STRATEGIC & SPECTRUM MISSIONS ADVANCED RESILIENT TRUSTED SYSTEMS (S^2MARTS)
REQUEST FOR SOLUTIONS (RFS)

in support of the

STARRY NITE – Advanced Integration Interconnect & Fabrication Growth for Domestic SOTA Radio Frequency Gallium Nitride

PROTOTYPE PROJECT

Project No. 21-12

All prospective respondents must be members of the NSTXL consortium.

1. **Project Title:** STARRY NITE – Advanced Integration Interconnect & Fabrication Growth for Domestic SOTA Radio Frequency Gallium Nitride.

2. **Prototype Project Sponsor/Requiring Activity:** Naval Surface Warfare Center (NSWC), Crane Division; Code WXP

3. **Contracting Activity:** NSWC, Crane Division

4. **Project Background & Current Capability:**

State-of-the-art (SOTA) foundry capabilities and advanced packaging are key technological discriminators amongst millimeter wave (mmW) applications, such as fifth generation (5G) communications, satellite communications (satcom), electronic warfare (EW), and radar. In order to maintain leadership in radio frequency (RF) microelectronics, the United States Defense Industrial Base (DIB) requires accelerated maturation of domestic open foundries with SOTA RF Gallium Nitride (GaN) offerings. Additionally, these SOTA fabrication capabilities require advanced interconnect (AIC) techniques to properly interface with recent evolutions in the DIB's advanced packaging ecosystem. Altogether, the Advanced Integration Interconnect & Fabrication Growth for Domestic SOTA Radio Frequency Gallium Nitride (STARRY NITE) seeks to satisfy these needs within the DIB ecosystem.

Over the last two decades, the DoD has supported the maturation of GaN technology due to its superior performance in high power, broadband RF applications. In comparison with Gallium Arsenide (GaAs), GaN offers higher output power, thermal conductivity, bandwidth, and power added efficiency (PAE). In comparison with other RF semiconductors competing for 5G market space (e.g., SiGe, Silicon, etc.), RF GaN is the only material with a path to potentially penetrate all 5G platforms: sub-6GHz remote radio head, sub-6GHz massive multi-input multi-output (MIMO) active antenna systems (AAS), backhaul, and mmW small cells. Unlike lower power RF materials which may be buoyed by non-military applications (e.g., automotive LiDAR and mobile handsets, etc.), it is strategic for the DoD to leverage the timely demands of a less captive SatCom market and support the maturation of domestic open RF GaN foundries within the DIB.

However, RF GaN is not without its weaknesses: it struggles from limited wafer sizes, higher costs, limited suppliers, and relatively lower maturity. "Sub-15" RF GaN (≤0.15μm gate length) is not domestically available in wafer sizes greater than 100mm (4") in diameter, which subsequently drives cost. Also, there is no domestic open foundry access to "Sub-10" RF GaN (≤0.10μm gate length), which stifles innovation and competition within the DIB. Furthermore, SOTA RF GaN production faces various challenges, such as realizing low-loss contacts and handling thinner wafers. AIC techniques (e.g., copper pillar bumping, heterogeneous interconnects, hot vias, etc.) are necessary to supply SOTA RF GaN wafers to the DoD advanced packaging ecosystem (e.g., the State-of-the-art Heterogeneous Integrated Packaging for RF (SHIP-RF) program).

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

STARRY NITE seeks to mature domestic, open SOTA RF GaN foundries in alignment with the DoD advanced packaging ecosystem. Therefore, program goals are as follows:

1.) RF GaN foundry maturation of Sub-15 and Sub-10 nodes
    a. Open foundry design access via multi-project wafer runs
    b. Secure design/IP capture supporting technology transition to the DIB
2.) RF GaN AIC maturation of Sub-15 and Sub-10 nodes supporting wafer servicing for the DoD advanced packaging ecosystem

