient to support 14 male warfighters or 50 civilians at NSRR specifications for one day produced over 14 days elapsed time with any necessary human intervention. While there may be commonalities, two distinct systems are permitted to address each use case, but each must comply with program metrics for SWaP and production. During this test, interventions are allowed to maximize productivity. Performers must submit a plan to exclude food- and water-borne pathogenic organisms disallowed by the military AOAC microbiological standard²

At the conclusion of Phase 2, the Government may fund the option for the Phase 3 effort on one, some, all, or none of the awards, based on funding availability and performance across the Phase 2 metrics.

Phase 3 Option (18 months) Performer teams will focus on development of a third food format that does not have to be nutritionally complete and additional flavors as well as demonstration of more precise control over macronutrient composition, more complete micronutrient content, and higher caloric density in the nutritionally complete food. In Phase 3, the systems will be expected to provide nutrition that meets the specified nutritional standards as indicated in Table 1 within SWaP envelope for each use case. Performers will demonstrate an integrated system for each use case with a specific written plan that shows the capability to scale up to meet program metrics.

- **FA1:** System output must meet NSOR specifications within specified tolerances for both use cases.

- **FA2:** Produce three flavors in a nutritionally complete shake or pudding format and two additional distinct flavors in two alternative formats for a total of seven flavor/format combinations, three of which are nutritionally complete. Demonstrate test readiness to meet the standard of “like slightly” or better on a 9 point hedonic scale administered by the Government T&E team on 100 g samples of system output for each use case produced in 1 day elapsed time.
- **FA3:** Demonstrate an integrated lab benchtop system or systems to meet the objectives of each use case within tolerances with proof of capability to scale production to meet the specifications of both program use cases. The system or systems must produce enough output for the small unit use case with proof the system could scale to support 14 male warfighters at operational rations standards within tolerances with caloric density such that all nutrients and all calories are delivered in 900 grams per person per day of system output. For the HADR use case, the system or systems must produce enough output in one day elapsed time with proof that the system could scale to sustain 100 civilians at restricted ration standards within tolerances. For both use cases, performers must demonstrate that their system can produce the daily objective output at the required caloric and nutrient density within tolerances in one day elapsed time with human intervention.

Table 1: Program Metrics

	Phase 1 Base (18 months)	Phase 2 Option (12 months)	Phase 3 Option (18 months)
FA1: Domesticated Microbes for Human Consumption			
Production of required macronutrients in shake/pudding format	Simultaneous production of all four classes, any ratio	Meet Nutritional Standards for Restricted Rations (NSRR) required macronutrient ratio $\leq \pm 30\%$	Meet Nutritional Standards for Operational Rations (NSOR) macronutrient requirement $\leq \pm 10\%$ in 900 g of output in shake or pudding format
Micronutrient content	Demonstrate accurate measurement of micronutrient content	$\geq 50\%$ of NSRR requirements,	$100\% \pm 20\%$ of NSOR requirements
FA2: Tailorability			
Produce Cornucopia flavors	Demonstrate ability to express molecules known to confer one flavor in system output	Demonstrate ability to express molecules known to confer two distinct flavors in shake/pudding format	Three flavors in shake/pudding nutritionally complete format + two distinct flavors each in two food formats that are not nutritionally complete
Expand Cornucopia flavor catalogue	Propose 10 possible desirable flavors; Select 5 for further development	Identify and demonstrate 10 flavors	Test readiness to meet/exceed standard of ‘like slightly’ for 7 distinct format/flavor combinations
Achieve necessary texture for each format	Shake/pudding, nutritionally complete	Shake/pudding + one additional format (bar, gel, jerky)	Nutritionally complete shake or pudding in three flavors; produce four additional distinct flavors that are test-ready for “slightly like” or better demonstrated by chemical analysis in two additional food formats
FA3: Integrated System Demonstrations for Military Use Cases			

System demonstration, 2 use cases	Benchtop demo of each essential process for both use cases	Integrated system demo, produce 1 day of output for 14 man unit or 50 , civilians on restricted rations in 14 days	Integrated system demos with proof of capability to scale production to meet goals for each use case
Per capita calories per day (Caloric density of output)	1500 kcal in \leq 1500 g of system output	1500 kcal \leq 1200g	3600 kcal \leq 900 g
Size, weight, and power		< 2X SWaP and safety envelope prescribed by two use cases (4400 lb. Humvee payload excluding 10 kW generator/water for small unit use case; for HADR use case, four Quadcons including generator, excluding water)	Integrated system concept \leq maximum allowable parameters, for each use case
Food safety		Demonstrate ability to exclude food-borne pathogens as indicated in DoD food standards and regulations	Demonstrate compliance with DoD food safety standards

Government Test & Evaluation (T&E) Team

In addition to selected performer teams, an independent Government T&E team will support all FAs and phases of the program to ensure the resulting technologies meet DoD needs and anticipate acquisition criteria. This team will inform application of program metrics and provide T&E of system performance, food safety and composition, and tailorability. Performers will be expected to work openly and regularly with DARPA and designated Government teams throughout the program. Performers will be required to provide details of their systems, including but not limited to engineering drawings, operating methods and instructions, software, datasets and samples to DARPA and/or any designated Government team member or organization upon request. **Proposals should include a task to reflect interaction with government teams and delivery of requested information, data, hardware, software and materials; the details of the work arrangement will be defined as the program proceeds.**

E. Schedule

Figure 1 provides the Cornucopia Program schedule.

DARPA will conduct two site visits to all performer sites in Phase 1 (at months 8 and 14) to assess progress against the Phase 1 Metrics as described in Table 1. At the beginning of month 15, the Government will conduct a detailed technical review of progress to date toward the 18-month metrics to inform decisions for which performers will continue into Phase 2. To be compliant with test readiness, performers must prove they have analyzed their prospective foodstuffs for nutritional composition as described in the metrics (caloric density, nutrient composition, relative amounts of each macronutrient, micronutrient content, molecules known to impart flavor) and that their benchtop system demonstrates exclusion of food-borne pathogens. There will be no Human Subjects Research conducted in Cornucopia. To administer program evaluations, Cornucopia products will be subject to the standard regulated and accredited biological, chemical, and physical analyses and testing applied to military foodstuffs by the

Government T&E Team. In Phases 2 and 3, on-site and off-site visits and meetings will occur at least once per phase to monitor progress.

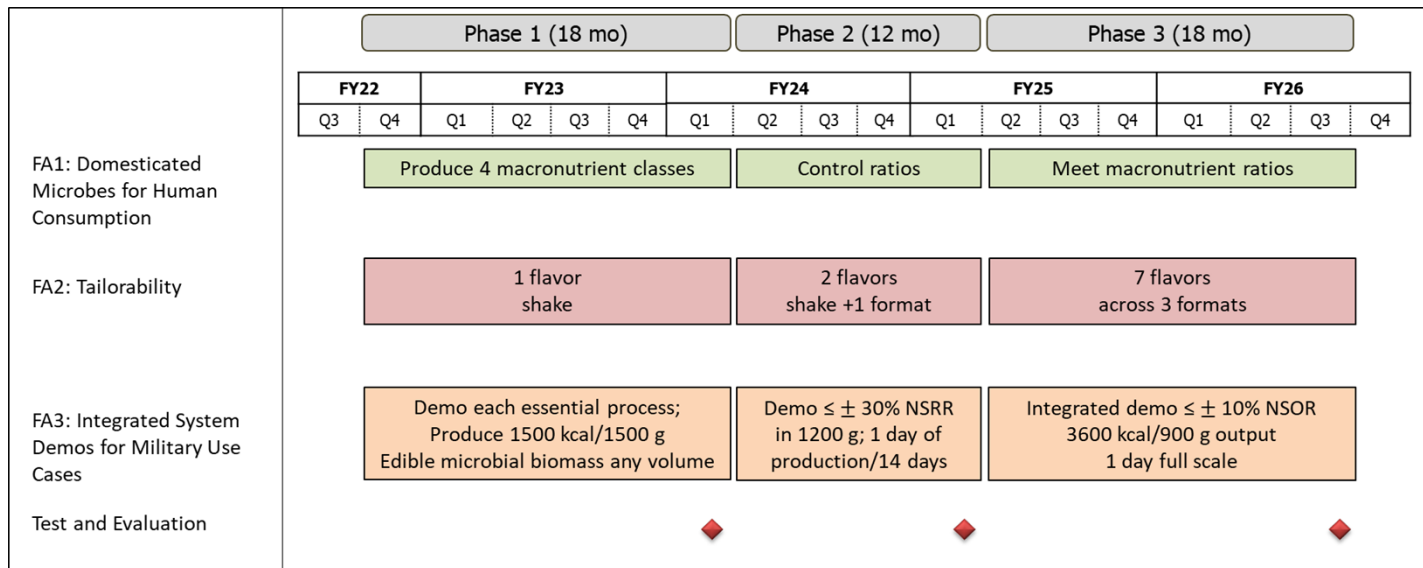


Figure 1. Program Schedule

F. Deliverables

Minimum deliverables:

