

**STRATEGIC & SPECTRUM MISSIONS ADVANCED RESILIENT TRUSTED SYSTEMS
(S²MARTS)
REQUEST FOR SOLUTIONS (RFS)**

in support of the
**Department of Navy (DoN) Additive Manufacturing for Technology
Protection (AM-TP) Project**

Project No. 20-08

All prospective respondents must be members of the NSTXL consortium.

- 1. Project Title:** Department of Navy (DoN) Additive Manufacturing for Technology Protection (AM-TP) Project
- 2. Prototype Project Sponsor/Requiring Activity:** Naval Surface Warfare Center (NSWC) Crane, Department of the Navy Anti-Tamper Program
- 3. Contracting Activity:** NSWC Crane Division

4. Project Background & Current Capability:

Recent advances in Additive Manufacturing (AM), commonly referred to as 3D printing, may be able to play a significant role in the next generation of Technology Protection (TP) techniques. The AM and TP communities have limited interaction today and current industry groups do not address the AM-TP segment, creating a gap. This is an opportunity for AM and TP community to increase the level to which innovative AM technologies are harnessed to meet current and future TP mission needs.

Additive Manufacturing is a technology that can build 3D structures using methods that add material, as opposed to traditional subtractive methods which remove material from a blank starting form. AM methods include physically adding material layer-by-layer, as well as continuous methods. The potential for building near-arbitrary 3D structures has led to significant investment and growth of the AM industry. Current technologies allow for printing plastic, metal, glass, and multi-material structures, while research hopes to enable directly printing complex structures, reactive/responsive structures, sensors, and biological tissues, among others.

Technology protection is a broad term for the protective measures a system can utilize against unwanted intrusion or compromise. A simple example is hardware designed such that a visual inspection does not reveal its technology, while more advanced TP methods may identify hardware which has been modified or even self-destruct upon tampering. The latter functions, termed Anti-Tamper (AT) are, for example, critical in electronics to protect devices from being exploited.

While the AM and TP industries are largely separate today, the capabilities of AM in terms of building structures with unique geometric designs and material combinations suggests that there may be a significant potential for developing innovative TP technologies using AM methods.

The AM technology landscape currently includes a wide range of large and small businesses providing “stand-alone” printers capable of manufacturing objects using polymers, plastics, metals, ceramics, and more; with a wider range of geometric and design freedom than many traditional and subtractive techniques. Today, AM is being applied to many DoD mission applications to assist with rapid prototyping, design support, form-fit-function checks, temporary spares, and even fully qualified and operational parts, primarily through applied research and manufacturing user’s groups. However, AM research and understanding of its specific potential to address TP threats is very limited. The prototyping allows respondents to apply any AM technology to the TP applications, and demonstrate improvement over current TP techniques, processes, or systems as well as feasibility for eventual deployment on DoD systems and platforms.

5. Desired End-State Objective(s) & Success Criteria:

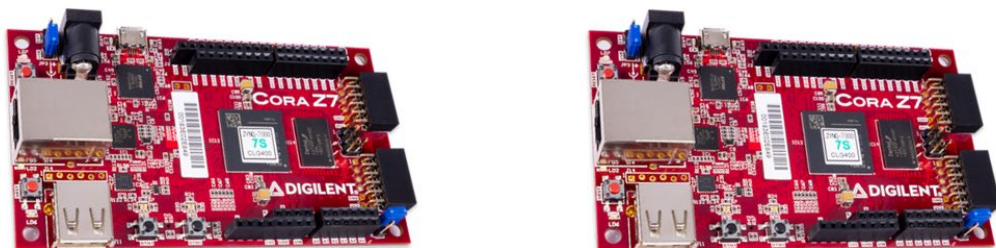
Additive Manufacturing will be applied to a System on a Chip (SoC) to demonstrate TP concepts, which will result in a prototype.

This solicitation asks respondents to demonstrate how to mitigate TP threats with AM. The TP threats are identified, in the classified annex (detailed later in this RFS) and will be provided to companies with the proper clearance.

