

**STRATEGIC & SPECTRUM MISSIONS ADVANCED RESILIENT TRUSTED SYSTEMS  
(S<sup>2</sup>MARTS)  
REQUEST FOR SOLUTIONS (RFS)**

*in support of the*  
**Threat Missile System Exploitation in Support of Hardware in the Loop  
Development**

Project No. 20-10b

*All prospective respondents must be members of the NSTXL consortium.*

- 1. Project Title:** Threat Missile System Exploitation in Support of Hardware in the Loop Simulator Development
- 2. Prototype Project Sponsor/Requiring Activity:** Naval Surface Warfare Center (NSWC) Crane, Code WXR
- 3. Contracting Activity:** Naval Surface Warfare Center (NSWC) Crane, Code 024
- 4. Project Background & Current Capability:**

The Naval Surface Warfare Center Crane Division, Infrared (IR) /Radar Frequency (RF) Systems Technologies Division (WXR) is seeking prototype support to address Modeling & Simulation issues in the area of countermeasures and countermeasure techniques to protect U.S. aircraft from threat missile systems. The threat environment is changing at an ever-increasing rate. This reality requires the capability to respond rapidly to new threat missile systems. This cannot be done without an efficient means of developing prototype models, simulators, countermeasures, and countermeasure techniques. The advent of each new threat missile system triggers the requirement for the development of multiple new prototype systems. These requirements cannot be met without efficient, flexible acquisition strategy.

As the number and complexity of threat weapon systems grow at an ever-increasing rate, it is critical to have the capability to develop prototype models of the new systems quickly and efficiently. Each new threat requires the building of a new prototype model which may in turn require upgrades to other existing Modeling and Simulation (M&S) tools that are part of an overall simulation. The development of new prototype system models involves considerable research and development efforts and, by its very nature, is not formulaic. Consequently, it is impossible to predict precise expertise and material requirements far enough in advance to accommodate traditional acquisition timelines.

Currently, a typical foreign material exploitation (FME) program does not focus on countermeasures development. Also, threat hardware purchased by WXR is not delivered until

the completion of the FME. The combination of these factors creates a significant delay in the Navy's ability to develop countermeasures resulting in an increased threat to Navy aircraft and crews. Inserting the development of hardware-in-the-loop (HITL) systems early in the FME process will shorten the timeline towards countermeasure development and success. A suite of reconfigurable signal-injection missile simulation (RSIMS) based HITL simulators of various threat infrared missile systems is required. These simulators are critical components for the countermeasure development phase of threat exploitation. Each new threat system represents a requirement to develop a new prototype simulator, and the threat list is growing much faster than prototype simulators can currently be built with existing resources.

For this effort, a new threat missile will be the focus of this project. The new threat hardware will be provided as Government Furnished Property (GFP) in support of this effort. The Government requires a HITL-ready prototype with all pertinent documentation and test data of this threat to be developed and delivered.

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

The Government requires a test and evaluation (T&E) ready RSIMS HITL simulator of this new threat missile for exploitation and countermeasure development that has been fully documented, verified, validated, and accredited. The simulator will be sufficiently documented to allow routine replication of the prototypes in response to run capacity requirements. The completion of the T&E ready simulator will establish a process that can be efficiently applied to react to new threat systems as they arise and enable the timely development of new prototype simulators.

The following steps outline the desired outcome:

### **Phase 1: Initial Threat Missile Exploitation – High Level Assessment**

- Visual inspection and photograph entire threat missile
- High level threat missile block diagram development
- Threat missile electrical/electronics circuit tracing
- Threat missile initial firmware extraction
- Threat missile airframe wind tunnel aerodynamic measurements
- Threat missile eject and flight motor testing and data collection

### **Phase 2: In-depth Threat Missile Exploitation - Hardware**

- Final schematic development
- Final firmware/software extraction
- Final circuit analysis
- Sensor/detector characterization
- HITL interface prototype design using the NSWC Crane RSIMS design
- Preliminary airframe model prototype design (in MATLAB/Simulink/TMAP format)
- Motor burn data analysis

### Phase 3: In-depth Threat Missile Exploitation - Software

- Software Reverse Engineering

### Phase 4: Digital and HITL Prototype Development

- HITL Preliminary Flyout Integration
- Final airframe model prototype design (in MATLAB/Simulink/TMAP format)
- Track Loop Simulator (TLS) HITL Prototype Hardware built with the NSWC Crane RSIMS design
- TLS HITL Acceptance Testing/Validation, Verification and Accreditation (VV&A) Report
  - Technical Data Package
  - Prototype demonstration
    - Crane and the Missile Space and Intelligence Center (MSIC) will provide the test parameters prior to the start of Phase 4

The project is expected to have a duration of 9-24 months. Upon successful completion of the Modeling and Simulation Capability Prototype the Performer will deliver the items listed in Section 6. Due to the unpredictable nature of threat exploitation and to the limited number of available assets, partial solutions will be acceptable.