- Performers are required to provide monthly (or as close as scheduling permits) technical progress reports to establish research progress. These reports should be in the form of a standardized slide presentation and a detailed, written technical report given to DARPA and discussed with the DARPA program management team via teleconference. Length and detail level will be at the discretion of the Program Manager.
- Performers will be required to submit monthly financial status updates. The prime performer must include information for itself and all subawardees/subcontractors. These reports should be in the form of an editable MS Excel file and should provide financial data including, but not limited to:
 - Program spend plan by phase and task.
 - Incurred program expenditures to date by phase and task.
 - Invoiced program expenditures to date by phase and task.
- A phase completion report submitted within 30 days of the end of each phase, summarizing the research done
- Leadership from each performer team (with additional key personnel at the discretion of the Principal Investigator (PI)) will be required to present research progress in person mid-phase and at the end of each phase. The purpose of these reviews is to ensure adequate engagement with the DARPA team to discuss details that might otherwise fall outside the scope of a routine technical brief and provide opportunities to discuss progress and scientific goals as well as any ongoing technical or

programmatic challenges that must be overcome to achieve the overarching goals of the program.

- When the final funded phase closes out, performer teams will provide a final report that summarizes all research activities, outcomes, and mechanisms discovered during the program; publications; research presentations; patent applications that result from the research pursued; and any additional deliverables required by the award instrument.
- Other negotiated deliverables specific to the objectives of the individual efforts. These may include registered reports; experimental protocols; publications; data management plan; intermediate and final versions of software libraries, code, and APIs, including documentation and user manuals; and/or a comprehensive assemblage of design documents, models, modeling data and results, and model validation data.
- Reporting as outlined in Section VI.C.

G. Government-furnished Property/Equipment/Information

Costs for Government Furnished equipment may be included.

H. Other Program Objectives and Considerations

1. Collaboration

DARPA does not anticipate the need for formal collaboration across performers. However, performers will be required to interact with the Government T&E team and to provide the T&E team with data and work products needed to assess performance. All proposals should describe plans for ensuring transparency of their processes to enable interactions with the T&E team.

2. Regulatory

Proposers must present a detailed plan for early and continued engagement with regulators (e.g., Food and Drug Administration, Environmental Protection Agency) throughout the program to discuss developing technologies and challenges in order to inform and facilitate technological advancement and the eventual translation of the technology to field deployment. Ideally, proposers will identify the regulatory framework at the time of proposal submission.

3. Intellectual Property

As with many DARPA programs, there is an emphasis on creating and leveraging open source technologies and architectures, making data sharing and collaboration key aspects of this program. Therefore, intellectual property rights asserted by proposers are strongly encouraged to be aligned with open source regimes, within reason. See Section VI.B.4 for more information related to intellectual property.

4. Other Considerations

If needed, DARPA will revise performer schedules to synchronize across performers, and monitor/revise as necessary throughout the program. Progress reporting as well as problem

identification and mitigation teleconference meetings will occur regularly, and scheduled with the DARPA PM and the Government team. Proposers should anticipate two site visits in Phase 1 and at least one site visit per subsequent phase by the DARPA Program Manager during which they will have the opportunity to demonstrate progress towards agreed-upon metrics.

Proposers should develop proposals as outlined in Section IV and should assume a target start date of June 2022. The following considerations should be addressed:

- Technical and programmatic strategies will conform to the entire program schedule and presents an aggressive plan to fully address all program goals, metrics and deliverables.
- Proposed task structures must be consistent across the proposed schedule, Statement of Work, and cost volume.
- Proposals must include the following meetings and travel in the proposed schedule and costs:
 - Starting at the mid-point of Phase 1 in order to initiate collaboration between teams and disseminate program developments, two-day Principal Investigator (PI) meetings held approximately every six months with options for virtual participation as well as in person attendance as travel restrictions allow, with locations split between the East and West Coasts of the United States. For budgeting purposes, plan for four two-day meetings over the course of the last 18 months of the program: two meetings in the Washington, D.C. area and two meetings in the San Francisco, CA area.

II. Award Information

A. General Award Information

DARPA anticipates multiple awards to integrated performer teams addressing all three Focus Areas (FAs).

The level of funding for individual awards made under this BAA will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers³ whose proposals are determined to be the most advantageous to the Government, all evaluation factors considered. 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;

³ As used throughout this BAA, “proposer” refers to the lead organization on a submission to this BAA. The proposer is responsible for ensuring that all information required by a BAA--from all team members--is submitted in accordance with the BAA. “Awardee” refers to anyone who might receive a prime award from the Government, including recipients of procurement contracts, cooperative agreements, or Other Transactions. “Subawardee” refers to anyone who might receive a subaward from a prime awardee (e.g., subawardee, consultant, etc.).

- 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 select only portions of proposals for award;
- fund awards in increments 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 identified for negotiation may result in a procurement contract, cooperative agreement, or Other Transaction (OT), depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors.

Proposers looking for innovative, commercial-like contractual arrangements are encouraged to consider requesting Other Transactions. To understand the flexibility and options associated with Other Transactions, consult <http://www.darpa.mil/work-with-us/contract-management#OtherTransactions>.

In accordance with 10 U.S.C. § 2371b(f), the Government may award a follow-on production contract or Other Transaction (OT) for any OT awarded under this solicitation if: (1) that participant in the OT, or a recognized successor in interest to the OT, successfully completed the entire prototype project provided for in the OT, as modified; and (2) the OT provides for the award of a follow-on production contract or OT to the participant, or a recognized successor in interest to the OT.

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 solicitation, the Government expects that program goals as described herein may be met by proposed efforts for fundamental research and non-fundamental research. Some 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 anticipated type of proposer (e.g., university or industry) and the nature of the solicited work, the Government expects 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.

