Request For White Papers:
Joint Services Additive Manufacturing

CAUTION NOTICE:

1. Solicitation for white papers, solution briefs or proposals does not guarantee that the government will make an award;

2. Offerors bear all costs to prepare and submit responses to this solicitation;

3. By submitting a response, offerors agree that the government:

    a. Shall reproduce the response, or any portions thereof, to the extent necessary to evaluate the offer;

    b. Shall use information contained in the brief only for evaluation purposes. DoD shall not disclose, directly or indirectly, such information to any person including potential evaluators, unless that person has been authorized to receive such information.

4. For traditional defense contractors only: statute requires[1] a cost sharing arrangement of at least one-third if a non-traditional defense contractor does not participate to a significant extent in this prototype project. A cost sharing arrangement is not a consideration for award; therefore, the government will give no evaluation preference to offerors that propose a cost sharing arrangement;

5. Any Prototype Other Transaction Agreement ("OTA") awarded in response to this solicitation may result in the award of a follow-on production contract or transaction without the use of further competitive procedures. The follow-on production contract or transaction will be available for use by one or more organizations in the Department of Defense and, as a result, the magnitude of the follow-on production contract or agreement could be significantly larger than that of the Prototype OTA. As such, any Prototype Other Transaction Agreement will include the following statement relative to the potential for follow-on production:

    In accordance with 10 U.S.C. 2371b(f), and upon a determination that the prototype project for this transaction has been successfully completed, this competitively awarded prototype OTA may result in the award of a follow-on production contract or transaction without the use of competitive procedures.

[1] 10 U.S.C. § 2371b(d)(1)(c)

BACKGROUND:

In November 2018, the Defense Logistics Agency ("DLA") and multiple military services designed and built a new additive manufacturing ("AM") capability. This capability is the Joint Additive Manufacturing Model Exchange ("JAMMEX"), a portal that DLA hosts, where disparate military AM communities can share project design files and associated data. The Army's RAPTOR program, the United States Marine Corps' Advanced Manufacturing Operations Cell and DLA are the first users of this exchange. The Office of the Secretary of Defense ("OSD") and the manufacturing institute America Makes are actively developing the scaled version for wider DoD use, with the first major release in August 2019.

This OTA effort is a secondary outcome of the exchange effort. How might DoD stakeholders tackle related problems as additive manufacturing efforts increase? This effort—driven by extensive interviews across DoD and industry—yielded three high-value problem areas. The first two, scanning and searching, relate to how we create and find new 3D models. The third area, printer management, relates to how we emulate standardization (critical for safety) in an ever-changing environment of emerging technology.

While additive manufacturing efforts uncovered these opportunities, future applications extend to many more DoD use cases. 3D scanning and geometric search, for example, could advance capacity on DoD item cataloging, distribution and disposition, and other areas.

PROBLEM STATEMENTS:

A. Problem Statement: NextGen 3D Scanners

3D part designers (makers and engineers) currently develop new 3D designs, almost exclusively, in laboratory conditions because of the limitations of current scanning technology: significant noise that requires significant manual post processing. These 3D part designers need smaller, portable scanners—agnostic of underlying technology (laser, photometric, etc.)—in order to develop 3D designs in adverse, less predictable circumstances. Adverse circumstances include small spaces, limited or unavailable internet connection and unpredictable environmental conditions.

Scaling Potential:

- Growing User Base. As JAMMEX Exchange grows, the DoD will develop more users to develop design files. Only a small percentage of these new users will have access to laboratory-based scanners, but many could possess handheld scanners.

- Rapidly create, test and analyze new part designs in theater. As additive manufacturing matures, DoD will exponentially expand its need to design and print parts (especially break-fix, short lifecycle parts) in adverse conditions with a quick turnaround.

B. Problem Statement: Geometric Search

3D part designers (makers and engineers) do not have an easy way to see whether another designer has already made their part. DLA, for context, manages 5.1 million national stock numbers (NSNs)—roughly equivalent to the possible universe of DoD-centric 3D printed items. Moreover, 3D part designers usually do not have the skillset to tag their items via established cataloging standards. Thus, these designers need a way to search for parts that does not depend on established nomenclature.

Scaling Potential:

- Intellectual Property. DoD stakeholders could use geometric shape search to locate 3D models that resemble restricted parts, protecting the government from liability. This search could serve as the backbone of a takedown feature to ensure DoD part repositories only contain approved models.

- Identify and match unknown components. The nexus of geometric search and 3D scanning has a variety of related uses, tangential to additive manufacturing. In warehouse environments, for example, DoD stakeholder could use these scanners to identify untagged assets. While it would not be cost-effective to put every untagged asset into a laboratory-sized coordinate measuring machine, it would be cost effective to use a fleet of low-cost handheld scanners. DoD stakeholders can use technologies like geometric search to match a handheld scan to an existing 3D model.

- Safe Disposal. Similar to the warehouse use case, the nexus of geometric search and 3D scanning would enable the DoD to safely dispose of unknown parts. Often, the underlying part materials can contain or create hazards. DLA Disposition Services and similarly situated organizations have standards with known quantities. This technology would enable DoD to quickly identify hazardous parts even in situations where we do not immediately have identifying material.