The desired outcome of this solicitation is a prototype that demonstrates one or more AM techniques to protect a Government-defined mission-representative circuit board, the Cora ZYNQ-7000 Single-Core SoC Development Board, Figure 1, against one or more TP threats that are identified in the classified annex.

Figure 1. Example of the Cora ZYNQ-7000 Single-Core SoC Development Board

Examples of Board Cora Z7 SoC



Three Cora ZYNQ-7000 Single-Core SoC Development Boards will be provided to performer(s) after award. The boards will be shipped to awardees once the performers have been announced. Awardees will apply the same technique(s) to each of the Cora ZYNQ-7000 Single-Core SoC Development Boards. All three boards will be returned to the Government for the hardware submissions of this effort. The hardware submissions (Cora ZYNQ-7000 Single-Core SoC Development Boards) should allow access to all ports and interfaces for testing.

Areas of technical consideration for this project will include, but not limited to:

- **Discrete application of AM**
 - How does the prototype leverage the unique benefits of AM?
- **Demonstrated value to TP community**
 - How does the proposed Minimum Value Proposition (MVP) solve a requirement (from the classified annex)?
- **Demonstrated feasibility for future deployment:**
 - How will the MVP meet reliability, repeatability, and other relevant considerations?
 - Note: The MVP would not need to initially meet deployment requirements. The MVP requires accompanying documentation for how it could eventually be matured for future deployment on DoD systems.
- **Function:**
 - How does AM neutralize the TP threat?
- **Reliability:**
 - Are the original functions of the system maintained?
- **SWaP-C:**
 - How does the AM solution affect size, weight, power, and cost?
- **Novel Applications:**
 - Is the solution unique?
- **Resources:**
 - What is the availability, of material to produce the solution (inks, equipment, knowledge, etc)?
- **TRL Maturity:**
 - How does adding AM affect the Technology Readiness Level (TRL)?
- **Program Management:**
 - What are the proposal's technical, cost, and schedule risk?

Anticipated Project Duration: 5-7 months

6. Project Deliverables:

#	Deliverable(s)	Description	Frequency	Delivery Method
1	Mid-Term Draft Final Report (Classified)	Draft of Final Report	Once	Secure Electronic submission or mail
2	Final Report (Classified)	Specification sheet, capabilities description, available test data, available test plan, describe design implementation and final design	Once	Secure Electronic submission or mail
3	Hardware (Refer to Security Classification Guide)	Prototype Hardware submissions	Once	Physical submission or mail

7. Current Project Budget: \$75,000 – \$100,000 per award / multiple awards are anticipated.

This value represents what is currently available for the subject project at the time of the RFS release. This value is subject to change but is being provided for planning purposes.

Respondents are encouraged to clearly explain how much of their solution can be developed for the advertised amount. Capabilities or project phases that will require additional funding beyond the project budget must be identified as such.

8. Security Classification, Respondent Restrictions, and other required compliances:

The RFS has been released under Distribution Statement A: Approved for public release.

The project encompasses the following restrictions:

- a. Security Classification: Respondents may be required to possess up to SECRET personnel and facilities clearance at the time of award. Respondents will be required to submit a plan on how and when they will be capable of obtaining a SECRET clearance. If the respondent already has the appropriate clearance level, they should state it in their proposal.

Anticipated Classification

	Unclassified	FOUO	Classified
RFS	x		
RFS Annex			x

Proposal		x	
Interim Report			x
Final Report			x
Hardware	x		

- The annex is CLASSIFIED SECRET. Personnel who are handling the CLASSIFIED SECRET annex must hold an active SECRET/COLLATERAL clearance.
- The prototype hardware submissions are anticipated to be unclassified.

