



OPEN PROJECT CALL

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1 Introduction and Background

NextFlex® is an industry-led, dynamic, collaboration-based Institute established to facilitate technology innovation and commercialization, accelerate manufacturing workforce development, and promote sustainable ecosystems for advanced manufacturing. NextFlex has established a low-volume prototyping center and is building a national network for advancing the development and integration of processes, materials, and infrastructure for making products with Flexible Hybrid Electronics (“FHE”) functionalities, and for developing and expanding consumer and defense FHE manufacturing in the United States. One mechanism to enable technology advancement and adoption is to provide cash and in-kind funding awards to proposal teams undertaking development projects that are critical to FHE manufacturing and to

capitalize on the diverse, often non-traditional talents and insights, wherever they reside, to solve problems. Commercial industry, academic, and government partners have proven NextFlex Project Calls to be an effective and efficient mechanism to overcome seemingly impossible technology and/or new product barriers. In its continuous efforts to expand FHE boundaries, NextFlex is pleased to announce its **Open Project Call—Request for Ideas** (RFI) program.

2 Open Project Call

NextFlex issues a Project Call approximately once per year addressing key gaps within the NextFlex Technology Roadmaps, which are created by the Technical Working Groups comprised of industry, academic, and government partners.

In addition to these topics, there may be opportunities to help move the industry forward that are either outside the scope of Project Call topics or are revolutionary ideas of which the Technical Working Groups and NextFlex community may not be aware.

To be equipped to respond to these opportunities, beginning December 1, 2017, NextFlex will launch an Open Project Call. The following categories of interest are provided to give ideas but are not meant to limit proposed topics or concepts:

- Short duration, small budget projects addressing recognized FHE gaps
- Development of specialized tools needed for FHE pilot production to be located at the NextFlex Technology Hub
- Revolutionary or game-changing application demonstrations in a commercially compelling market area or clear military need case
- Cross-institute collaboration opportunities
- Opportunity for Agency Funded Projects
- Process development sabbatical at the NextFlex Technology Hub in San Jose¹

This announcement seeks ideas for topics that are aligned with NextFlex Technical Working Groups but not addressed by ongoing NextFlex programs or other published or planned solicitations. Descriptions of the NextFlex Technical Working Groups are provided below. To avoid white papers that duplicate existing activities or are responsive to other published solicitations, potential responders are highly encouraged to review current NextFlex programs and solicitations.

If the white paper project idea is of interest to the NextFlex community, then those projects that are highly regarded by the review board will be invited to submit a full proposal which will be reviewed by a team of independent experts from NextFlex, US government, Institute members, and Technical Working Groups. Favorably reviewed proposals will be presented to the NextFlex

¹ In the case of process development proposals to be implemented at the NextFlex Technology Hub, NextFlex will review proposals requesting up to \$20,000 of federal funding to send a researcher or engineer to the NextFlex Technology Hub in San Jose to develop processes or methods using the tools located at the Technology Hub. Processes or methods developed through this mechanism will be required to be shared with the NextFlex community. These applications should be restricted to corporate entities as universities and government organizations have other channels to offset costs in these areas. These projects should be cost shared at a minimum of 1:1 ratio and should be scheduled for a period of two weeks to six months in duration.

Governing Council during quarterly meetings for consideration for funding, provided materials are received in time to be reviewed in advance of the Governing Council meetings. In the case of NextFlex receiving too many submissions to be processed by the reviewers in time, your submission will be carried forward to the subsequent quarter. Funding approvals and declinations will be communicated within two weeks of the conclusion of NextFlex Governing Council meetings.

All proposals selected from the white paper process must adhere to NextFlex cost share, accounting, and IP guidelines. All participants receiving core Institute federal funds, must become members of the Institute prior to executing a Development Agreement or commencing work. Projects submitted to NextFlex for funding should consider the value to the Institute and the FHE industry, as well as the future goals of advancing the FHE ecosystem within the U.S., and submitters should clearly articulate those aspects in the proposal process. In addition, all projects should define a commercialization or technology transition plan that demonstrates industry need and a robust business case for the proposed manufacturing technology development. The white papers submitted for funding should be between Manufacturing Readiness Levels (MRL) and Technology Readiness Levels (TRL) of 4 and 7 at the start of the project. More details on MRL and TRL can be found at <http://www.dodmrl.com> and http://esto.nasa.gov/files/TRL_definitions.pdf.