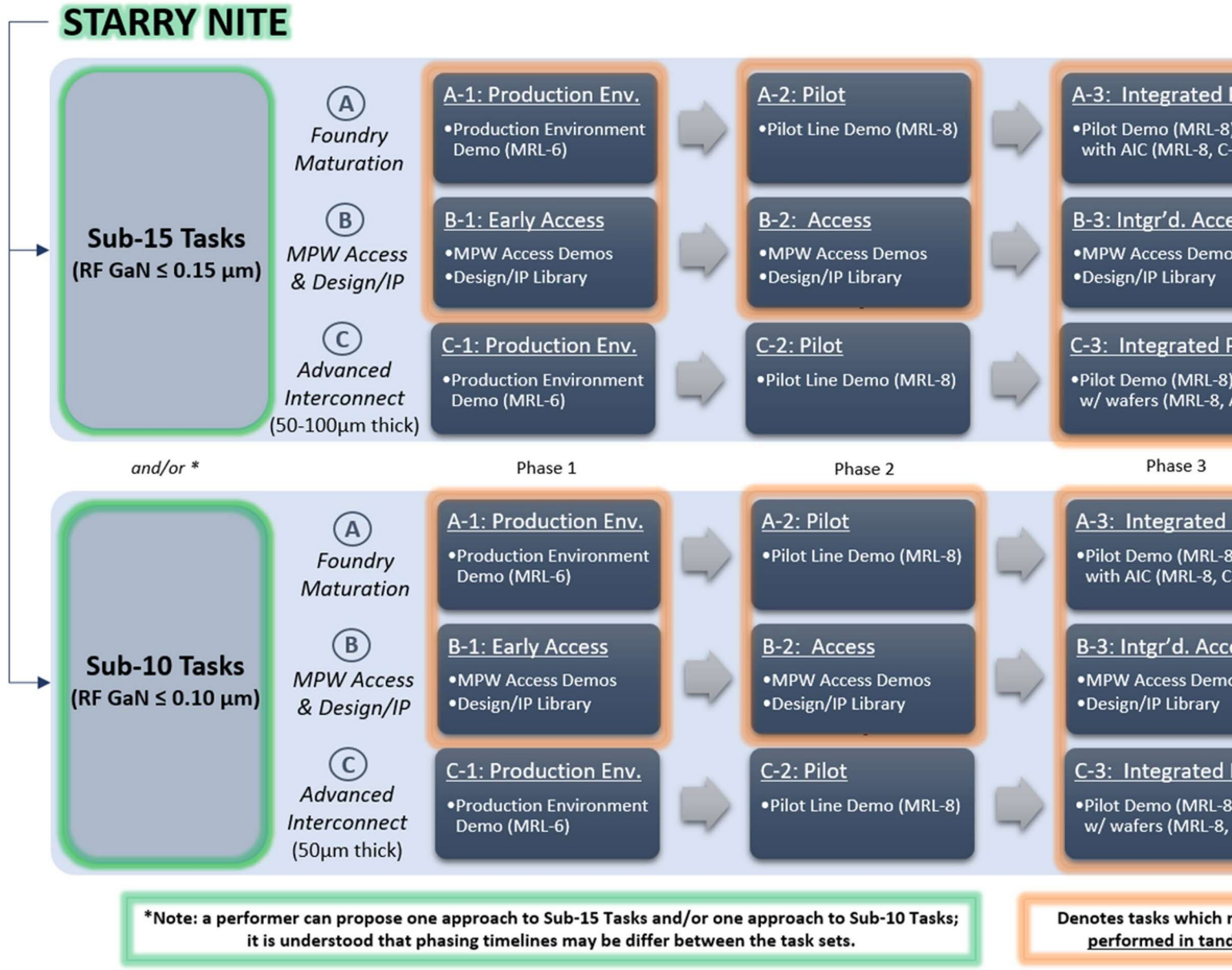
On the next page, Figure 1 illustrates how these goals are broken down into performer task sets and carried across three phases and up to two technology nodes (Sub-15 and Sub-10).

The RFS for STARRY NITE elicits solutions for all three phases, and performers may write on task sets for one or both technology nodes. I.e., a single performer can submit up to two proposals, where one is for Sub-15 Tasks and the second for Sub-10 Tasks. In an effort to encourage competition within the DIB, multiple performer awards are a possibility.

Due to varying maturity, it is anticipated that timing of phases for each technology node may differ per proposal; e.g., it is possible that a performer may propose to enter Phase 2 directly. However, the preferred period of performance for all proposed parallel tasks (i.e., A&B and/or C) will be no longer than two years for Phase 1, two years for Phase 2, and five years for all three phases combined. Longer period of performances will be considered. The primary purpose of phasing the tasks is to mitigate program risk. Therefore, the timing of phases between performers and technology nodes need not align. Tasks sets which must be performed in tandem are clearly marked on Figure 1.

