



**2025 Focused Solicitation
Request for Proposals (RFP)
Issued: 8/1/2025**

White Paper Responses Due Date: 8/28/2025
Full Proposals Due Date: 11/01/2025

1. Mission/Objectives and Topics

The Nano-Bio Materials Consortium (NBMC), established in 2013 through a cooperative agreement with the U.S. Air Force Research Laboratory and managed by SEMI, brought together experts from industry, academia, and government to advance electronic technologies for human performance monitoring and augmentation. Across forty-eight projects involving more than four dozen organizations, the consortium delivered key innovations in flexible, low-power, wearable systems including ECG, hydration, and biomarker sensors designed to operate under the demanding conditions of airman performance monitoring and aeromedical evacuation.

While initially centered on general physiological monitoring, NBMC has expanded its scope to address component, and system-level technologies that enhanced decision-making, biometric tracking, and performance augmentation under stringent Size, Weight, Power, and Cost (SWaP-C) constraints. Advances included high-performance flexible electronics, multi-sensor integration, AI/ML-enabled signal processing, implantable biosensors, textile-based interfaces, and interventional capabilities such as neuromodulation and precision drug delivery.

Building on this foundation, the focus has shifted toward the development of integrated semiconductor-enabled systems designed to operate in extreme and dynamic environments. Emphasis is placed on environmentally durable materials, embedded thermal and power management, and edge AI architectures for distributed, real-time analytics. In parallel, the program has placed increased attention on high-fidelity biosignal sensing platforms with biocompatible, minimally invasive interfaces, secure low-power processing, and adaptive user interfaces that capture and enhance both physiological and cognitive function in real-world operational settings.

The scope also now includes robust, scalable sensor arrays and digital twin-enabled control systems for real-time industrial bioprocess monitoring in biologically active environments. Furthermore, the integration of compact, bio-inspired sensor technologies capable of detecting chemical, biological, and radiological threats across air, water, soil, and surfaces has emerged as a priority focusing on operational longevity, low cross-sensitivity, and extreme environmental resilience. Together, these evolving priorities reflect NBMC's ongoing commitment to enabling mission-critical sensing, diagnostics, and augmentation systems at the intersection of defense, health, and industrial innovation.

The 2025 RFP topics include:

- A. Foundational Technology in Extreme Environment: Advanced Materials, Power Management, and Edge Computing
- B. Biosignal Sensing and Processing, and User Interface Technology
- C. Real-Time Monitoring of Industrial Bioprocess
- D. Bio-inspired sensors for detection of a broad spectrum of threat exposures across diverse environmental conditions

Concept demonstrations and/or prototypes must be part of the deliverables for consideration of an award. If your proposal involves human demonstrations or includes human subjects research (HSR), please provide concise responses to the questions in Section 7 of the white paper instructions. Collaboration with end-user communities for independent testing and characterization is highly recommended. End-users may include defense customers, commercial market users, or relevant supply chain partners.

2. Proposal Process

The proposal process will start with a white paper submission. Members of the RFP Review Committee will review the white papers and recommend those for full proposal submission to the Governing Council.

The primary point of contact, for the submissions selected by the review committee for further consideration, will be invited to submit a full proposal.

To date, SEMI has enabled funded R&D projects to be conducted by industry and academic teams with technical guidance and oversight from the subject matter experts within the government.

SEMI will support technical approaches that are novel, or game-changing thus having a more significant element of risk, as well as approaches that represent evolutionary improvements upon existing capability, which tend to be less risky and involve shorter development and delivery intervals. It is recognized that it may be desirable to include information that is considered confidential and proprietary by the submitter to fully and effectively convey the technical merits of the proposal. While a best effort will be made to restrict the proposal information to those with a need to know expressly for purposes of the review, it is recommended that the inclusion of proprietary information be limited to the minimum necessary to convey the highlights of the technical approach.

With respect to intellectual property developed under a SEMI contract, the following policy has been established to encourage suppliers to cooperate with SEMI and our government partners in the accomplishment of their objectives:

“Legal title to any technology developed under a funded research and development contract will be the property of the development partner.”