University or non-profit research institution performance under this solicitation may include effort categorized as fundamental research. In addition to Government support for free and open scientific exchanges and dissemination of research results in a broad and unrestricted manner, the academic or non-profit research performer or recipient, regardless of tier, acknowledges that such research may have implications that are important to U.S. national interests and must be protected against foreign influence and exploitation. As such, the academic or non-profit research performer or recipient agrees to comply with the following requirements:

- (a) The University or non-profit research institution performer or recipient must establish and maintain an internal process or procedure to address foreign talent programs, conflicts of commitment, conflicts of interest, and research integrity. The academic or non-profit research performer or recipient must also utilize due diligence to identify Foreign Components or participation by Senior/Key Personnel in Foreign Government Talent Recruitment Programs and agree to share such information with the Government upon request.
 - i. The above described information will be provided to the Government as part of the proposal response to the solicitation and will be reviewed and assessed prior to award. Generally, this information will be included in the Research and Related Senior/Key Personnel Profile (Expanded) form (SF-424) required as part the proposer's submission through Grants.gov.
 1. Instructions regarding how to fill out the SF-424 and its biographical sketch can be found through Grants.gov.
 - ii. In accordance with USD(R&E) direction to mitigate undue foreign influence in DoD-funded science and technology, DARPA will assess all Senior/Key Personnel proposed to support DARPA grants and cooperative agreements for potential undue foreign influence risk factors relating to professional and financial activities. This will be done by evaluating information provided via the SF-424, and any accompanying or referenced documents, in order to identify and assess any associations or affiliations the Senior/Key Personnel may have with foreign strategic competitors or countries that have a history of intellectual property theft, research misconduct, or history of targeting U.S. technology for unauthorized transfer. DARPA's evaluation takes into consideration the entirety of the Senior/Key Personnel's SF-424, current and pending support, and biographical sketch, placing the most weight on the Senior/Key Person's professional and financial activities over the last 4 years. The majority of foreign entities lists used to make these determinations are publicly

available. The DARPA Countering Foreign Influence Program (CFIP) “Senior/Key Personnel Foreign Influence Risk Rubric” details the various risk ratings and factors. The rubric can be seen at the following link: <https://www.darpa.mil/attachments/092021DARPACFIPRubric.pdf>

- iii. Examples of lists that DARPA leverages to assess potential undue foreign influence factors include, but are not limited to:
 1. Executive Order 13959 “Addressing the Threat From Securities Investments That Finance Communist Chinese Military Companies”: <https://www.govinfo.gov/content/pkg/FR-2020-11-17/pdf/2020-25459.pdf>
 2. The U.S. Department of Education’s College Foreign Gift and Contract Report: [College Foreign Gift Reporting \(ed.gov\)](#)
 3. The U.S. Department of Commerce, Bureau of Industry and Security, List of Parties of Concern: <https://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern>
 4. Georgetown University’s Center for Security and Emerging Technology (CSET) Chinese Talent Program Tracker: <https://chinatalenttracker.cset.tech>
 5. Director of National Intelligence (DNI) “World Wide Threat Assessment of the US Intelligence Community”: [2021 Annual Threat Assessment of the U.S. Intelligence Community \(dni.gov\)](#)
 6. Various Defense Counterintelligence and Security Agency (DCSA) products regarding targeting of US technologies, adversary targeting of academia, and the exploitation of academic experts: <https://www.dcsa.mil/>

DARPA’s analysis and assessment of affiliations and associations of Senior/Key Personnel is compliant with Title VI of the Civil Rights Act of 1964. Information regarding race, color, or national origin is not collected and does not have bearing in DARPA’s assessment.

University or non-profit research institutions with proposals selected for negotiation that have been assessed as having high or very high undue foreign influence risk, will be given an opportunity during the negotiation process to mitigate the risk. DARPA reserves the right to request any follow-up information needed to assess risk or mitigation strategies.

- iv. Upon conclusion of the negotiations, if DARPA determines, despite any proposed mitigation terms (e.g. mitigation plan, alternative research personnel), the participation of any Senior/Key Research Personnel still represents high risk to the program, or proposed mitigation affects the Government’s confidence in proposer’s capability to successfully complete the research (e.g., less qualified Senior/Key Research Personnel) the Government may determine not to award the proposed effort. Any

decision not to award will be predicated upon reasonable disclosure of the pertinent facts and reasonable discussion of any possible alternatives while balancing program award timeline requirements.

- (b) Failure of the academic or non-profit research performer or recipient to reasonably exercise due diligence to discover or ensure that neither it nor any of its Senior/Key Research Personnel involved in the subject award are participating in a Foreign Government Talent Program or have a Foreign Component with an a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer may result in the Government exercising remedies in accordance with federal law and regulation.
 - i. If, at any time, during performance of this research award, the academic or non-profit research performer or recipient should learn that it, its Senior/Key Research Personnel, or applicable team members or subtier performers on this award are or are believed to be participants in a Foreign Government Talent Program or have Foreign Components with a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer , the performer or recipient will notify the Government Contracting Officer or Agreements Officer within 5 business days.
 - 1. This disclosure must include specific information as to the personnel involved and the nature of the situation and relationship. The Government will have 30 business days to review this information and conduct any necessary fact-finding or discussion with the performer or recipient.
 - 2. The Government's timely determination and response to this disclosure may range anywhere from acceptance, to mitigation, to termination of this award at the Government's discretion.
 - 3. If the University receives no response from the Government to its disclosure within 30 business days, it may presume that the Government has determined the disclosure does not represent a threat.
 - ii. The performer or recipient must flow down this provision to any subtier contracts or agreements involving direct participation in the performance of the research.
- (c) Definitions
 - i. Senior/Key Research Personnel
 - 1. This definition would include the Principal Investigator or Program/Project Director and other individuals who contribute to the scientific development or execution of a project in a substantive, measurable way, whether or not they receive salaries or compensation under the award. These include individuals whose absence from the project would be expected to impact the approved scope of the project.

2. Most often, these individuals will have a doctorate or other professional degrees, although other individuals may be included within this definition on occasion.
- ii. Foreign Associations/Affiliations
1. Association is defined as collaboration, coordination or interrelation, professionally or personally, with a foreign government-connected entity where no direct monetary or non-monetary reward is involved.
 2. Affiliation is defined as collaboration, coordination, or interrelation, professionally or personally, with a foreign government-connected entity where direct monetary or non-monetary reward is involved.
- iii. Foreign Government Talent Recruitment Programs
1. In general, these programs will include any foreign-state-sponsored attempt to acquire U.S. scientific-funded research or technology through foreign government-run or funded recruitment programs that target scientists, engineers, academics, researchers, and entrepreneurs of all nationalities working and educated in the U.S.
 2. Distinguishing features of a Foreign Government Talent Recruitment Program may include:
 - a. Compensation, either monetary or in-kind, provided by the foreign state to the targeted individual in exchange for the individual transferring their knowledge and expertise to the foreign country.
 - b. In-kind compensation may include honorific titles, career advancement opportunities, promised future compensation or other types of remuneration or compensation.
 - c. Recruitment, in this context, refers to the foreign-state-sponsor's active engagement in attracting the targeted individual to join the foreign-sponsored program and transfer their knowledge and expertise to the foreign state. The targeted individual may be employed and located in the U.S. or in the foreign state.
 - d. Contracts for participation in some programs that create conflicts of commitment and/or conflicts of interest for researchers. These contracts include, but are not limited to, requirements to attribute awards, patents, and projects to the foreign institution, even if conducted under U.S. funding, to recruit or train other talent recruitment plan members, circumventing merit-based processes, and to replicate or transfer U.S.-funded work in another country.

- e. Many, but not all, of these programs aim to incentivize the targeted individual to physically relocate to the foreign state. Of particular concern are those programs that allow for continued employment at U.S. research facilities or receipt of U.S. Government research funding while concurrently receiving compensation from the foreign state.
 - 3. Foreign Government Talent Recruitment Programs DO NOT include:
 - a. Research agreements between the University and a foreign entity, unless that agreement includes provisions that create situations of concern addressed elsewhere in this section,
 - b. Agreements for the provision of goods or services by commercial vendors, or
 - c. Invitations to attend or present at conferences.
- iv. Conflict of Interest
 - 1. A situation in which an individual, or the individual's spouse or dependent children, has a financial interest or financial relationship that could directly and significantly affect the design, conduct, reporting, or funding of research.
- v. Conflict of Commitment
 - 1. A situation in which an individual accepts or incurs conflicting obligations between or among multiple employers or other entities.
 - 2. Common conflicts of commitment involve conflicting commitments of time and effort, including obligations to dedicate time in excess of institutional or funding agency policies or commitments. Other types of conflicting obligations, including obligations to improperly share information with, or withhold information from, an employer or funding agency, can also threaten research security and integrity and are an element of a broader concept of conflicts of commitment.
- vi. Foreign Component
 - 1. Performance of any significant scientific element or segment of a program or project outside of the U.S., either by the University or by a researcher employed by a foreign organization, whether or not U.S. government funds are expended.
 - 2. Activities that would meet this definition include, but are not limited to:
 - a. Involvement of human subjects or animals;

- b. Extensive foreign travel by University research program or project staff for the purpose of data collection, surveying, sampling, and similar activities;
 - c. Collaborations with investigators at a foreign site anticipated to result in co-authorship;
 - d. Use of facilities or instrumentation at a foreign site;
 - e. Receipt of financial support or resources from a foreign entity; or
 - f. Any activity of the University that may have an impact on U.S. foreign policy through involvement in the affairs or environment of a foreign country.
- 3. Foreign travel is not considered a Foreign Component.
- vii. **Strategic Competitor**
 - 1. A nation, or nation-state, that engages in diplomatic, economic or technological rivalry with the United States where the fundamental strategic interests of the U.S are under threat.