In the following pages of the RFS, project objectives are broken out per task. Clear entry and exit criteria are provided for each phase in the following RFS sections. If there are any unique key performance parameters not cited within the RFS, proposals are encouraged to cite the associated entrance and exit criteria for each phase.

Lastly, a detailed cost proposal is required as part of the response to this RFS. The proposal must categorize total project costs at a high-level per task and per phase over time (quarterly). Supporting cost details (e.g., labor hours/rates, capex, material, etc.) should be further broken out respectively. Cost-share is perceived favorably; proposals must clearly denote which portions of tasking and cost details are covered by project funds vs. cost-share. The cost proposal must clearly map to the proposed technical tasking included in the RFS response.



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Task Set A: RF GaN Foundry Maturation

One of the primary goals of STARRY NITE is to mature domestic, open foundries, specifically Sub-15 and/or Sub-10 RF GaN process nodes. Therefore, Task Set A focuses on taking the SOTA technology node(s) from R&D production Manufacturing Readiness Level 4 (MRL-4) to a production environment demonstration (MRL-6) in Phase A-1 and to a pilot line demonstration (MRL-8) in Phase A-2. Phase A-3 serves as a platform for demonstration of an integrated pilot line offering SOTA wafers from Task Set A with Multi-Project Wafer (MPW) Access (see Task Set B) and AIC (see Task Set C). Below, Foundry Maturation tasks are broken out per phase.

Phase A-1: Production Environment Demonstration (MRL-6)

1.) Baseline existing R&D production process(es) (MRL-4)
2.) Build, install, and demo necessary process tools
3.) Select and refine device and process architecture
4.) Deliver preliminary models and alpha process design kits (PDKs)
5.) Demonstrate production environment via prototype wafer lot delivery (MRL-6)

Phase A-2: Pilot Line (MRL-8)

1.) Qualify necessary tools and processes
2.) Finalize device and process architecture
3.) Deliver beta and final PDKs
4.) Demonstrate qualification lots and verify reproducibility
5.) External release of qualified process for pilot line wafers (MRL-8)

Phase A-3: Advanced Integrated Pilot Line

1.) Demonstrate an integrated pilot line offering:
    a. SOTA pilot line wafers (Phase A-3)
    b. Recurrent MPW access for DIB designers to pilot line node(s) (see Phase B-3)
    c. AIC (MRL-8) aligning with DIB packaging ecosystem needs (see Phase C-3)

Task Set A – RF GaN Foundry Maturation Metrics		
Parameter	*Sub-15 Node*	*Sub-10 Node*
Wafer Size	≥ 150 mm (6”)	≥ 100 mm (4”)
Gate Length	≤ 0.15 µm	≤ 0.10 µm
f_{peak}	≥ 65 GHz	≥ 120 GHz
f_{app_range}	DC to ≥ 60 GHz	DC to ≥ 100 GHz
P_{out}	≥ 4 W/mm	≥ 2.5 W/mm
Thickness	50 – 100 µm	50 µm
V_{dd} (notional)	28-30V	12-24V
MTTF	≥ 10^6 hrs @ 200°C @ V_{dd}	
MRL (entry)	≥ 4 (R&D)	
MRL (Phase A-1)	≥ 6 (Transition from Engr to Mfg Control)	
MRL (Phase A-2)	≥ 8 (Pilot Line)	
Open Foundry	YES	
Yield (entry, Phase A-1, Phase A-2)	Disclose in proposal	
Cycle Time (entry, Phase A-1, Phase A-2)	Disclose in proposal	
Capacity (entry, Phase A-1, Phase A-2)	Disclose in proposal	
Cost/Wafer (entry, Phase A-1, Phase A-2)	Disclose in proposal	

Task Set A – RF GaN MMIC Benchmark Metrics		
Parameter	*Sub-15 Node*	*Sub-10 Node*
Contact Resistance	Disclose in proposal	
Frequency	Disclose in proposal	
BW	Disclose in proposal	
PAE	Disclose in proposal	
Gain	Disclose in proposal	
Reliability	Disclose in proposal	