Development agreements generally will be awarded on an actual cost basis, not to exceed contracts, with payments to be made quarterly and based on milestones as presented in the proposal. If your institution has a U.S. government approved rate structure, use it. If not, the normal commercial cost accounting system used for internal R&D projects will be acceptable. The methods used to value “cost sharing” cost must be the same as those used to value the full project costs. All suppliers are expected to have a government approved or industry standard accounting system by which actual project costs are tracked and reported. This is an absolute requirement to be sure that cost share obligations are met.

A work breakdown structure should be the basis of project schedules, milestone definitions, and cost estimates. Cost estimates for each major step leading to the completion of a milestone should be used as the basis for the amount from the grant to be paid. A spreadsheet showing these calculations should accompany each proposal. The same spreadsheet should also show the specifics of how you will contribute your matching share of the total costs of the development contract. Cost sharing expectations have been established in the master agreement between SEMI and AFRL, and a minimum 50/50 cost sharing ratio between government and industry is targeted.

3. Research and Development Award Budget

Anticipation for this 2025 RFP solicitation is a cash budget range of \$250,000 - \$750,000 with an additional matching (or greater) cost share from the award recipient(s). Submissions may be from single institutions, or a project team comprised of various companies and/or universities. Submissions from multi-institutional teams are preferred. Programs proposed should run from 12-18 months. The hard stop for the project completion will be communicated at a later date.

4. TRL and MRL Entry and Exit Levels

The maturity of the proposed research effort should be assessed by a TRL or MRL definition. We seek innovations in TRL 3 through TRL 6 showing clear technology maturation over the duration of the project. TRL and MRL levels are determined through the project team self-assessment as well as AFRL, or other designated end user assessments. Proposers should consider the definitions of TRL and MRL and reference specific elements within the TRL category that will enable the maturation of the technology. Primary focus by the RFP review team will be on the justification and maturation of TRL, however, reference to MRL awareness should be included.

The definition of the TRL and MRL levels are described below:

TECHNOLOGY READINESS LEVEL DEFINITIONS

TRL 3. Analytical and experimental critical function and/or characteristic proof of concept

- Active research and development are initiated
- This includes analytical studies and laboratory studies to physically validate the analytical predictions of separate elements of the technology
- Examples include components that are not yet integrated or representative

TRL 4. Component and/or breadboard validation in laboratory environment

- Basic technological components are integrated to establish that they will work together
- Relatively “low fidelity” compared with the eventual system
- Examples include integration of “ad hoc” hardware in the laboratory

TRL 5. Component and/or breadboard validation in relevant environment

- Fidelity of breadboard technology increases significantly
- Basic technological components are integrated with reasonably realistic supporting elements so they can be tested in a simulated environment
- Examples include “high-fidelity” laboratory integration of components

TRL 6. System/subsystem model or prototype demonstration in a relevant environment

- Representative model or prototype system, well beyond TRL 5, tested in a relevant environment
- Represents a major step up in a technology’s demonstrated readiness
- Examples include testing a prototype in a high-fidelity laboratory environment or in simulated operational environment

MANUFACTURING READINESS LEVEL DEFINITIONS

MRL 4. Capability to produce the technology in a laboratory environment

- Required investments, such as manufacturing technology development identified
- Processes to ensure manufacturability, producibility and quality are in place to produce demos.
- Manufacturing risks identified for prototype build
- Manufacturing cost drivers identified
- Producibility assessments of design concepts have been completed.
- Key Performance Parameters (KPP) identified
- Special needs identified for tooling, facilities, material handling and skills

MRL 5. Capability to produce prototype components in a production relevant environment

- Manufacturing strategy refined and integrated with Risk Management Plan
- Identification of enabling/critical technologies and components is complete
- Prototype materials, tooling and test equipment demonstrated on components in a production relevant environment
- Manufacturing technology development efforts initiated or ongoing
- Producibility assessments of key technologies and components ongoing
- Cost model based upon detailed end-to-end value stream map

MRL 6. Capability to produce a prototype system or subsystem in a production relevant environment

- Initial manufacturing approach developed
- Most manufacturing processes have been defined and characterized, but there are still significant engineering/design changes
- Preliminary design of critical components completed
- Producibility assessments of key technologies complete
- Prototype materials, tooling and test equipment, as well as personnel skills have been demonstrated on subsystems/ systems in a production relevant environment
- Detailed cost analysis includes design trades. Cost targets allocated.
- Producibility considerations shape system development plans

TRL and MRL CLARIFYING DEFINITIONS

BREADBOARD: Integrated components that provide a representation of a system/subsystem and which can be used to determine concept feasibility and to develop technical data. Typically configured for laboratory use to demonstrate the technical principles of immediate interest. May resemble final system/subsystem in function only.