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 determine whether the proposed research shall be considered fundamental and to select the award instrument type. Appropriate language will be included in resultant awards for non-fundamental research to prescribe publication requirements and other restrictions, as appropriate. This language 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 to be performed by a potential awardee is non-fundamental research, its proposed subawardee's effort may be fundamental research. It is also possible that the research performed by a potential awardee is fundamental research while its proposed subawardee's effort may be non-fundamental research. In all cases, it is the potential awardee's responsibility to explain in its proposal which proposed efforts are fundamental research and why the proposed efforts should be considered fundamental research.

III. Eligibility Information

A. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal for DARPA's consideration.

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 solicitation 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, that (a) cites the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and (b) certifies the FFRDC's compliance with the associated FFRDC sponsor agreement's terms and conditions. These conditions are a requirement 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 and compete with industry. This information is required for Government Entities proposing to be awardees or subawardees.

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. Other Applicants

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 solicitation. 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 solicitation 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.

Include any OCIs affirmations and disclosures in Attachment G: VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS.

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). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

For more information on potential cost sharing requirements for Other Transactions for Prototype, see <http://www.darpa.mil/work-with-us/contract-management#OtherTransactions>.

IV. Application and Submission Information

Prior to submitting a full proposal, proposers are *strongly encouraged* to first submit an abstract as described below. This process allows a proposer to ascertain whether the proposed concept is (1) applicable to the Cornucopia BAA and (2) currently of interest. For the purposes of this BAA, applicability is defined as follows:

- The proposed concept is applicable to the focus areas described herein.
- The proposed concept is important to DSO's current investment portfolio.
- The proposed concept investigates an innovative approach that enables revolutionary advances, i.e., will not primarily result in evolutionary improvements to the existing state of practice.
- The proposed work has not already been completed (i.e., the research element is complete but manufacturing/fabrication funds are required).
- The proposer has not already received funding or a positive funding decision for the proposed concept (whether from DARPA or another Government agency).

Abstracts and full proposals that are not found to be applicable to the Cornucopia BAA as defined above may be deemed non-conforming⁴ and removed from consideration. All abstracts and full proposals must provide sufficient information to assess the validity/feasibility of their claims as well as comply with the requirements outlined herein for submission formatting, content and transmission to DARPA. Abstracts and full proposals that fail to do so may be deemed non-conforming and removed from consideration. Proposers will be notified of non-conforming determinations via letter.

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 or additional solicitation regarding this opportunity will be issued, nor is additional information available except as provided at the SAM.gov website (<https://sam.gov/>), the Grants.gov website (<http://www.grants.gov/>), or referenced herein.

B. Content and Form of Application Submission

1. Abstract Information and Formatting

As stated above, proposers are strongly encouraged to submit an abstract in advance of a full proposal to minimize effort and reduce the potential expense of preparing an out of scope proposal. All proposers are required to use Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE and Attachment B: ABSTRACT TEMPLATE provided with this solicitation on <https://sam.gov/> and <http://www.grants.gov/>. Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE described herein must be in .ppt, .pptx or .pdf format and should be attached as a separate file to this document.

The abstract provides a synopsis of the proposed project by briefly answering the following questions:

- What is the proposed work attempting to accomplish or do?
- How is the work performed today (what is the state of the art or practice), and what are the limitations?

⁴ "Conforming" is defined as having been submitted in accordance with the requirements outlined herein

- 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?
- What is new in your approach, and why do you think it will be successful?

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 conforming full proposals using the published evaluation criteria and without regard to any comments resulting from the review of an abstract.

Proposers should note that a favorable response to an abstract is not a guarantee that a proposal based on the abstract will ultimately be selected for award negotiation.

While it is DARPA policy to attempt to reply to abstracts within thirty calendar days, proposers to this solicitation may anticipate a response within approximately three weeks. These official notifications will be sent via email to the Technical POC and/or Administrative POC identified on the abstract coversheet.

2. Full Proposal Information and Formatting

a. Proposal Volumes

Full proposals must consist of all 3 volumes described below. To assist in proposal development, templates for these volumes are posted as attachments to this solicitation on <https://sam.gov/>. The templates are specific to each volume, as outlined below.

Full proposals requesting a procurement contract or Other Transaction (OT) must use the following attachments in each volume:

- **Volume 1**
 - Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE
 - Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT
- **Volume 2**
 - Attachment E: PROPOSAL TEMPLATE VOLUME 2: COST
 - Attachment F: MS Excel™ DARPA COST PROPOSAL SPREADSHEET
- **Volume 3**
 - Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

Full proposals requesting a cooperative agreement must use the following attachments in addition to the Grants.gov application package:

- **Volume 1**
 - Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE

- Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT
- **Volume 2***
 - Attachment F: MS Excel™ DARPA COST PROPOSAL SPREADSHEET
- **Volume 3**
 - Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

* Full proposals requesting a cooperative agreement do not need to include Attachment E. Instead, Budget Justification should be provided as Section L of the SF 424 Research & Related Budget form provided via <http://www.grants.gov> (see section IV.E.1.c for additional details). The Budget Justification should include the following information for the recipient and all subawardees:

- **Direct Labor (sections A and B)** - Detail the total number of persons and their level of commitment for each position listed as well as which specific tasks (as described in the SOW) they will support.
- **Equipment (section C)** - Provide an explanation for listed requested equipment exceeding \$5,000, properly justifying why it is required to meet the objectives of the program.
- **Travel (section D)** - Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc.
- **Other Direct Costs (section F)** - Provide a justification for the items requested and an explanation of how the estimates were obtained.
- **Participant/Trainee Support Costs (section E)** - Provide details on Tuition/Fees/Health Insurance, Stipends, Travel and Subsistence costs.

The Government requires that proposers use the provided MS Excel™ DARPA Standard Cost Proposal Spreadsheet in the development of their cost proposals. A customized cost proposal spreadsheet may be an attachment to this solicitation. If not, the spreadsheet can be found on the DARPA website at <http://www.darpa.mil/work-with-us/contract-management> (under “Resources” on the right-hand side of the webpage). All tabs and tables in the cost proposal spreadsheet should be developed in an editable format with calculation formulas intact to allow traceability of the cost proposal. This cost proposal spreadsheet should be used by the prime organization and all subcontractors. In addition to using the cost proposal spreadsheet, the cost proposal still must include all other items required in this announcement that are not covered by the editable spreadsheet. Subcontractor cost proposal spreadsheets may be submitted directly to the Government by the proposed subcontractor via e-mail to the address in Part I of this solicitation. **Using the provided cost proposal spreadsheet will assist the Government in a rapid analysis of your proposed costs and, if your proposal is selected for a potential award, speed up the negotiation and award execution process.**

All proposers are required to use the appropriate templates based on the type of award requested. Templates are provided as attachments to this solicitation on <https://sam.gov/> and <http://www.grants.gov>. Full Proposals that do not include the appropriate attachments as detailed

here may be deemed non-conforming and may not be evaluated.

b. DARPA Embedded Entrepreneur Initiative (EEI)

Awardees pursuant to this solicitation may be eligible to participate in the DARPA Embedded Entrepreneurship Initiative (EEI) during the award's period of performance. EEI is a limited scope program offered by DARPA, at DARPA's discretion, to a small subset of awardees. The goal of DARPA's EEI is to increase the likelihood that DARPA-funded technologies take root in the U.S. and provide new capabilities for national defense. EEI supports DARPA's mission "to make pivotal investments in breakthrough technologies and capabilities for national security" by accelerating the transition of innovations out of the lab and into new capabilities for the Department of Defense (DoD). EEI investment supports development of a robust and deliberate Go-to-Market strategy for selling technology product to the government and commercial markets and positions DARPA awardees to attract U.S. investment. The following is for informational and planning purposes only and does not constitute solicitation of proposals to the EEI.