## 6. Project Deliverables

#	Deliverable(s)	Description	Frequency	Delivery Method
1	Spot Report	Provide spot reports on completion of any major milestone	As needed	Electronic
2	Block Diagram	High level block diagram of electronic components and functional architecture	Upon Completion of Phase 1	Crane, IN
3	Schematics	Electronic copy of final schematic	Upon Completion of Phase 2	Crane, IN
4	HITL Prototype design	Electronic copy of the HITL prototype design to include recommendations for threat asset hardware modifications	Upon Completion of Phase 2	Crane, IN
5	Top level software description	High level software description sufficient to allow for countermeasure evaluation and counter-countermeasure development	Upon Completion of Phase 3	Crane, IN
6	HITL	Fully functional HITL simulator including all documentation, hardware, software, complete technical data package, and accreditation support package (verification and validation data and documentation)	Upon Completion of Phase 4	Crane, IN

## 7. **Current Project Budget:** \$980,000

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 should propose a cost that reflects the respondent's approach and not use the budgetary estimate only. Respondents are encouraged to clearly explain how much of their solution can be developed for the advertised or lesser 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:** This

RFS has been released under the following—

Distribution Statement A: *Approved for public release.*

This project encompasses the following restrictions:

- a. Security Classification: All contractors who support the M&S Capability Development will be required to have cleared personnel and facilities clearance at the SECRET level (Personnel and Safeguarding) level at the time of proposal.
- b. ITAR Compliance is required at time of proposal.
- c. Respondent Restrictions: Respondents and subcontractors are limited to U.S. companies
- d. Any additional restrictions applicable to this project: Simulator and subcomponent designs must be compatible with NSWC Crane RSIMS real-time simulation architecture. The RSIMS software and documentation will be provided as GFI. The threat hardware utilized for this project will be provided as GFP.
- e. Respondents must be compliant with DODI 8582.01. "Security of Unclassified DoD Information and Non-DoD Information Systems" and DoDM 5200.01 Volume 4, "DoD Information Security Program; Controlled Unclassified Information". Respondents must implement the security requirements in NIST SP 800-171, "Protecting Controlled Unclassified Information in Non-Federal Information Systems and Organizations"
- f. Respondents shall complete the Section 889(a)(1)(B) Prohibition on Contracting with Entities Using Certain Telecommunications and Video Surveillance Services or Equipment representation attached to this RFS (Attachment #1), and return the signed representation with the submitted proposal.

## 9. **Level of Data Rights Requested by the Government:**

Unlimited rights: The right to use, modify, reproduce, perform, display, release, or disclose technical data in whole or in part, in any manner, and for any purpose whatsoever, and to have or authorize others to do so.

**10. RFS and Response Process:**

a. The following is requested from all respondents:

<b>Proposal Volumes</b>	<b>Page Limitation</b>
Technical Report	20 pages (max)
Price Response	5 pages (max)

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
- Do not submit classified information with your response.

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:

i. 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 - 8).**

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. Foreign Owned, Controlled, or Influenced (FOCI) Documentation (if applicable): Documentation may include, but is not limited to: Standard Form 328 (Certificate Pertaining to Foreign Interest); Listing of Key Management Personnel; an Organizational Chart; Security Control Agreements: Special Security Agreements; and Proxy Agreements or Voting Trust Agreements. It is recommended companies who fall within the FOCI category visit <https://www.dss.mil> for additional guidance and instruction.
4. 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.

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.

5. 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.
6. 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. It is anticipated that, if selected, the proposed TDD will be incorporated into the resultant OTA. Respondents are encouraged to be concise but thorough when outlining their work statements. The TDD may be submitted as an appendix or a separate file as part of the proposal.
7. 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 and U.S. employee citizenship.
  - 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.
  - c. If applicable, Foreign Owned, Controlled, or Influenced (FOCI) Mitigation Documentation shall be provided for subcontractors and will not count towards the page count.
8. 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 10(b)(iii)(5) 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 employ Fixed Price with Payable Milestones pricing structure.

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.
  - a. The proposed milestone payment schedule shall be provided in a columnar/table format with the following column headers: Task/Milestone; Timeline/date; and Payment Value. Milestones payments shall align with a meaningful project event.
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 S<sup>2</sup>MARTS (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.

## **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 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**

1. FY 2019 NDAA Section 889 (a)(1)(B) Section 889 Verification - Representation
2. FY 2019 NDAA Section 889 (a)(1)(B) Section 889 Clause

### **14. Important Dates**

- a. Questions related to this RFS shall be submitted no later than 12:00 PM EDT on Monday, December 14, 2020.

To submit any questions, visit the opportunities page at [www.nstxl.org/opportunities](http://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 Friday, January 8, 2021.
- c. To submit your proposal, visit the opportunities page at [www.nstxl.org/opportunities](http://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 one Other Transaction Agreement as a result of this RFS; however, more than one award may be made if determined to be in the Government’s best interest. 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. No classified data shall be submitted within the proposal. To the extent that the project involves DoD controlled unclassified information, respondents must comply with DoDI 8582.01 and DoDM 5200.01 Volume 4. Respondents must implement the security requirements in NIST SP 800-171 for safeguarding the unclassified internal information system; and must report any cyber incidents that affect the controlled unclassified information directly to DoD at <https://dibnet.dod.mil>.
- h. Export controls: 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).