HIGH FIDELITY: Addresses form, fit and function. High fidelity laboratory environment would involve testing with equipment that can simulate and validate all system specifications within a laboratory setting.

LOW FIDELITY: A representative of the component or system that has limited ability to provide anything but first order information about the end product. Low fidelity assessments are used to provide trend analysis.

MODEL: A reduced scale, functional form of a system, near or at operational specification. Models will be sufficiently hardened to allow demonstration of the technical and operational capabilities required of the final system.

OPERATIONAL ENVIRONMENT: Environment that addresses all of the operational requirements and specifications required of the final system to include platform/packaging.

PROTOTYPE: The first early representation of the system which offers the expected functionality and performance expected of the final implementation. Prototypes will be sufficiently hardened to allow demonstration of the technical and operational capabilities required of the final system.

RELEVANT ENVIRONMENT: Testing environment that simulates the key aspects of the operational environment.

SIMULATED OPERATIONAL ENVIRONMENT: Environment that can simulate all of the operational requirements and specifications required of the final system or a simulated environment that allows for testing of a virtual prototype to determine whether it meets the operational requirements and specifications of the final system.

PRODUCTION RELEVANT ENVIRONMENT: An environment normally found during MRL 5 and 6 that contains key elements of production realism not normally found in the laboratory environment (e.g. uses production personnel, materials or equipment or tooling, or process steps, or work instructions, stated cycle time, etc.). May occur in a laboratory or model shop if key elements or production realism are added.

Additional Information on the Technology and Manufacturing Readiness Assessment process can be found at:

- TRL Assessment: <https://www.cto.mil/wp-content/uploads/2025/03/TRA-Guide-Feb2025-Cleared.pdf>
- MRL Assessment: <http://dodmrl.com>

5. Focused Solicitation

This RFP outlines four focused solicitation topics targeting the advancement of biosensor, biomarker detection, and bio-industrial sensing technologies for both Department of Defense (DoD) and commercial applications. Proposals should leverage semiconductor-based innovations including MEMS, CMOS-compatible sensors, and chip-scale integration to develop compact, reliable, and scalable platforms. Regardless of topic, all submissions must address shared system-level requirements such as on-device AI for real-time analytics, secure and standards-compliant data handling, and interoperable hardware and firmware architectures.

All proposals, regardless of topic (A, B, C, or D), must address the following technical requirements:

- **Low-Power AI Processing:** Solutions must enable real-time signal processing, anomaly detection, data fusion, signal filtering, and decision-making on device delivering actionable insights while minimizing energy consumption through e.g. efficient compute architectures
- **Edge AI & Secure Data Integrity:** Systems should incorporate on-device AI for analytics and tamper resistant data logging to ensure secure, unalterable records suitable for clinical-grade applications
- **Data Integrity & Compliance:** Proposals must include edge-based data processing protocols that ensure secure, privacy-preserving handling and demonstrate compliance with medical and regulatory standards such as HIPAA and GDPR
- **Interoperability & Data Standardization:** Proposals should use or develop standardized data formats and integration protocols to ensure cross-platform interoperability and ensure long term accessibility of health data by users and clinicians, regardless of device origin
- **Power Management:** Solutions must support continuous operation through low-power design, efficient power usage, and/or energy harvesting mechanisms suitable for real-time monitoring and processing

Topics

Topic A: Foundational Technology in Extreme Environment: Advanced Materials, Power Management, and Edge Computing

The goal of this topic is to develop foundational technologies that improve the reliability and performance of sensors and devices in extreme environments. Focus areas include advanced materials, power and thermal management leveraging semiconductor technologies, sustainable and recyclable manufacturing, multimaterial additive manufacturing for biomanufacturing applications, and data mining for early detection of long-term issues through real-time trend analysis and robust data handling.