There are three elements to DARPA's EEI: (1) A Senior Commercialization Advisor (SCA) from DARPA who works with the Program Manager (PM) to examine the business case for the awardee's technology and uses commercial methodologies to identify steps toward achieving a successful transition of technology to the government and commercial markets; (2) Connections to potential industry and investor partners via EEI's Investor Working Groups; and (3) Additional funding on an awardee's contract for the awardee to hire an embedded entrepreneur to achieve specific milestones in a Go-to-Market strategy for transitioning the technology to products that serve both defense and commercial markets. This embedded entrepreneur's qualifications should include business experience within the target industries of interest, experience in commercializing early stage technology, and the ability to communicate and interact with technical and non-technical stakeholders. Funding for EEI is typically no more than \$250,000 per awardee over the duration of the award. An awardee may apportion EEI funding to hire more than one embedded entrepreneur, if achieving the milestones requires different expertise that can be obtained without exceeding the awardee's total EEI funding. The EEI effort is intended to be conducted concurrent with the research program without extending the period of performance.

EEI Application Process:

After receiving an award under the solicitation, awardees interested in being considered for EEI should notify their DARPA Program Manager (PM) during the period of performance. Timing of such notification should ideally allow sufficient time for DARPA and the awardee to review the awardee's initial transition plan, identify milestones to achieve under EEI, modify the award, and conduct the work required to achieve such milestones within the original award period of performance. These steps may take 18-24 months to complete, depending on the technology. If the DARPA PM determines that EEI could be of benefit to transition the technology to product(s) the Government needs, the PM will refer the performer to DARPA Commercial Strategy.

DARPA Commercial Strategy will then contact the performer, assess fitness for EEI, and in consultation with the DARPA technical office, determine whether to invite the performer to participate in the EEI. Factors that are considered in determining fitness for EEI include DoD/Government need for the technology; competitive approaches to enable a similar capability or product; risks and impact of the Government's being unable to access the technology from a

sustainable source; Government and commercial markets for the technology; cost and affordability; manufacturability and scalability; supply chain requirements and barriers; regulatory requirements and timelines; Intellectual Property and Government Use Rights, and available funding.

Invitation to participate in EEI is at the sole discretion of DARPA and subject to program balance and the availability of funding. EEI participants' awards may be subsequently modified bilaterally to amend the Statement of Work to add negotiated EEI tasks, provide funding, and specify a milestone schedule which will include measurable steps necessary to build, refine, and execute a Go-to-Market strategy aimed at delivering new capabilities for national defense. Milestone examples are available at: <https://www.darpa.mil/work-with-us/contract-management>.

Awardees under this solicitation are eligible to be considered for participation in EEI, but selection for award under this solicitation does not imply or guarantee participation in EEI.

3. 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 with a label such as "Proprietary" or "Company Proprietary." NOTE: "Confidential" is a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

4. Controlled Unclassified Information (CUI) and Controlled Technical Information (CTI) on Non-DoD Information Systems

Proposers and awardees are subject to the DoD requirements related to protection of CUI and CTI IAW Executive Order 13556, *Controlled Unclassified Information*, DFARS 252.204-7000, *Disclosure of Information*, DFARS 252.204-7012, *Safeguarding Covered Defense Information and Cyber Incident Reporting*, DoD Instruction 5200.48, *Controlled Unclassified Information*, DoD Instruction 8582.01, *Security of Non-DoD Information Systems Processing Unclassified Nonpublic DoD Information*. See <http://www.darpa.mil/work-with-us/additional-baa> for additional guidance on protecting CUI on Non-DoD Information Systems.

CUI is defined as unclassified information that requires safeguarding or dissemination controls, pursuant to and consistent with applicable law, regulations, and Government-wide policies.

Controlled Technical Information (CTI) is defined as technical information with military or space application that is subject to controls on its access, use, reproduction, modification, performance, display, release, disclosure, or dissemination. The term CTI does not include information that is lawfully publicly available without restrictions.

DoD considers "technical information" to be technical data or computer software, as those terms are defined in Defense Federal Acquisition Regulation Supplement clause 252.227-7013, "Rights in Technical Data - Noncommercial Items" (48 CFR 252.227-7013). Examples of technical information include research and engineering data; engineering drawings and associated lists; specifications, standards, process sheets, manuals, technical reports, technical orders, catalog-item identifications, data sets, studies and analyses and related information; and computer software code. Note that such technical information may or may not be controlled (i.e., CTI), depending on whether it has military or space application.

Proposers should indicate in their proposal if their proposed solution includes CUI. All proposals indicating CUI requirements must include a draft CUI protection plan in Attachment G, PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS detailing how CUI will be protected at performance sites as well as sub-contractor locations. The draft CUI protection plan is not a source selection criterion, and there is no page limit. During selection and negotiation, DARPA will determine additional requirements and clarification required of the CUI protection plan

As part of Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT, the proposer should include a Statement of Work with a breakdown of all research tasks and subtasks and indicate the proposed classification for each. For all tasks and subtasks proposed to be unclassified, proposers should distinguish between work proposed to be Fundamental Research versus work proposed to be CUI. Proposers will provide a short explanation for why each subtask should be categorized as Fundamental Research or CUI.

If CUI tasks are proposed in the Statement of Work, proposers must provide a plan for protecting Controlled Unclassified Information as part of Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 8.

CTI is to be marked “DISTRIBUTION C. Distribution authorized to U.S. Government agencies and their contractors; Critical Technology; [current date]. Other requests for this document shall be referred to DARPA, DSO” in accordance with Department of Defense Instruction 5203.24, “Distribution of Statements on Technical Documents.”

5. Security Information

DARPA anticipates that submissions received under this BAA will be unclassified. However, should a proposer wish to submit classified information, an *unclassified* email must be sent to the BAA mailbox requesting submission instructions from the DARPA/DSO Program Security Officer (PSO).

- a. Program Security Information
 - i. Program Security

Proposers should include with their proposal any proposed solution(s) to program security requirements unique to this program. Common program security requirements include but are not limited to: operational security (OPSEC) contracting/sub-contracting plans; foreign participation or materials utilization plans; program protection plans (which may entail the following) manufacturing and integration plans; range utilization and support plans (air, sea, land, space, and cyber); data dissemination plans; asset transportation plans; classified test activity plans; disaster recovery plans; classified material/asset disposition plans and public affairs/communications plans.

- b. Controlled Unclassified Information (CUI)

For unclassified proposals containing controlled unclassified information (CUI), applicants will ensure personnel and information systems processing CUI security requirements are in place.

- i. CUI Proposal Markings

If an unclassified submission contains CUI or the suspicion of such, as defined by Executive Order 13556 and 32 CFR Part 2002, the information must be appropriately and conspicuously

marked CUI in accordance with DoDI 5200.48. Identification of what is CUI about this DARPA program will be detailed in a DARPA CUI Guide and will be provided as an attachment to the BAA or may be provided at a later date.

ii. CUI Submission Requirements

Unclassified submissions containing CUI may be submitted via DARPA's BAA Website (<https://baa.darpa.mil>) in accordance with Part II Section VIII of this BAA.

iii. CUI Authorized Systems

Proposers submitting proposals involving the pursuit and protection of DARPA information designated as CUI must have, or be able to acquire prior to contract award, an information system authorized to process CUI information IAW NIST SP 800-171 and DoDI 8582.01.