Classified Annex: The Classified Annex with information at the Secret/Collateral level can be requested via email to s2marts@nstxl.org. Requests for the classified annex should include at a minimum; Company name, the technical point of contact (POC) name and phone number, Facility Security Officer (FSO) name and phone number, CAGE code, statement of facility clearance and safeguarding capability, a valid address for receiving classified material at the Secret/Collateral level and a statement certifying the company's intent to participate through a submission of a solution. Provide inner and outer envelope addresses.

Classified Annex's will be mailed out weekly. Request received no later than 12:00 PM EDT on Tuesday's will be mailed out on Wednesday's. Requested for Classified Annex will be

accepted through December 1, 2020.

b. ITAR Compliance is required at the time of award.

c. Respondent Restrictions: Respondents are limited to companies based in the United States only; Subcontractors/teaming partners may not include foreign entities.

d. Hazardous Material: None

e. Section 889(a)(1)(B) Prohibition on Contracting with Entities Using Certain Telecommunications and Video Surveillance Services or Equipment – Offeror shall provide their representation in RFS Attachment c and return the signed representation with the submitted proposal.

f. Additional restrictions/Other: Submissions shall not contain hazardous, corrosive, energetic, reactive, or other materials that cannot be safely mailed and handled by laboratory staff without specialized protective equipment.

All work must be done in accordance with the Anti-Tamper (AT) Security Classification Guide (SCG). You may request a copy from the AT PO website: <https://at.dod.mil/>. The current AT SCG version is 20200713. The SCG will be included with the Classified Annex.

9. Level of Data Rights Requested by the Government:

Government Purpose Rights: The right to use, modify, reproduce, release, perform, display, or disclose technical data within the Government without restriction. This also includes the rights to release or disclose technical data outside the Government and authorize persons to whom release or disclosure has been made to use, modify, reproduce, release, perform, display, or disclose technical data for United States government purposes. This level of restriction is set at five-years but may be negotiated & tailored to a specific project. The five-year period, or such other period that may be negotiated, would commence upon execution of the agreement that required development of the items, components, or processes or creation of the data. The performer will have the exclusive right, including the right to license others, to use technical data in which the Government has obtained government purpose rights under this agreement for any commercial purpose during the five-year period. Upon expiration of the five-year period (or other negotiated length of time), the Government will receive unlimited rights in the technical data and computer software.

10. RFS and Response Process:

This project will employ a 2-stage evaluation approach for the award of the AM/TP project. The first stage will be a traditional submission that is outlined below. The second stage (Prototyping Concept Summit – PCS) will be an invite only session that provides the opportunity for a live brief and open discussion with the tech owner on the submitter's solution approach, specifics, timeline and cost.

First Stage Submission Requirements:

- 2-page Capability Statement
- 5-page Task Description Document (TDD), this will clearly define the work to be completed under the OTA
- 1-page ROM and schedule

a. The following is requested from all respondents:

First Stage Submission	Capability Statement	TDD Response	Price Response
Page Maximum	2	5	1

Second Stage, known as the Prototyping Concept Summit – PCS, submission requirements will be provided to each invited submitter at the conclusion of Stage 1 reviews. The PCS will be conducted in a hybrid format depending upon environment (COVID-19) at the time of execution.

For written submissions, the following formatting guidelines shall be followed by respondents:

- 10-point font (or larger) for all response narratives; smaller type may be used in figures and tables but must be clearly legible.
- Single-spaced, single-sided (8.5 by 11 inches).
- Margins on all sides (top, bottom, left, and right) should be at least 1 inch.
- Page limitations shall not be circumvented by including inserted text boxes/pop-ups or internet links to additional information. Such inclusions are not acceptable and will not be considered as part of the response
- Files must be submitted in PDF and/or Microsoft Word formats only. Price volumes may be submitted in an editable, unlocked Excel file

b. Each submittal **must include** (i) a Cover Page, (ii) a Technical Response, and (iii) a Price Response that each align to the instructions below:

- Cover Page: (Not included within page count) The cover page shall include the company's name, Commercial and Government Entity (CAGE) Code (if available), level of facility clearance (if available), address, primary point of contact, business size, and status of U.S. ownership.