Topic A: Technology Requirements/ In Scope:

Develop the technologies that enable the following features:

- Develop environmentally durable materials and sensors that maintain reliable performance under extreme conditions (heat, moisture, dust), validated against adapted military standards
- Develop integrated thermal management solutions, incorporating technologies like microfluidics or real-time sensing (e.g. piezoelectric) to prevent overheating in compact, high-power devices
- Develop high-resolution environmental sensing systems for rapid, high-frequency detection of localized and broad-area hazards to enhance situational awareness
- Develop integrated monitoring systems that capture and synchronize physiological and environmental sensor data for comprehensive health and exposure assessments
- Develop platforms that integrate human feedback (subjective input) with objective sensor data into a single, actionable dashboard
- Advance multimaterial additive manufacturing techniques to improve interface reliability and reduce failure in bio-integrated devices
- Develop biomanufacturing and bioprinting methods using biocompatible, biodegradable materials for in vivo and in vitro biosensing applications
- Develop edge AI frameworks to determine optimal distribution of on-device vs. cloud-based processing, ensuring efficient, real-time, AI-driven decision support

Topic B: Biosignal Sensing and Processing, and User Interface Technology

The goal of this topic is to advance semiconductor-enabled sensing systems, edge signal processing, and user interface technologies for capturing biosignals ranging from surface-level to deep tissue.

Applications span both public health monitoring and performance optimization for Service Members, including Airmen and Guardians. Proposed solutions should leverage innovations in CMOS-compatible sensors, MEMS-based transducers, and ultra-low-power semiconductor platforms to deliver compact, intelligent, and field-deployable systems. Emphasis should be placed on the use of semiconductor-based architectures that integrate sensing, compute, memory, and secure storage to support real-time analytics, encrypted data logging, and consistent performance in extreme environments including -40°C/-40°F to 50°C/122°F, as well as high vibration, altitude, and humidity. System designs should focus on modular hardware configurations, intuitive and adaptive user interfaces, and power-efficient operation suitable for continuous use in both defense and healthcare scenarios. User interface development should align with mission-critical and clinical usability standards. These solutions must demonstrate semiconductor-enabled sensing and edge AI capabilities for real-time signal interpretation, anomaly detection, and autonomous response, while also supporting multimodal sensor fusion frameworks. This effort should directly support Department of Defense (DoD) priorities, with specific relevance to (AFRL) objectives. Key areas include the durability and ruggedization of sensors and electronics, ensuring reliable performance under physical, thermal, and electromagnetic stressors.

Topic B: Technology Requirements/ In Scope:

Develop the technologies that enable the following features:

- Biosensing & Signal Processing capabilities
 - Develop biocompatible, minimally invasive sensors for both skin and deep-tissue applications
 - Advancement of solid-state, semiconductor enabled sensors (e.g. MEMS, Graphene, etc.) to improve the accuracy, stability, and signal-to-noise ratio in dynamic environments

- Generation of validated material data including tissue-interface models, site-specific degradation rates, and aging behavior
- Implementation of AI-based signal filtering and event-triggered detection to enhance real-time biosignal clarity and relevance
- Integration of onboard diagnostics for continuous, real-time, multi-parameter physiological tracking and intelligent alerting
- Support for modular platforms to facilitate flexible deployment and enable future biomarker discovery
- Integrate low-power wireless connectivity (e.g., BLE) with on-body networking capabilities to enable seamless data transmission and interoperable system operation
- Adaptive Health Platforms, Clinical & Commercial Readiness
 - Develop edge-integrated user interfaces for triage, trend analysis, and real-time decision-making to minimize user burden and maximize responsiveness
 - Create disease-specific diagnostic and monitoring tools (e.g., cardiac, cancer, neuro, metabolic) using semiconductor-enabled biosignal processors for clinical accuracy and deployment scalability
 - Build integrated health tracking systems that combine on-device data acquisition, embedded analytics, and secure memory subsystems to capture and process real-world evidence in decentralized care environments
 - Deliver clinical trial-ready platforms designed for early disease detection and population-scale data collection, with integrated data security and traceability features
 - Provide standardized, high-quality datasets to support clinical insights and AI development
 - Align sensing and diagnostic tools with clinical billing and reimbursement standards, including Current Procedural Terminology (CPT) code alignment and digital health pathway integration, while maintaining data integrity and auditability at the hardware level
 - Enable scalable, low-cost manufacturing and alignment with payer and provider infrastructure

Topic C: Real-Time Monitoring of Industrial Bioprocess

The goal of this topic is to develop infrastructure for smart monitoring of non-pharmaceutical, non-medical bio-industrial manufacturing processes, such as the production of chemical and material derivatives for aerospace applications (e.g. fuels, and rubber).. To support advanced biomanufacturing, proposals should focus on adapting and extending sensing capabilities beyond conventional chemosynthetic parameters to enable real-time measurement of biologically relevant variables such as glucose concentration, dissolved oxygen, and metabolite levels. Sensor platforms must be compatible with biologically active systems and maintain reliable performance across diverse microbial and cell-based production environments.