The ability to perform classified work is not a requirement on this effort. However, it is possible that applications encountered during the execution of the contract may be classified. As such, may be useful for some performers to have access to classified information at up to the [INSERT LEVEL]. Therefore, if the proposer does have the ability to work at that level, the proposal should describe their organization's ability to perform classified work and their facilities' ability to receive and store classified materials as well as their ability and experience to perform work using classified information technology. This information should be included in Attachment G, PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS.

Security classification guidance and direction via a Security Classification Guide (SCG) and/or DD Form 254, "DoD Contract Security Classification Specification," will not be provided at this time, since DARPA is soliciting ideas only. If a determination is made that the award instrument may result in access to classified information, a SCG and/or DD Form 254 will be issued by DARPA and attached as part of the award.

C. Submission Dates and Times

Proposers are warned that submission deadlines as outlined herein are in Eastern Time and will be strictly enforced. When planning a response to this solicitation, proposers should take into account that some parts of the submission process may take from one business day to one month to complete (e.g., registering for a Data Universal Numbering System (DUNS) number or Taxpayer Identification Number (TIN)).

DARPA will acknowledge receipt of *complete* submissions via email and assign identifying numbers that should be used in all further correspondence regarding those submissions. If no confirmation is received within two business days, please contact the BAA Administrator at Cornucofia@darpa.mil to verify receipt.

1. Abstracts

Abstracts must be submitted per the instructions outlined herein *and received by DARPA* no later than the due date and time listed in Part I: Overview Information. Abstracts received after this time and date may not be reviewed.

2. Full Proposals

Full proposal packages as detailed in Section IV.B.2 above, and, as applicable, proprietary

subawardee cost proposals and classified appendices to unclassified proposals, must be submitted per the instructions outlined herein *and received by DARPA* no later than the due date and time listed in Part I: Overview Information. Proposals received after this time and date may 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. Email submissions will not be accepted. Failure to comply with the submission procedures outlined herein may result in the submission being deemed non-conforming and withdrawn from consideration.

a. Abstracts

DARPA/DSO will employ an electronic upload submission system (<https://baa.darpa.mil/>) for all UNCLASSIFIED abstracts sent in response to this solicitation. *Abstracts must not be submitted via Grants.gov or email.*

First time users of the DARPA BAA Submission website must complete a two-step account creation process. The first step consists of registering for an extranet account by going to the URL listed above 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, the second step requires proposers to go back to the submission website and log in using that user name and password. After accessing the extranet, proposers may then create a user account for the DARPA BAA Submission website by selecting the “Register your Organization” link at the top of the page. Once the user account is created, proposers will be able to see a list of solicitations open for submissions, view submission instructions, and upload/finalize 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 abstracts submitted electronically through the DARPA BAA Submission website must meet the following requirements: (1) uploaded as a zip file (.zip or .zipx extension); (2) only contain the document(s) requested herein; (3) only contain unclassified information; and (4) must not exceed 100 MB in size. Only one zip file will be accepted per abstract and abstracts not uploaded as zip files will be rejected by DARPA.

Technical support for the DARPA BAA Submission website is available during regular business hours, Monday – Friday, 9:00 a.m. – 5:00 p.m. Requests for technical support must be emailed to BAAT_Support@darpa.mil with a copy to Cornucopia@darpa.mil. Questions regarding

submission contents, format, deadlines, etc. should be emailed to Cornucopia@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

Since proposers may encounter heavy traffic on the web server, DARPA discourages waiting until the day abstracts are due to request an account and/or upload the submission.

NOTE: Proposers submitting an abstract via the DARPA BAA Submission site MUST (1) click the “Finalize” button in order for the submission to upload AND (2) do so with sufficient time for the upload to complete prior to the deadline. Failure to do so will result in a late submission.

b. Proposals Requesting a Procurement Contract or Other Transaction

Proposers requesting procurement contracts or Other Transactions may submit full proposals through ONE of the following methods: (1) electronic upload (DARPA-preferred); or (2) direct mail/hand-carry.

i. Electronic Upload

DARPA/DSO encourages proposers to submit UNCLASSIFIED proposals via the DARPA BAA Submission website at <https://baa.darpa.mil>.

First time users of the DARPA BAA Submission website must complete a two-step account creation process. The first step consists of registering for an extranet account by going to the URL listed above 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, the second step requires proposers to go back to the submission website and log in using that user name and password. After accessing the extranet, proposers may then create a user account for the DARPA BAA Submission website by selecting the “Register your Organization” link at the top of the page. Once the user account is created, proposers will be able to see a list of solicitations open for submissions, view submission instructions, and upload/finalize 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 full proposals submitted electronically through the DARPA BAA Submission website must meet the following requirements: (1) uploaded as a zip file (.zip or .zipx extension); (2) only contain the document(s) requested herein; (3) only contain unclassified information; and (4) must not exceed 100 MB in size. Only one zip file will be accepted per full proposal and full proposals not uploaded as zip files will be rejected by DARPA.

Technical support for the DARPA BAA Submission website is available during regular business hours, Monday – Friday, 9:00 a.m. – 5:00 p.m. Requests for technical support must be emailed to BAAT_Support@darpa.mil with a copy to Cornucopia@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to Cornucopia@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

Since proposers may encounter heavy traffic on the web server, DARPA discourages waiting until the day proposals are due to request an account and/or upload the submission. NOTE:

Proposers submitting a proposal via the DARPA BAA Submission site MUST (1) click the “Finalize” button in order for the submission to upload AND (2) do so with sufficient time for the upload to complete prior to the deadline. Failure to do so will result in a late submission.

ii. Direct Mail/Hand-carry

Proposers electing to submit procurement contract or Other Transaction proposals via direct mail or hand-carried must provide one paper copy and one electronic copy on CD or DVD of the full proposal package. All parts of the proposal package must be mailed or hand-carried in a single delivery to the address noted in Section VII below.

a. 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> (DARPA-preferred); 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: In addition to the volumes and corresponding attachments requested elsewhere in this solicitation, proposers must also submit the three forms listed below.

Form 1: 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. § 1681 et.seq.), the Department of Defense (DoD) is collecting 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. In addition, the National Defense Authorization Act (NDAA) for FY 2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including foreign talent programs by countries that desire to exploit United States’ technology within the DoD research, science and technology, and innovation enterprise. This requirement is necessary for all research and research-related educational activities. The DoD is using the two forms below to collect the necessary information to satisfy these requirements. Detailed instructions for each form are available on Grants.gov.

Form 2: The Research and Related Senior/Key Person Profile (Expanded) form, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_3_0-V3.0.pdf, will be used to collect the following information for all senior/key personnel, including Project Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals’ efforts under the project are funded by the DoD. The form includes 3 parts: the main form administrative information, including the Project Role, Degree Type and Degree Year; the biographical sketch; and the current and pending support. The biographical sketch and current and pending support are to be provided as attachments:

- Biographical Sketch: Mandatory for Project Directors (PD) and Principal Investigators (PI), optional, but desired, for all other Senior/Key Personnel. The biographical sketch should include information pertaining to the researchers:
 - Education and Training.
 - Research and Professional Experience.
 - Collaborations and Affiliations (for conflict of interest).
 - Publications and Synergistic Activities.
- Current and Pending Support: Mandatory for all Senior/Key Personnel including the PD/PI. This attachment should include the following information:
 - A list of all current projects the individual is working on, in addition to any future support the individual has applied to receive, regardless of the source.
 - Title and objectives of the other research projects.
 - The percentage per year to be devoted to the other projects.
 - The total amount of support the individual is receiving in connection to each of the other research projects or will receive if other proposals are awarded.
 - Name and address of the agencies and/or other parties supporting the other research projects
 - Period of performance for the other research projects.

Additional senior/key persons can be added by selecting the “Next Person” button at the bottom of the form. Note that, although applications without this information completed may pass Grants.gov edit checks, if DARPA receives an application without the required information, DARPA may determine that the application is incomplete and may cause your submission to be rejected and eliminated from further review and consideration under the solicitation. DARPA reserves the right to request further details from the applicant before making a final determination on funding the effort.