C. Problem Statement: Printer Management and Security

Inside the military services, the program mangers responsible for additive manufacturing repositories do not have visibility on what happens with the parts they host. These program managers do not know how many parts that makers print, the quality of those prints, environmental conditions, printer settings and other critical post-production data. Often, they attempt to capture this data with surveys or other non-systematic data-gathering methods. These program managers need an automated system that tracks the full lifecycle of a printed part: from design to print to quality assessment. In sum, current systems are uni-directional from repository to maker. Future systems need to capture maker data (bi-directional) and feed it back into the home repository.

Scaling Potential:

- Drive Security. U.S. adversaries are aware of DoD interest in additive manufacturing and will attack vulnerabilities. Printer management software would allow DoD to see what is happening on a printer level and ensure the integrity of files from repository to printer and back.

- Drive Standardization. Printer management software will serve as a bridge to existing systems that are not immediately replaceable. Ideally, in the long term, DoD will have a standardized set of

printers with common settings. In the short and medium terms, makers print on more than a hundred different models with disparate settings. This effort should ensure interoperability so that many printers can yield the same quality for the same part.

SUBMISSION CRITERIA & EVALUATION PROCESS

The Government shall evaluate each offeror submission on the following three technical criteria[2], all of equal importance. The government shall also consider price. The technical criteria, popularized by IDEO[3], is a common method to drive enterprise innovation and build successful prototypes. These criteria help prevent common dead ends and drive prototypes that are actionable, which the government is likely to adopt and scale.

1. **Feasibility** – solution to problem statement is technically possible. This criterion measures whether the technology exists or is likely to be developed in the scope of this prototype effort. An example of something that is not feasible is a "Star Trek" transporter;

2. **Viability** – solution to problem statement is compatible with DoD constraints, technical environments and other organizational requirements. This criterion measures whether DoD could easily adopt the prototype. An example of something which is not viable is a technology that has no chance of passing DoD cyber security requirements; and

3. **Desirability** – solution is responsive to a problem statement. This criterion measures whether end users are likely to adopt the offeror's prototype solution. An example of something which is not desirable is a piece of field equipment that is so uncomfortable to carry that end users refuse to bring it into the field. Another example of something which is not desirable is a feasible, viable technology that does not meet the problem that end users are trying to solve.

The government does not anticipate that offerors will have a solution that combines all three problem areas. Offerors should focus their responses on the particular problem statement to which they have relevant technology. Should an offeror have technology that is relevant to more than one problem area, it may submit separate white papers. Offerors should only provide one paper per problem statement.

White papers shall conform to the following. Should offerors submit anything longer, the government will only evaluate the first five pages of a white paper.

- Four pages of technical discussion—explicitly addressing the target problem statement and how the proposed solution meets the three evaluation criteria
- A one page rough order of magnitude ("ROM") price

Within one month, the government shall respond to each white paper submission. At that time, the

[2] https://medium.com/innovation-sweet-spot/desirability-feasibility-viability-the-sweet-spot-for-innovation-d7946de2183c

[3] IDEO is a prominent Silicon Valley-based design firm. See IDEO.org

government shall inform an offeror that:

1.) the government has not selected to move forward with the submitted white paper; or
2.) the government requests that the offeror participate in an in-person (or virtual) pitch.

The government shall use the same criteria to evaluate pitches as described for white papers.

After pitches, the government shall further down-select potential awardees and issue a request for prototype proposal ("RPP") to the remaining candidate firm(s). The RPP will have specific guidelines. Chiefly, offerors must submit a statement of work and a detailed price breakdown as it relates to payment milestones. The government shall use the same criteria to evaluate prototype proposals as described for white papers and solution briefs.

PROJECT DURATION, ESTIMATED FUNDING & AWARD DATE:

Period of Performance: Successful offerors shall receive payment upon completion of the following project phases/payment milestones:

1	Collaborative Minimum Viable Product ("MVP") Design
1	Evaluation, payment and go/no-go decision
2	Awardee delivers MVP to government
2	Evaluation, payment and go/no-go decision; Scope prototype requirements
3	Awardee delivers prototype to government
3	Evaluation, payment and completion

For purposes of this project, the MVP is defined as the project blue print—the first step in the iterative process. After award, the successful offeror shall work with the government's technical team to develop this detailed project plan for the eventual prototype. The government recognizes that, prior to award, offerors will have limited knowledge of the government's relevant IT infrastructure and this collaborative phase allows the awardee to conduct relevant beneficiary discovery.

Minimum Funding: $600,000.

The Government reserves the right to award multiple prototypes. Depending on technical merit, the government may allocate this funding:

- across multiple awards to various companies on one problem statement;
- across multiple awards to various companies on multiple problem statements;
- on one award to a single company; or
- any other configuration/allocation, including no award.

Please direct all questions and comments before the white paper submission deadline to accelerate@dla.mil

Electronic copies of white papers due: July 17, 2019 by 1:00 PM ET.