Task Set B: RF GaN MPW Access & Design/IP

Another goal of STARRY NITE is to provide secure access to open foundries for domestic 3rd party SOTA RF GaN designers. Therefore, Task Set B phasing must be performed in tandem with Task Set A phasing. Throughout the program, wafer space is continuously made available to both performer and 3rd party designers via multi-project wafer runs. The performer will find 3rd party customers interested in funding their own designs on the MPW runs. If MPW space is unavailable on a node under development (e.g., Phase A-1), the performer is to provide open MPW access to the nearest comparable node until the node under development can become available. The performer will host the submission and review of 3rd party designs, allowing government participation in said review and final say on which designs are accepted. For 3rd party designs of interest to the government, the government requests the right to fund the 3rd party design portion of the wafer run with the intent of obtaining government purpose rights for that design. As the performer moves into Phases B-2 and B-3, the minimum number of MPW runs on program-matured nodes (see Task Set A) is gradually increased.

A secondary objective underlying this task is to support the performer(s) in standing up a business structure, which supports open access and the generation of an IP palate with

government purpose rights from which other DoD programs can pick and choose, while industry is free to implement the designs commercially in dual-use applications. Additionally, designs and IP are securely captured and demonstrated for potential transition to the DIB and DoD advanced packaging ecosystem. The intent is to encourage the secure retention of 3rd party design IP and provide other DoD programs an annual forum to evaluate designs and IP for potential transition. Performer security is required to support handling of controlled UNCLASSIFED information (e.g., Critical Technology Information) and export controlled information via proper marking, storage, and encryption. Performer security will not be required to support handling of CLASSIFIED information. The annual demo forums should allow for DIB feedback to iterate technology readiness level (TRL) maturity of designs across multiple MPWs and subsequently better target DIB end-use needs. Below, MPW Access & Design/IP tasks are broken out per phase.

Phase B-1: Early MPW Access Demo & Secure IP Capture

1.) Host MPW design access 2-4 times per year; if current node under development is unavailable for MPW, provide access to the nearest comparable node available.
   - ≥ 1 performer design per MPW
   - ≥ 3 third party designers per MPW
   - ≥ 1 government design per MPW
2.) Develop a secure library which captures the designs/IP from each MPW
3.) Demonstrate designs/IP and secure library to DIB annually; collect feedback on foundry process, design maturation, and library interface

Phase B-2: MPW Access Demo & Secure IP Capture

1.) Host MPW design access 2-4 times per year; if current node under development is unavailable for MPW, provide access to the nearest comparable node available.
   - ≥ 1 MPW per year for any node under development in Task Set A
   - ≥ 1 performer design per MPW
   - ≥ 3 third party designers per MPW
   - ≥ 1 government design per MPW
2.) Host a secure library which captures the designs/IP from each MPW
3.) Demonstrate designs/IP and secure library to DIB annually; collect feedback on foundry process, design maturation, and library interface

Phase B-3: Advanced MPW Access Demo & Secure IP Capture

1.) Demonstrate an advanced integrated pilot line offering:
   - SOTA pilot line wafers (Phase A-3)
   - Recurrent MPW access for DIB designers to pilot line node(s) (see Phase B-3)
   - AIC (MRL-8) aligning with DIB packaging ecosystem needs (see Phase C-3)
2.) Host MPW design access 2-4 times per year; if current node under development is unavailable for MPW, provide access to the nearest comparable node available.
   - ≥ 2 MPWs per year for any node under development in Task Set A
   - ≥ 1 performer design per MPW
   - ≥ 3 third party designers per MPW
   - ≥ 1 government design per MPW
3.) Host a secure library which captures the designs/IP from each MPW
4.) Demonstrate designs/IP and secure library to DIB annually; collect feedback on foundry process, design maturation, and library interface

Task Set B – RF GaN MPW Designs & IP Library Metrics		
Parameter	*Sub-15 Node*	*Sub-10 Node*
MPW Offerings (Phase B-1)	2-4 / year / node Task Set A or comparable node	
MPW Offerings (Phase B-2)	2-4 / year / node ≥ 1 / year from each Task Set A node	
MPW Offerings (Phase B-3)	4 / year / node ≥ 2 / year from each Task Set A node	
1st Party Design/IP Count/MPW	≥ 1	
3rd Party Design/IP Count/MPW	≥ 3	
Govt Design/IP Count/MPW	≥ 1	
Design/IP Library 3rd Party Friendly	YES	
Design/IP Library Secure Cloud	YES	
DIB Design/IP Demo	1 / year	