Form 3: [Research and Related Personal Data](https://apply07.grants.gov/apply/forms/sample/RR_PersonalData_1_2-V1.2.pdf), 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.*

i. Electronic Upload

DARPA encourages cooperative agreement proposers to submit their proposals via electronic upload at <http://www.grants.gov/web/grants/applicants/apply-for-grants.html>. Proposers electing to use this method must complete a one-time registration process on Grants.gov before a proposal can be electronically submitted. *If proposers have not previously registered, this process can take up to four weeks* so registration should be done in sufficient time to ensure it does not impact a proposer’s ability to meet required submission deadlines. Registration requirements and instructions are outlined at <http://www.grants.gov/web/grants/register.html>.

Carefully follow the DARPA submission instructions provided with the solicitation application package on Grants.gov. Only the required forms listed therein (e.g., SF-424 and Attachments form) should be included in the submission. *NOTE: Grants.gov does not accept zipped or encrypted proposals.*

Once Grants.gov has received an uploaded proposal submission, Grants.gov will send two email messages to notify proposers that: (1) the proposal has been received by Grants.gov; and (2) the proposal 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 validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the submission must be corrected, resubmitted and revalidated before DARPA can retrieve it. If the solicitation is no longer open, the rejected proposal cannot be resubmitted. Once the proposal is retrieved by DARPA, Grants.gov will send a third email to notify the proposer. DARPA will send a final confirmation email as described in Section IV.C.

To avoid missing deadlines, Grants.gov recommends that proposers submit their proposals to Grants.gov 24-48 hours in advance of the proposal due date to provide sufficient time to complete the registration and submission process, receive email notifications and correct errors, as applicable.

Technical support for Grants.gov submissions may be reached at 1-800-518-4726 or support@grants.gov.

ii. Direct Mail/Hand-carry

Proposers electing to submit cooperative agreement proposals via direct mail or hand-carried must provide one paper copy and one electronic copy on CD or DVD of the full proposal package. Proposers must complete the SF 424 R&R form (Application for Federal Assistance, Research and Related) provided at Grants.gov as part of the opportunity application package for this BAA and include it in the proposal submission. All parts of the proposal package must be mailed or hand-carried to the address noted in Section VII below.

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 proposed technical team has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks, and planned mitigation efforts are clearly defined and feasible. The proposed schedule aggressively pursues performance metrics in an efficient time frame that accurately accounts for the anticipated workload.

- **Potential Contribution and Relevance to the DARPA Mission**

The potential contributions of the proposed effort bolster the national security technology base and support DARPA's mission to make pivotal early technology investments that create or prevent technological surprise. The proposed intellectual property restrictions (if any) will not significantly impact the Government's ability to transition the technology.

The proposed intellectual property restrictions (if any) will not significantly 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

DARPA will conduct a scientific/technical review of each conforming proposal. Conforming proposals comply with all requirements detailed in this solicitation; 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.

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. Proposals that are determined selectable will not necessarily receive awards (see Section II). Selections may be made at any time during the period of solicitation. For evaluation purposes, a proposal is defined to be the document and supporting materials as described in Section IV.

1. Handling of Source Selection Information

DARPA policy is to treat all submissions as source selection information (FAR 2.101 and 3.104), and to only disclose their contents to authorized personnel. Restrictive notices notwithstanding, 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. Subject to the restrictions set forth in FAR 37.203(d), DARPA may also request input on technical aspects of the proposals from other non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

Submissions will not be returned. The original of each submission received will be retained at

DARPA and all other non-required copies destroyed. A certification of destruction may be requested via email to the BAA mailbox, provided the formal request is received within 5 days after being notified of submission status.

C. Countering Foreign Influence Program (CFIP)

DARPA's CFIP is an adaptive risk management security program designed to help protect the critical technology and performer intellectual property associated with DARPA's research projects by identifying the possible vectors of undue foreign influence. The CFIP team will create risk assessments of all proposed Senior/Key Personnel selected for negotiation of a fundamental research grant or cooperative agreement award. The CFIP risk assessment process will be conducted separately from the DARPA scientific review process and adjudicated prior to final award.

D. Federal Awardee Performance and Integrity Information (FAPIS)

Following the review and selection process described above, but prior to making an award above the simplified acquisition threshold (FAR 2.101), DARPA is required⁵ to review and consider any information available through the designated integrity and performance system (currently FAPIS). Selectees have the opportunity to comment on any information about themselves entered in the database. DARPA will consider any comments and other information in FAPIS or other systems prior to making an award.

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. Solicitation Provisions and Award Clauses, Terms and Conditions

Solicitation provisions relevant to DARPA BAAs are listed on the Additional BAA Content page on DARPA's website at www.darpa.mil/work-with-us/additional-baa. This page also lists award clauses that, depending on their applicability, may be included in the terms and conditions of awards resultant from DARPA solicitations. This list is not exhaustive and the clauses, terms and conditions included in a resultant award will depend on the nature of the research effort, the specific award instrument, the type of awardee, and any applicable security or publication restrictions.

For terms and conditions specific to grants and/or cooperative agreements, see the DoD General Research Terms and Conditions (latest version) at <http://www.onr.navy.mil/Contracts-Grants/submit-proposal/grants-proposal/grants-terms-conditions> and the supplemental DARPA-

⁵ Per 41 U.S.C. 2313, as implemented by FAR 9.103 and 2 CFR § 200.205.

specific terms and conditions at <http://www.darpa.mil/work-with-us/contract-management#GrantsCooperativeAgreements>.

The above information serves to put potential proposers and awardees on notice of proposal requirements and award terms and conditions to which they may have to adhere.

2. 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 solicitation. 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/sys_attachment.do?sys_id=c08b64ab1b4434109ac5ddb6bc4bcbb8.

NOTE: New registrations can take an average of 7-10 business days to process in SAM. SAM registration requires the following information:

- DUNS number
- TIN
- Commercial and Government Entity (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).

3. Representations and Certifications

In accordance with FAR 4.1102 and 4.1201, proposers requesting a procurement contract must complete electronic annual representations and certifications at <https://www.sam.gov/>.

In addition, all proposers are required to submit for all award instrument types supplementary DARPA-specific representations and certifications at the time of proposal submission. See <http://www.darpa.mil/work-with-us/reprs-certs> for further information on required representation and certification depending on your requested award instrument.

4. Intellectual Property

Proposers should note that the Government does not own the intellectual property or technical data/computer software developed under Government contracts. The Government acquires the right to use the technical data/computer software. Regardless of the scope of the Government’s rights, awardees 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 awardees, though DARPA will have, at a minimum, Government Purpose Rights (GPR) to technical data and computer software developed through DARPA sponsorship.

If proposers desire to use proprietary computer 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 expecting to use, but not to deliver, commercial open source tools or other materials in implementing their approach may be required to indemnify the Government against legal liability arising from such use.

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) 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. See Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

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

i. 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 non-conforming. A template for complying with this request is provided in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

ii. 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 noncommercial 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 non-conforming. A template for complying with this request is provided in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

d. Other Types of Awards

Proposers 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. 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 non-conforming. A template for complying with this request is provided in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

5. Program-generated Data

Data are increasingly the key product of research and engineering endeavors. To ensure the reproducibility of results and access to source data for future research, awardees will be required to maintain and deliver any data generated during award performance ("program-generated data") that is needed to accomplish these goals. Awardees shall be expected to document both the proprietary and non-proprietary products of their research to ensure the retention and potential reusability of this information. This may include:

- Raw unprocessed data, software source code and executables, build scripts, process sequence, programmatic communication and other collaboration activities
- Data sets: rarified, experimental, test and measurement data
- Design of experiments and simulations
- Models or simulations (computational or mathematical)

- Recordings of various physical phenomena (including images, videos, sensor data, etc.)
- Access to and use of institutional, organizational or scientific community repositories and archives

When possible, DARPA may share some or all of the program-generated data with the broader research community as open data (with permission to access, reuse, and redistribute under appropriate licensing terms where required) to the extent permitted by applicable law and regulations (e.g., privacy, security, rights in data, and export control). DARPA plans to enable reproducibility of results through data sharing and to establish (or contribute to) digital collections that can advance this and other scientific fields.