Respondents shall also identify the applicable 10 U.S.C. § 2371b eligibility criteria related to the response (*please identify only one*):

- There is at least one nontraditional defense contractor (*defined below*) or nonprofit research institution participating to a significant extent in the project; **OR**
- All significant participants in the transaction other than the Federal Government are small businesses (including small businesses participating in a program described under section 9 of the Small Business Act (15 U.S.C. § 638)) or nontraditional defense contractors; **OR**
- At least one third of the total cost of the project is to be provided by sources other than the Federal Government.

Note: A *Nontraditional Defense Contractor* is defined as an entity that is not currently performing and has not performed, for at least the one-year period preceding the solicitation of sources by the Department of Defense (DOD) for the procurement of transaction, any contract or subcontract for the DOD that is subject to full coverage under the cost accounting standards prescribed pursuant to 41 U.S.Code § 1502 and the regulations implementing such section.

ii. Technical Response:

Responses should be constructed to align with the order of the instructions below (1 - 7).

1. Solution Narrative: Respondents shall describe the approach used to design/deliver a unique prototype solution for the prototype technology objectives defined in RFS Section 5, Desired End-State Objective(s), to include any attachments. While these focus areas are of significant importance, responses will be considered as a whole. No pricing shall be included in the technical response.

The Solution Narrative must also include a discussion on schedule and the timing of all deliverable(s) to include those outlined within RFS Section 6, Project Deliverables.

2. Explanation Supporting Eligibility for Award of a Prototype OTA:

Respondents shall provide rationale to support the specific condition that permits award of an OTA to the proposed prime contractor/performer. The onus of proof to support *nontraditional participation to a significant extent; small business or nontraditional defense contractor status; or any cost sharing arrangement* lies with the respondent and has a direct correlation to award eligibility.

3. Government Furnished Property or Information: Respondents must clearly identify if its proposed solution depends on Government Furnished Information (GFI) / Government Furnished Property (GFP) or other forms of Government support (i.e.

laboratory or facility access), etc. in addition to the Cora ZYNQ-7000 Single-Core SoC Development Board.

If so, the response must specify the GFI/GFP required. Respondents must clearly identify if its proposed solution depends on GFI/GFP or other forms of Government support be provided, the impact to the solution if the requested information/property/asset is not available, and will confirm the details with the respondent prior to any proposal revisions or selection, if applicable.

4. Mandatory Compliance with Restrictions: Respondents must address the restrictions identified within RFS Section 8, Security Classification, Respondent Restrictions, and other Required Compliance, and explain how each regulation or standard is currently, or will be met.
5. Task Description Document (Not Included Within Page Count): Respondents must provide a Task Description Document (TDD) outlining the project tasks to be performed along with schedule milestones and delivery dates required for successful completion. Respondents are encouraged to be concise but thorough when outlining their work statements.
6. Summary of Subcontractor Participation (if applicable): Respondents must identify all subcontractors involved and their role within the performance of the proposed concept. The information must include the following:
 - a. Subcontractor company name, Commercial and Government Entity (CAGE) Code (if available), level of facility clearance (if available), address, primary point of contact, business size, and status of U.S. ownership.
 - b. If the subcontracted company's involvement is considered significant, rationale supporting the significance must be present within the narrative. The onus of proof to support participation to a significant extent or any cost sharing arrangement lies with the respondent and has a direct correlation to award eligibility.
7. Data Rights Assertions and Level of Rights Proposed:
 - a. The rights offered should be displayed in a manner that allows for ease of discussion in determining trade-offs and potential options for long-term sustainability of the deliverables of this effort.
 - b. If rights are being asserted at a level less than the Government's desired level of allocation (see RFS Section 9, Level of Data Rights Requested by the Government), respondents must provide detail explaining the specific rationale for the assertion. Please also review 9(b)(iii)(3) below for additional requirements related to data rights pricing.