Task Set C: RF GaN Advanced Interconnect Maturation & Alignment

A third goal of STARRY NITE is to establish domestic services adding AIC to SOTA RF Gallium Nitride on Silicon Carbide (GaN-on-SiC) wafers utilized within the DoD's advanced packaging ecosystem. Therefore, Task Set C focuses on maturing AIC processes to a production environment demonstration (MRL-6) in Phase C-1 and to a pilot line demonstration (MRL-8) in Phase C-2. Phase C-3 serves as a platform for demonstration of an integrated pilot line, which offers AIC pilot line services on SOTA pilot line wafers (see Task Set A) with MPW Access (see Task Set B) to SOTA pilot line wafers (see Task Set A).

The program structure allows for performers to propose maturation plans for varying wafer thicknesses for Sub-15 and Sub-10 nodes. Entry criteria for Phase C-1 is a pre-established R&D process (MRL-4) for AIC and a pre-established RF GaN foundry with production environment demonstration (MRL-6). Depending on technology maturity, it may be that the phasing timeline for Task Set C does not align with the phasing timeline for Task Sets A & B. However, in order to begin Phase A-3 & B-3, Phase C-2 must be completed. Below, AIC tasks are broken out per phase.

Phase C-1: Production Environment Demonstration (MRL-6)

1. Perform gap analysis of AIC for the DoD advanced packaging ecosystem.
2. Assess pre-established baseline R&D production (MRL-4) process
3. Build, install, and demo necessary process tools to support advanced SiC substrate
4. Establish AIC process modules
5. Design and procure mask sets
6. Perform reliability testing
7. Demonstrate production environment via prototype wafer lot delivery (MRL-6)

Phase C-2: Pilot Line (MRL-8)

1. Qualify necessary tools and processes to support advanced SiC substrate
2. Refined AIC process modules
3. Design and procure mask sets
4. Design and procure assembly
5. Complete reliability testing
6. Verify reproducibility
7. Demonstrate pilot line process (MRL-8)

Phase C-3: Advanced Integrated Pilot Line

1. Demonstrate an advanced integrated pilot line offering:
    a. SOTA pilot line wafers (Phase A-3)
    b. Recurrent MPW access for DIB designers to pilot line node(s) (see Phase B-3)
    c. AIC pilot line services (MRL-8) aligning with DIB packaging ecosystem needs (see Phase C-3)

Task Set C – Advanced Interconnect Maturation Metrics		
Parameter	*Sub-15 Node*	*Sub-10 Node*
Wafer Size	≥ 150 mm (6”)	≥ 100 mm (4”)
Gate Length	≤ 0.15 µm	≤ 0.10 µm
Wafer Thickness	50 – 100 µm	50 µm
MRL (entry to Phase C-1)	≥ 4 (required to start Phase C.1)	
RF GaN Fab MRL (entry to Phase C-2)	≥ 6 (required to start Phase C.2)	
MRL (Phase C-2)	≥ 6 (Transitioned from Engr to Mfg Control)	
MRL (Phase C-3)	≥ 8 (Pilot Line)	
3rd party friendly	YES	
Process Controls	Disclose in proposal	
Line Yield	Disclose in proposal	
Pitch	Disclose in proposal	
Cycle Time	Disclose in proposal	
Cost/Wafer	Disclose in proposal	
RF Probe on Bump Count	Disclose in proposal	
Reliability Temp Cycling	Disclose in proposal	
Reliability biased-HAST	Disclose in proposal	
Reliability Electromigration	Disclose in proposal	