Building on these sensing capabilities, proposals should also enhance traditional processing techniques by enabling novel, multi-parameter control strategies throughout the biomanufacturing workflow. These strategies should leverage real-time biosensor data to dynamically adjust process conditions and improve outcomes. Approaches must be process-agnostic and broadly applicable across bio-industrial manufacturing, including both fermentation and downstream processing. The focus is on creating real-time, low-cost, and scalable sensing systems to reduce media and feedstock waste, enable digital twin integration, and improve overall process efficiency using simple, robust sensor arrays.

Ultimately, this effort will support the transition to in-house, resilient bio-industrial manufacturing capabilities.

Topic C: Technology Requirements/ In Scope:

Develop the technologies that enable the following features:

- Sensing and signal processing capabilities
 - Develop scalable, low-cost sensor arrays for multi-parameter monitoring (e.g., temperature, pressure, flow, pH, metabolites, contamination, gas levels, and failure detection)
 - Design and develop sensor platforms or chip-based systems that are fully compatible with biologically active environments and capable of maintaining stable, accurate

performance across a range of microbial and cell-based production systems to support real-time measurement of biologically relevant variables such as glucose concentration, dissolved oxygen, and metabolite levels. Improved feedback mechanisms should enable dynamic control actions, including adjustments to sparging rates or nutrient feeds.

- Advance traditional biomanufacturing techniques to enable process-agnostic, multi-parameter control strategies. Leverage real-time sensing data to support dynamic control across fermentation and downstream processing in bio-industrial systems.
- Integrate analytical tools such as FTIR, Raman, UV/VIS, electrochemical, optical, and impedance sensing for enhanced diagnostics
- Real-Time Analytics & Control Systems
 - Develop and implement digital twins for predictive, real-time process optimization
 - Integrate edge computing for local data processing, anomaly detection, and AI-driven decision-making
 - Develop closed-loop control systems triggered by sensor input for automated responses
- Commercial & Manufacturing Readiness
 - Develop scalable, reconfigurable platforms for adaptive, real-time monitoring of industrial bioprocesses to minimize waste
 - Design and deploy user-friendly, interoperable systems to support rapid integration and workforce adoption

Topic D: Bio-inspired sensors for detection of a broad spectrum of threat exposures across diverse environmental conditions

The goal of this topic is to develop compact, reliable, and low-power bio-inspired sensors for detecting chemical, biological, and radiological threats across air, water, soil, and surfaces. These sensors should operate in real-time, minimize false positives, offer long operational life, and seamlessly integrate into broader systems.

Topic D: Technology Requirements/ In Scope:

- Exposures of interest
 - Radiation in air, water and soil
 - Warfare agents
 - Chemicals and biological contaminants in water, soil and on surfaces
 - Industrial, environmental, warfare agents
 - Chemicals (gas, vapor, aerosol) and biological contaminants in air
 - Occupational exposures
 - Chemical warfare agents
 - Indoor air contaminants
 - Electromagnetic energy
- Technology Requirements
 - Develop sensors with near real-time response capabilities
 - Develop systems with low (approaching zero) false positives and false negatives
 - Develop solutions with minimal cross-sensitivity to non-target substances
 - Develop technologies that remain robust and functional across extreme temperatures and humidity (-40°C/-40°F to 50°C/122°F; 0% to 99% RH)
 - Develop compact solutions with reduced Size, Weight, and Power (SWaP) compared to traditional systems
 - Develop devices requiring minimal or no field calibration
 - Develop components with a minimum operational life of two years
 - Develop components manufactured domestically within the United States
 - Develop open-architecture platforms for seamless integration into broader systems

6. Requirements for Receiving an Award

To submit a response to this RFP and subsequently be considered for an award, several requirements must be met as detailed below:

- To receive an award the company or composite team of companies must have a significant presence in the United States in the form of R&D activities and/or manufacturing. At least 50% of the work activity (funds) must be spent within the U.S. operations. The primary company leading the proposal must be a U.S.-owned company. Further, for the period of award performance plus the 3 years following, the primary company plus all IP resulting from said award must remain under control of a U.S.-owned or majority-controlled company. In certain cases, where it can be demonstrated that the development is both critical to U.S. manufacturing capability and unique, this “preference for U.S. operations” requirement can be waived with AFRL approval. Any responding company requiring such a waiver must make this known in the pre-proposal document.
- The company or companies must be committed to volume manufacturing of the developed products and provision to the U.S. medical electronic industry on a right-of-first acceptance basis. Applied research conducted by universities will be considered and does not need to meet this requirement. However, in this latter case a pathway to commercialization and/or licensing must be envisioned and described.
- The company or companies, including universities, must provide a matching share of the development cost in cash and in-kind contributions (e.g., labor and materials) - 50% MINIMUM.
- Companies and organizations which are selected for an award, including all partners and/or subcontractors, must subsequently join SEMI at the appropriate membership level. Membership information is available at <https://www.semi.org/en/connect/semi-membership-levels>
- Companies and organizations which are selected for an award, including all partners and/or subcontractors, must agree to terms and conditions set forth in the SEMI Development Agreement before receiving any portion of the award.
- Each project team may submit no more than THREE proposals total, whether as a primary project team or as a subrecipient.
- Project Team MUST attend ONE consortium conference or Event AND participate in at least ONE consortium Gap Analysis activity PER YEAR.

7. White Paper Instructions

Your white paper must include the following information:

- Project Title
- RFP Topic you are responding to
- UEI (Unique Entity Identifier)
- EIN (Employer Identification Number)
- CAGE (Commercial and Government Entity) code
- Your Organization
- Primary Point of Contact's email
- Total Federal Funds Requested
- Total Project Cost (Federal Funds + Cost share)
- Project Duration

White paper submissions are limited to 4 pages, including cover pages, tables of contents, figures, etc. Each submission should contain:

- A description of the proposed idea
- TRL and MRL (Current and Target)

- High-level budget and timeline
- Background and experience of the R&D team
- A clear outline of the problem being addressed, how the proposed idea solves it, how it advances the industry, and how it applies to Air Force and Department of Defense (DoD) applications
- A comparison to the state-of-the-art benchmark, with a defined reference
- A potential path to manufacturing

If your proposal includes human subjects research (HSR), please provide concise answers to the following questions:

1. Will the proposed HSR require direct funding from this project or will it be funded separately and only the results of the HSR will be shared and used in the study
2. If the HSR effort is planning on using direct funds from the proposed effort, please clarify whether the purpose of the HSR is for technology demonstration, or do you plan to address additional scientific/clinical questions
3. If the HSR effort is planning on using direct funds from the proposed effort, please describe your approach to obtaining regulatory approvals
 - a. Please provide details about the institutional review board (IRB) that you will use
 - b. Please clarify whether the proposal team has been involved in similar/related HSR efforts previously. If the answer to this question is yes, what was the IRB determination, minimal risk or greater than minimal risk?
 - c. Please provide information about the total number of subjects that you plan to involve in the study
 - d. If the proposed research involves the use of non-commercial new devices, please provide a brief clarification on whether additional regulatory approvals (such as FDA/IRB exemptions for research use only) will be required
 - e. Please provide a high-level estimate on the timeline required for obtaining regulatory approvals

Any HSR performed under the NBMC program will require additional local IRB (or IRB exemption) approval to be further approved by AFRL HRPO. If the white paper is selected for subsequent consideration, the approach and expected timelines for obtaining both IRB and HRPO approvals should be included in the full proposal.

Please format your pages with 1" Margins, and Arial font size 10 to 12. We encourage applicants to review the full proposal instructions for suggested content and structure.

White papers will only be accepted electronically up to 5:00 PM PT on the due date of August 28, 2025. The Primary Point of Contact for your team will submit your completed proposal via email to nbmcrfp@semi.org. The Primary Point of Contact will receive a confirmation email with your assigned paper number.