- c. Any items previously developed with federal funding (and used for the proposed solution) should clearly identify all individual components funded by the Government and the recipient of the deliverables.
- d. If commercial software is proposed as part of the prototype solution, all applicable software licenses must be identified and included with the response. Note that any software license term or condition inconsistent with federal law will be negotiated out of the license.

iii. Price Response:

The price response shall be submitted as a separate file from the technical response. No pricing details shall be included in the technical response. This project will be exercised as a Fixed Price effort with payable milestone payments.

1. The overall total price should be divided among severable increments that align to a proposed milestone payment schedule. Milestones are not required to match actual expenditures but should realistically align to the effort expended or products delivered.
2. In order to support the Government's evaluation of fair and reasonable pricing, the respondent shall delineate the key pricing components, and show clear traceability to the phases and/or milestones of the Technical Response. At a minimum, key pricing components include Labor Total(s), Other Direct Costs/Material Total(s), License prices and Subcontractor price(s). Data should be segregated by each key objective, milestone, and/or phase proposed.
3. Include a brief narrative that explains your pricing structure and maps the proposed prices to the solution's technical approach.
4. Including a Basis of Estimate to support your pricing may substantially expedite evaluation of your response.
5. If limited or restricted rights are being asserted within the response, a table that includes prices for both Government Purpose Rights and Unlimited Rights for any limited or restricted item must be included.
6. Any additional features or capabilities that extend beyond the currently requested core technical objectives shall be separately priced for the Government's consideration. Pending funding availability and need, the Government may fund these advanced features at a later date.

11. Evaluation Process and Methodology:

- a. Individual responses will be evaluated with consideration given to:

- i. Demonstrated expertise and overall technical merit of the response;
 - ii. Feasibility of implementation; and
 - iii. Total project risk as it relates to the technical focus areas, price and schedule
- b. The Government will evaluate the degree to which the proposed solution provides a thorough, flexible, and sound approach in response to the prototype technical objectives as stated in RFS Section 5, Desired End-State Objectives, as well as the ability to fulfill the objectives in this RFS.
- c. The Government will award this project, via S²MARTS (Agreement No. N00164-19-9-0001), to the respondent(s) whose solution is assessed to be the most advantageous to the Government, when price, schedule, technical risks, the level of data rights, and other factors are considered. The Government reserves the right to award to a respondent that does not meet all the requirements of the RFS.
- d. The proposed project price, schedule, and intellectual property/data rights assertions will be considered as aspects of the entire response when weighing risk and reward. The assessment of risks is subjective and will consider all aspects of the proposed solution. Respondents are responsible for identifying risks within their submissions, as well as providing specific mitigating solutions.
- e. The Government reserves the right to reject a submission and deem it ineligible for consideration if the response is incomplete and/or does not clearly provide the requested information. Debriefings will not be provided.
- f. Non-Government advisors will assist in the evaluation of the prototypes. Non-Government advisors will be required to sign a Non-Disclosure Agreement (NDA) prior to working on the AMTP effort. The Agreements Officer will review NDA's for conflicts prior to allowing access to source selection information. The companies identified herein have agreed not to engage in the manufacture or production of hardware, services, research and development that is related to the AMTP effort, and to refrain from disclosing proprietary information to unauthorized personnel.

The following company will have non-Government Personnel advising

Doug Palmer
Booz Allen Hamilton
BALLSTON QUARTER SECURITY OFFICE
DoD CAGE Code: 1E4G2
4121 Wilson Blvd. Suite 700 Arlington, VA 22203
DoD FSO: Lisa Chbarat

Rory Burke
Booz Allen Hamilton
HEADQUARTERS - MCLEAN SECURITY OFFICE
DoD CAGE Code: 17038
8283 Greensboro Drive McLean, VA 22102

DoD FSO: Will Matthews
784611

Mike Young
SAIC Cage Code: 1SNC2
Technology Integration Office, OUSD(R&E)

12. Follow-On Activity:

- a. Upon successful completion of this prototype effort, the Government anticipates that a follow-on production effort may be awarded via either contract or other transaction, without the use of competitive procedures if the participants in this transaction successfully complete the prototype project as competitively awarded from this document. The prototype effort will be considered successfully complete upon demonstration of the aforementioned technology objectives.
- b. Successful completion for a specific capability may occur prior to the conclusion of the project to allow the Government to transition that aspect of the prototype project into production while other aspects of the prototype project have yet to be completed.
- c. Requirements of other potential follow-on activities could involve, though not limited to, continued development and baseline management, fielding, sustainment, training, further scaling of the solution, integration of future capabilities, or integration of the solution with other capabilities.