6. Project Deliverables:

#	Deliverable(s)	Description	Frequency	Delivery Method
A-1.1	MRL-4 Production Process Baseline Report	Brief USG on baseline R&D production; MRL-4 maturity demonstration	1	Tech @ US-based facility; PPT & Virtual Brief
A-1.2	MRL-6 Production Environment SOTA Wafer & PDK Demonstration	Node qualified to transition from engineering to production control	1	US-based facility; to be inspected in-person by government technical SMEs.
A-2.1	MRL-8 Pilot Line SOTA Wafer & PDK Demonstration	Node qualified for Pilot Line	1	US-based facility; to be inspected in-person by government technical SMEs.
A-3.1	MRL-8 Pilot Line SOTA Wafer & PDK Demonstration with AIC	demonstrate advanced integrated pilot line offering MRL-8 SOTA wafers (A-3a), MPW Access (B-3a, B-3b, B-3c), and MRL-8 AIC (C-3a) and its alignment to DoD advanced packaging ecosystem	1	US-based facility; to be inspected in-person by government technical SMEs.
B-1.1	MRL-4 to MRL-6 Multi-Project Wafer Runs	Host MPW runs for 3rd party performers (final section by government); provide diced die to performers	2-4/yr	Virtual Kickoff with online posting of MPW offerings; US-based facility; die by mail
B-1.2	Design IP & Secure Capture	All govt-funded designs should be subject to government purpose rights; capture in secure library	For all MPW designs	Secure Cloud; Demo – Virtual/In-Person
B-1.3	Design/IP Demonstration Day	Host Design IP annual DIB demo day to facilitate transition	Annual	Secure Cloud; Demo – Virtual/In-Person; PPT Brief from each performer
B-2.1	MRL-6 to MRL-8 Multi-Project Wafer Runs	Host MPW runs for 3rd party performers (final section by government); provide diced die to performers	2-4/yr	Virtual Kickoff with online posting of MPW offerings; US-based facility; die by mail
B-2.2	Design IP & Secure Capture	All govt-funded designs should be subject to government purpose rights; capture in secure library	For all MPW designs	Secure Cloud; Demo – Virtual/In-Person
B-2.3	Design/IP Demonstration Day	Host Design IP annual DIB demo day to facilitate transition	Annual	Secure Cloud; Demo – Virtual/In-Person; PPT Brief from each performer

#	Deliverable(s)	Description	Frequency	Delivery Method
B-3.1	MRL-8 Multi-Project Wafer Runs with AIC	Host MPW runs for 3rd party performers (final section by government); provide diced die to performers	2-4/yr	Virtual Kickoff with online posting of MPW offerings; US-based facility; die by mail
B-3.2	Design IP & Secure Capture	All govt-funded designs should be subject to government purpose rights; capture in secure library	For all MPW designs	Secure Cloud; Demo – Virtual/In-Person
B-3.3	Design/IP Demonstration Day	Host Design IP annual DIB demo day to facilitate transition	Annual	Secure Cloud; Demo – Virtual/In-Person; PPT Brief from each performer
C-1.1	AIC Gap Analysis	Analyze gaps and actions necessary to service wafers for DoD advanced packaging ecosystem	1	Tech @ US-based facility; PPT & Virtual Brief
C-1.2	MRL-4 Production Baseline Report & Design Rule Guidelines	Brief USG on baseline R&D production capability	1	PPT & Virtual Brief
C-1.3	MRL-6 Advanced Interconnect Demonstration	Process qualified to transition from engineering to production control; demonstrate alignment with DoD advanced packaging ecosystem	1	US-based facility; to be inspected in-person by government technical SMEs.
C-2.1	MRL-8 Pilot Line AIC Demonstration	Process qualified for Pilot Line	1	US-based facility; to be inspected in-person by government technical SMEs.
C-3a	MRL-8 Pilot Line AIC Demo with SOTA wafers (MRL-8) and MPW Access	demonstrate advanced integrated pilot line offering MRL-8 SOTA wafers (A-3a), MPW Access (B-3a, B-3b, B-3c), and MRL-8 AIC (C-3a) and its alignment to DoD advanced packaging ecosystem	1	US-based facility; to be inspected in-person by government technical SMEs.
D-5.1	IMS	Demonstrate Project Management. Identify and track key performance parameters	Quarterly	Electronic MS Project (Detailed) & PPT (High-Level); Virtual Brief
D-5.2	Annual maturation roadmap for each task – foundry, MPW, and AIC.	Annual maturation roadmap for each task, including business strategy, volume projections, cost models for foundry product offerings.	Annual	Electronic PPT & Virtual