8. Full Proposal Instructions

The format below will help us evaluate your proposal and ensure that the major topic areas are covered. Full proposal submissions are limited to 20 pages maximum. The Proposal Support section does not count towards this page limit. Please format your pages with 1" Margins, and Arial font size 10 to 12. Your Proposal must be submitted in both Microsoft Word and Adobe PDF formats with the exception of the Financial section.

Content: The proposal shall comply with the following content and structure.

Page 1: Cover Page (REQUIRED)

Date
Project Title (Concise)
RFP Topic

Company Name
 Address
 EIN
 UEI
 CAGE

Primary Administrative Contact (telephone and email)
 Project Leader Contact Information (telephone and email)
 Project Team (Prime & Subs)
 Project Duration (In months with dates)

Total Project Cost
 Cost Share
 Federal Funds Requested

Page 2: Table of Contents (REQUIRED)

Page 3: Executive Summary, containing a short description of the project objective and industry or supply chain impact (REQUIRED)

Pages 4-20: Proposal Content

Statement of Work (REQUIRED)

1. Introduction
 - 1.1. Problem definition
 - 1.2. Project scope
 - 1.3. Technical approach, rationale and innovative claims with supporting data and diagrams
 - 1.4. Performance target metrics and/or specifications
 - 1.5. Prior work and current status and uniqueness compared to the State of the Art and existing products on the market
2. Project Proposal
 - 2.1. Clear objective(s)
 - 2.2. Tasks clearly delineated to address all objectives
 - 2.2.1. Detailed task description
 - 2.2.2. Milestones, deliverables including demonstration prototypes, reports, process definition, test results, reviews etc. This is a written description. Your Gantt chart should be in 2.4.
 - 2.3. Project management approach
 - 2.3.1. Roles and relationships of key personnel and institutions
 - 2.3.1.1. Technical representative & alternate,
 - 2.3.1.2. Contract representative,
 - 2.3.1.3. Development Partner's Project Manager
 - 2.3.1.4. Co-development partner at AFRL (encouraged)
 - 2.3.2. Lead institution and subcontract partners
 - 2.4. Project schedule of tasks indicated (This should be in the format of a Gantt chart and a table.)
 - 2.4.1. Milestones,
 - 2.4.2. Deliverables to SEMI NBMC (This should also include a short video to get people excited about what you are doing)
 - 2.5. Define the initial or current (starting/benchmark) and targeted (by the end of the project) performance metrics for the innovation (device, process, software, or model/simulation) and present them in a written summary and table.

Parameter	Starting Metric	Target Metric
-----------	-----------------	---------------

2.5.1. Robustness Assessment for Air Force or DoD Operational Conditions:

Define the initial or current (starting/benchmark) and target (by the end of the project) robustness metrics for the innovation (device, process, software, or model/simulation) and present them in a written summary and table.

Test Objective	Test Method	Post-test Evaluation	Starting Metric	Target Metric
----------------	-------------	----------------------	-----------------	---------------

2.6. TRL and MRL Current standings and planned advancements by the end of the project.

2.7. SEMI furnished resources (If not needed, keep section and indicate none requested.)

2.8. Project Risk Assessment

2.8.1. Table: Analysis of Risk and Mitigation Strategy (list risk assessment tools/processes used if any)

Risk	Consequence	Mitigation Strategy	Impact (L, M, H)	Probability of Risk (L, M, H)
------	-------------	---------------------	------------------	-------------------------------

2.9. Workforce Development: Will students or interns be involved in your project? How involved will they be? Team members should be encouraged to present their work during project review meetings, including students or interns.

Business Section (REQUIRED)

1. Market Analysis and Competitive Landscape

1.1. Competitive benchmark – what solutions are available today and how does your innovation differentiate?

1.2. Market drivers

1.2.1. Existing product portfolio and/or future product concepts

1.2.2. Primary markets served and market drivers (i.e. wireless, mobile, performance specs, etc.)

1.2.3. Market Assessments/ Value Proposition of your innovation

1.3. Commercialization path/ strategy

1.4. Government Transition plan/ strategy

2. Company Background and Capability to Meet Technical and Business Targets

2.1. Team & key personnel

2.1.1. Management and technical personnel experience and qualifications

2.1.2. Roles and responsibilities of key personnel

2.1.3. Clearly indicated lead institution and subcontract partners

2.1.4. Contact information for technical lead and contract representative

2.2. Facilities and equipment

2.3. Relevant company information

2.3.1. Three-year revenue and/or investment round (omit for University)

2.3.2. Staff size and make-up by function relevant to this project and in addition to key personnel

2.3.3. IP strategy or business strategy for innovations resultant of this effort such as licensing strategy, new product introduction, M&A, etc.