6. Human Subjects Research (HSR)/Animal Use

Proposers that anticipate involving human subjects or animals in the proposed research must comply with the approval procedures detailed at <http://www.darpa.mil/work-with-us/additional-baa>, to include providing the information specified therein as required for proposal submission.

7. Electronic Invoicing and Payments

Awardees will be required to submit invoices for payment electronically via Wide Area Work Flow (WAWF), accessed through the Procurement Integrated Enterprise Environment at <https://piee.eb.mil/>, unless an exception applies. Registration in WAWF is required prior to any award under this BAA.

8. Electronic and Information Technology

All electronic and information technology acquired or created through this BAA must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. § 749d) and FAR 39.2.

9. 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://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-171r2.pdf>) and DoDI 8582.01 that are in effect at the time the solicitation 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.

C. Reporting

1. Technical and Financial Reports

The number and types of technical and financial reports required under the award will be specified in the award document and may include monthly financial reports, monthly technical reports and/or a yearly status summary. 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. Patent Reports and Notifications

All resultant awards will contain a mandatory requirement for patent reports and notifications to be submitted electronically through i-Edison (<https://public.era.nih.gov/iedison>).

VII. Agency Contacts

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

- **Technical POC:** Molly Jahn, Program Manager, DARPA/DSO
- **BAA Email:** Cornucopia@darpa.mil
- **BAA Mailing Address:**
DARPA/DSO
ATTN: HR001122S0012
675 North Randolph Street
Arlington, VA 22203-2114
- **DARPA/DSO Opportunities Website:** <http://www.darpa.mil/work-with-us/opportunities>

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

VIII. Other Information

A. Proposers Day

The Cornucopia Proposers Day will be held on December 15, 2021 via webcast. Advance registration is required. See DARPA-SN-22-07 Amendment 1 posted at <https://sam.gov> for all details. Participation in the Cornucopia Proposers Day or viewing the webcast is voluntary and is not required to propose to this solicitation.

B. Frequently Asked Questions (FAQs)

Administrative, technical, and contractual questions should be emailed to Cornucopia@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 10 days of the proposal due date may not be answered. DARPA will post an FAQ list at: <http://www.darpa.mil/work-with-us/opportunities>. The list will be updated on an ongoing basis until the BAA expiration date as stated in Part I.

C. Collaborative Efforts/Teaming

DARPA highly encourages teaming before proposal submission and will facilitate the formation of teams with the necessary expertise. Potential proposers may choose to participate in either, none, or both of the following options:

1. Proposers Day Attendee List (publicly available): Participant contact information (name, organization, email address) will be included on a Cornucopia Proposers Day Attendee List published on the DSO Opportunities website. The registration website will ask registrants to indicate whether they approve publication of their contact information.
2. Proposer Profile List (limited distribution): Interested parties will submit a one-page profile consisting of their contact information (name, organization, email, telephone number, mailing address, and, if applicable, organization website), a brief description of their technical competencies, and, if applicable, their desired expertise from other teams/organizations. All profiles must be emailed to Cornucopia@darpa.mil no later than 5:00 PM on December 10, 2021. Following the deadline, the consolidated teaming profiles will be sent via email to the proposers who submitted a valid profile. Specific content, communications, networking, and team formation are the sole responsibility of the participants. Neither DARPA nor DoD endorses the information and organizations contained in the consolidated teaming profile document, nor does DARPA or DoD exercise any responsibility for improper dissemination of the teaming profiles.
3. Slide Show: Attendees may be afforded the opportunity to submit a 2-minute pre-recorded voice track presentation during the webcast outlining their interests and capabilities. The purpose of these presentations is to facilitate teaming discussions among the attendees. Upon registering, attendees may indicate if they would like to submit a pre-recorded presentation. Due to limited availability, DARPA will accept submissions on a first-come, first-served basis, and does not guarantee that these requests to brief will be fulfilled. Submitted briefing materials are limited to a single, PDF-format slide, which should be appropriate for public release, as they will be shared with the session via webcast. The slide must be submitted to Cornucopia@darpa.mil by 5:00 PM on December 10, 2021. DARPA will contact submitters upon receipt of their slide with additional guidance for the webcast.

IX. Appendix 1

Military Dietary Reference Intake (MDRI) Nutritional Standards for Operational Rations (NSOR) and Nutritional Standards for Restricted Rations (NSRR)¹

Nutrient	Unit	Operational rations	Restricted rations
Energy	kcal	3600	1500
Protein ²	g	102	68
Carbohydrate	g	510	210
Fat	g	³	³
Linoleic acid	g	17	8.5
α-linolenic acid	g	1.6	0.8
Fiber	g/d	32	16
Vitamin A ⁴	µg RAE (IU)	900 (3000)	450 (1500)
Vitamin D ⁵	g	5	2.5
Vitamin E ⁶	mg	15	7.5
Vitamin K	µg	120	60
Vitamin C	mg	90	45
Thiamin (B ₁)	mg	1.2	0.6
Riboflavin (B ₂)	mg	1.3	0.7
Niacin ⁷	mg NE	16	8
Vitamin B ⁶	mg	1.3	0.7
Folate ⁸	µg DFE	400	200
Vitamin B ₁₂	µg	2.4	1.2
Calcium	mg	1000	500
Phosphorus	mg	700	350
Magnesium	mg	420	210
Iron	mg	15	8
Zinc	mg	11	5.5
Sodium ⁹	mg	5000–7000	2500–3500
Iodine	µg	150	75
Selenium	µg	55	28
Fluoride	mg	4.0	2.0
Potassium	mg	4700	2350

Note.

¹ Values are minimum standards at the time of consumption, except for fat (which does not have an absolute standard value) and sodium (which presents minimum and maximum content levels). Nutritional standards for rations are based on the MDRI established for healthy, active military personnel.

² When protein requirements are increased, particularly during energy deficit (2013) and for periods of intense physical training (2009), supplemental high-quality protein should be consumed in 25 to 30 g servings in order to achieve protein intakes at the upper end of the MDRI at 1.6 g/kg.

³ Total energy from fat should not exceed 30 percent of total kcal. The omega fatty acids, linoleic and α-linolenic, should be included in this 30 percent calculation.

⁴ The unit of measure is microgram retinol activity equivalents (µg RAE). 1 µg RAE = 1 µg retinol = 12 µg β-carotene = 24 µg other provitamin A carotenoids. Vitamin A will also be expressed in IUs, a standard unit for the nutrition labeling in the United States. 1 IU = 0.3 µg retinol = 0.6 µg β-carotene = 1.2 µg provitamin A carotenoids.

⁵ As calciferol. 1 µg calciferol = 40 IUs vitamin D.

⁶ The unit of measure is milligram α-tocopherol that includes RRR-α-tocopherol, the only form of α-tocopherol that is found in food and the 2R-stereoisomeric forms that are found in fortified foods and dietary supplements. This does not include the 2S-stereoisomeric forms that are also found in fortified foods and dietary supplements.

⁷ The unit of measure is NE. 1 mg NE = 1 mg niacin or 60 mg dietary tryptophan.

⁸ The unit of measure is DFE. 1 µg DFE = 1 µg food folate, 0.5 µg synthetic folic acid taken on an empty stomach, or 0.6 µg synthetic folic acid taken with meals.

⁹ These values do not include the salt packet. The sodium content of restricted rations may not be adequate for military personnel operating in hot environments, especially if they are not acclimatized.

See Headquarters Departments of the Army, the Navy, and the Air Force Washington, DC, 3 January 2017 Medical Services. Army Regulation 40–25 OPNAVINST 10110.1/MCO 10110.49 AFI 44–141. “Nutrition and Menu Standards for Human Performance Optimization.” Pg. 14.

<https://www.armyresilience.army.mil/ard/images/pdf/Policy/AR%2040-25%20Nutrition%20and%20Menu%20Standards%20for%20Human%20Performance%20Optimization.pdf>