#	Deliverable(s)	Description	Frequency	Delivery Method
D-5.3	Quarterly Reports	Quarterly high-level status updates and discussion. To include status of milestones, deliverables, and maturation roadmaps.	Quarterly	Electronic PPT & Virtual
D-5.4	Technical Execution Area Reviews	Present to OSD Leadership and Stakeholders	Semi-Annual	Electronic PPT & Virtual/In-Person
D-5.5	Meetings & Updates	Track incremental progress	Monthly / As Needed	Electronic PPT and Virtual
D-5.6	Milestones & Financials	Keep an updated record of milestones mapping to the DoD ME roadmap	Monthly	Electronic Excel Document (Detailed) & PPT (High-Level Summary)
D-5.7	Monthly Reports	Monthly report/update on the prototype project CSWF requirements	Monthly	Electronic Excel Document
D-5.8	CSWF Baseline	DoD Manual 8570.01M Cyber Security Certifications and Requirements. New hire information for tasking requiring Cyber IT/Cybersecurity functions shall be submitted to the AOR at least 7 days prior to employee beginning performance of any Cyber IT/Cybersecurity functions on this tasking.	As Needed / 7 days prior to performance	Electronic Excel Document

7. Current Project Budget: $25.6M

This value represents what is currently available for a single award of a single node with all three task lanes being executed throughout all three phases. This value is subject to change and is provided for planning purposes. Respondents should propose a cost that reflects the respondent's approach and not use the budgetary estimate only. 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

☐ Distribution Statement B: Distribution authorized to U.S. Government agencies only (fill in reason) (date of determination). Other requests for this document shall be referred to (insert controlling DoD office)."

☐ Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors (fill in reason) (date of determination). Other requests for this document shall be referred to (insert controlling DoD office)."

☐ Distribution Statement D: Distribution authorized to the Department of Defense and U.S. DoD contractors only (fill in reason) (date of determination). Other requests shall be referred to (insert controlling DoD office).

☐ Distribution Statement E: Distribution authorized to DoD Components only (fill in reason) (date of determination). Other requests shall be referred to (insert controlling DoD office)."

This project encompasses the following restrictions:

a. Security Classification: Unclassified

b. Is ITAR Compliance required? Yes, at time of award.

c. Respondent Restrictions (e.g., domestic companies only): Domestic companies or facilities only.

d. Hazardous Material: No

e. Any additional restrictions applicable to this project: Any additional restrictions applicable to this project: Respondents shall complete the Section 889(a)(1)(B) Prohibition on Contracting with Entities Using Certain Telecommunications and Video Surveillance Services or Equipment (Attachment B) and return the signed representation with the submitted proposal.

f. Cyber Security Workforce (CSWF) Qualifications and Reporting

Tasking outlined in this RFS may require personnel to perform Cyber IT/Cybersecurity functions, therefore shall meet the requirements of DoD Manual 8570.01M Cyber Security Certifications and Requirements (https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/857001m.pdf?ver=2017-04-17-134634-203). The Performer shall ensure that personnel who are categorized as working within the DoD IA workforce meet the appropriate requirements of DoD Manual 8570.01M. The performer shall provide a list of all personnel assigned with personnel performing Cyber IT/Cybersecurity functions as a part of the monthly Performer's Progress, Status, and Management Report (Deliverable identified in Section 6 above). The report shall include employee name, list of applicable Cyber IT/Cybersecurity function category/level required certifications and fulfillment status and CL status.

New hire information for tasking requiring Cyber IT/Cybersecurity functions shall be submitted to the Action Officer Representative (AOR) at least 7 days prior to employee beginning performance of any Cyber IT/Cybersecurity functions on this tasking. New hire information shall include name, list of applicable Cyber IT/Cybersecurity functions

category/level, required certifications and fulfillment status to include a copy of the certification documentation. Performers are encouraged to provide new hire information to ensure Government concurrence with qualification to perform Cyber IT/Cybersecurity functions. Per regulations, Performer personnel who do not have proper and current certifications shall be denied access to DoD information systems for the purpose of performing information assurance functions." and therefore may not be allowed to perform nor charge under this Agreement.

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:

a. The following is requested from all respondents:

	Technical Response	**Price Response**
Page Maximum	25	7

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:

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 that 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.

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 a 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^2MARTS (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 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.

13. Attachments

a. Section 889 Verification and Representation

14. Important Dates

a. Questions related to this RFS shall be submitted no later than July 1, 2021 at 12PM EST.

   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 PM EST Friday, July 26, 2021.

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 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 (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).