2.3.4. Present patents held related to the proposal topic

2.3.5. Is the Company Foreign or Domestically owned

2.3.6. How long has it been in business?

2.3.7. Prior experience with similar subawards?

2.3.8. Purchasing policy?

2.3.9. Evidence of effective financial controls within the subrecipient's system

Pages 21-X: Proposal Support (This is not included in the page count.)**Financial Section (REQUIRED)**

1. Detailed Project Cost and Cost Share by Task or by Quarter. An Excel Template will be provided by SEMI.

1.1. Labor, materials, overhead, travel and capital

Appendix

1. Appendix
 - 1.1. Technical References
 - 1.2. Letters of Support

Full Proposals will only be accepted electronically up until 5:00 PM PT on the due date of November 1, 2025. Please submit your completed proposal via email to nbmcrfp@semi.org with your assigned paper number in the subject.

9. Proposal Evaluation

Full proposals will be evaluated by the review committee based on a set of criteria that include budget, collaboration value, dual-use (commercial and Air Force/ DoD) applicability, relevance to the ecosystem, relevance to advancing or demonstrating the role of nano-bio material for biosensing, bio-industry systems, and environmental threat monitoring, schedule & milestones, deliverables, overall proposal quality, and team capabilities. White paper and full proposal content requirements are listed in sections 7 and 8. Programs run from 12-18 months, which includes a clear set of deliverables, quarterly project reviews, quarterly invoice packages, a demonstration component/system, and a final report.

Upon receipt, submissions will be forwarded to the RFP Review Committee. During the final selection process of full proposals, some communication or negotiation between the potential supplier and representatives of AFRL and/or SEMI may be initiated over the terms, conditions, specifications, deliverables, schedule or other relevant factors contained in the proposal in advance of awarding a contract. Granting of any awards to submissions in response to this RFP are contingent upon the continued availability of funding from the U.S. Government.

SEMI encourages proposers to assemble project teams with a broad range of skills and expertise—including engineering, materials science, manufacturing, data analytics, program management, and commercialization. Teams that integrate technical depth with operational, regulatory, and application-specific knowledge are better positioned to deliver impactful outcomes.

SEMI plans to grant and administer funding which should be matched (50% of total project cost requested) with funds in the form of cash and in-kind contributions provided by the grant recipients to cover the total project cost. It should be noted that historically, cost share for funded development programs has averaged greater than 60% industry funding. Technical leaders from member companies and government will be identified to provide project oversight and direction. These Project Teams typically will be comprised of 2 to 4 experts from the consortium membership as well as members from the successful individual supplier or supplier team.

In responding to this solicitation, partnering among industrial companies or industrial company/ R&D organization/university teams is highly encouraged. Individual responses will be considered if appropriate size, breadth and expertise are sufficient to effectively cover all areas (e.g., technical resources, financial stability, and market presence) critical to the successful completion of the proposal.

10. RFP Schedule

The tentative schedule of activities for the RFP is as follows:

August 1, 2025	RFP Issued
August 8, 2025	Webinar
August 28, 2025	White Paper Due
October 1, 2025	Notification of White Paper Outcome and Full Proposal Requests
November 1, 2025	Full Proposals Due
December 12, 2025	Notification of Award (Each full proposal Primary Point of Contact will be notified)

The RFP Schedule is subject to change based on availability of review personnel, commitment of federal funds, and other factors.

11. Resources

Additional information can be found at <http://www.nbmc.org>

Additional information and guidance on prospective proposal partners may be available and should be requested at nbmcrfp@semi.org. Please include a brief description of your institution's competencies/contribution and highlight the type of institution/partner that would increase the quality, maturity, or commercial viability of your ideas.

A webinar will be held on August 8, 2025, to review white paper requirements and answer any questions from the public. A recording of the webinar will be available at <http://www.nbmc.org>.

12. Contact Information

Communication and questions during the proposal period should be directed to nbmcrfp@semi.org.