13. Attachments

- a. Section 889 Prohibition and Reporting
- b. Section 889 Verification and Representation

14. Important Dates

- a. Questions related to this RFS shall be submitted no later than 12:00 PM EDT on Friday, November 6, 2020.
To submit any questions, visit the opportunities page at www.nstxl.org/opportunities, select the “Current” tab, locate the respective project, and select “Submit a Question”.
- b. Proposals submitted in response to this RFS are due no later than 12:00 PM EDT on Wednesday, December 16, 2020.
- c. To submit your proposal, visit the opportunities page at www.nstxl.org/opportunities, select the “Current” tab, locate the respective project, and select the “Submit Proposal” link. You must have an active account and be logged-in to submit your response.

- d. RFS Respondents must be active members of the consortium at the time of proposal submission.

15. Additional Project Information

- a. The Government intends to award up to twelve OT Agreements as a result of this RFS. The Government also reserves the right to not select any of the solutions proposed.
- b. Acceptable responses not selected for the immediate award will be retained by NSTXL & the Government for possible future execution and funding. The non-selected proposals will be considered as viable alternatives for up to 36 months. If a proposal (that was not previously selected) is determined to be a suitable alternative, the company will be contacted to discuss any proposal updates and details of a subsequent project award.

Respondents whose proposals are not selected for the initial award shall not contact the Government or NSTXL to inquire about the status of any ongoing effort as it relates to the likelihood of their company being selected as a future alternative.

- c. The United States Navy, specifically Naval Surface Warfare Center, Crane Division, has release authority on any publications related to this prototype project.
- d. Unsuccessful respondents will be notified, however, debriefings for this project are not required nor planned at this time.
- e. If resource-sharing is proposed in accordance with 10 U.S. Code § 2371b(d)(1)(C), then the non-Federal amounts counted as provided, or to be provided, by parties other than the Federal Government may not include costs that were incurred before the date on which the OT agreement becomes effective. Costs offered as a resource-share that were incurred for a project after the beginning of negotiations, but prior to the date the OT agreement becomes effective, may be counted as non-Federal amounts if and to the extent that the Agreements Officer determines in writing that: (1) the party other than the Federal Government incurred the costs in anticipation of the OT agreement; and (2) it was appropriate for the entity to incur the costs before the OT agreement became effective in order to ensure the successful implementation of the OT agreement.
- f. Certain types of information submitted to the Department during the RFS and award process of an OT are exempt from disclosure requirements of 5 U.S.C. §552 (the Freedom of Information Act or FOIA) for a period of five years from the date the Department receives the information. It is recommended that respondents mark business plans and technical information that are to be protected for five years from FOIA disclosure with a legend identifying the documents as being submitted on a business confidential basis.

- g. All work must be done in accordance with the Anti-Tamper (AT) Security Classification Guide (SCG). You may request a copy from the AT PO website: <https://at.dod.mil/>. The current AT SCG version is 20200713.
- h. Export controls (if applicable): Research findings and technology developments arising from the resulting proposed solution may constitute a significant enhancement to the national defense and to the economic vitality of the United States. As such, in the conduct of all work related to this effort, the selected performer must comply strictly with the International Traffic in Arms Regulation (22 C.F.R. §§ 120-130), the National Industrial Security Program Operating Manual (DoD 5220.22-M) and the Department of Commerce Export Regulation (15 C.F.R. §§ 730-774).