Additionally, and in the interest of leveraging the DoD investment in the NextFlex Technology Hub, proposals can request manufacturing, prototyping, or analytical services provided by NextFlex Labs as a portion of, or entirely in lieu of, cash awards for the federal funding portion of their proposal. Proposers who are interested in this approach may contact NextFlex with an outlined statement of work to get a value for such services for planning, budgeting, and cost share purposes.

Open Project Call Timeline

The Open Project Call process will occur in two steps.

Step 1: White Paper. These are considered by the evaluation team to minimize the investment of time and energy into out-of-scope proposals or proposals in areas not deemed a funding priority at the time of review.

Step 2: Full Proposal. Proposers of white papers determined to be of interest to the NextFlex community will be invited to submit full proposals.

The ability to respond to submissions is governed by the availability of review resources and the quantity of proposals received. A response can generally be expected within six to eight weeks after submission of a white paper, though extenuating circumstances may dictate revised timelines. Final funding decisions will be conducted whenever possible after full proposal submissions—if invited to submit a full proposal—during quarterly governing council meetings. As such, decision timing is subject to the specific timing of your submission, the review process, and the governing council meeting schedule.

Projects should not exceed 12 months.

3 FHE Definition

Flexible Hybrid Electronics (FHE) is defined as an introduction for potential members of NextFlex (“Institute” or “the Institute”) who may not be familiar with FHE and the scope of NextFlex efforts in the Manufacturing USA network.

NextFlex describes FHE as the intersection of additive circuitry, passive devices, and sensor systems that may be manufactured using printing methods (sometimes referred to as printed electronics) and thin, flexible silicon chips, or multichip interposer structures. These devices can take advantage of the power of silicon and the economies and unique capabilities of printed circuitry to form a new class of devices for IoT, medical, robotics, consumer, and communication markets. FHE devices enable a new class of electronics that conform to any shape, but are also bendable, twistable, and stretchable. While we primarily use the term “flexible,” we are interested in manufacturing methods that fall into the categories of flexible, stretchable, conformable, and direct-deposited circuitry (circuitry applied directly to a 3-D surface without the need for a substrate carrier). Considering this, the Institute will focus its efforts on solutions in the space combining silicon and flexible, stretchable, or conformable systems with a significant component of additive processing as part of the design. Proposals and approaches that target pure “printed systems” and additive processing of organic transistors or other logic systems (metal oxide, carbon nanotubes) as their primary focus will most likely be considered at too low of a TRL for Institute Project Calls as of 2017. Conversely, approaches that appear to be incremental advancements on currently mature manufacturing technologies will potentially be considered at too high a TRL/MRL level to be considered for Institute funding (such as a traditional flexible printed circuit board approach utilizing solely etched copper for conductors and solder assembled COTS packaged die for the active components at the system level).

4 Technical Working Groups

The following is a summary of the NextFlex Technical Working Groups, which may help in understanding the needs of the FHE community.

1. **Human Health and Performance Monitoring Systems.** Wearable, unobtrusive, and non-invasive devices for sensing and reporting physiological state of warfighters, athletes, geriatric populations, and medical patients in varied environments.
2. **Asset Monitoring Systems.** Conformal or integrated devices for sensing and reporting the state of infrastructure, vehicles, logistics, or the environment. Networks of sensors or devices for Internet of Things (IoT) concepts
3. **Integrated Array Antennas.** Patterning of efficient, printed wideband array elements on flexible or conformal surfaces and integration of thinned electronics with printed wideband array elements.
4. **Soft and Wearable Robotics.** Soft, compressible sensors and devices for robotic functionality, enabling active clothing, wearable robots or robotic tools, and advanced prosthetics. Improved robot-human interactions for surgery, manufacturing, and consumer electronics.
5. **Device Integration and Packaging.** Development of new tools for testing, slicing, and thinning of silicon wafers, as well as for electronic device and sensor integration on flexible, stretchable, and/or foldable substrates. Leveraging advanced precision printing and high-speed, automated pick-and-place for integration of device components, interconnects, and data lines.

6. **Printed Flexible Components and Microfluidics.** Developing and maturing contact and non-contact printing processes that support hybrid device concepts, including sensors and discrete device components. Printing and integration of microfluidic channels and fluidic control elements.
7. **Materials.** Manufacturing scale-up of conductive and dielectric inks and pastes, adhesives, encapsulant materials, and flexible substrates.
8. **Modeling and Design.** Leveraging existing software and hardware design capabilities, simulation techniques, and manufacturing process control tools, while also integrating novel manufacturing design rules for FHE.
9. **Standards, Testing, and Reliability.** Developing tools and test protocols to evaluate device-level and system-level FHE performance, as well as reliability in both commercial and military environments. Partnering with standards organizations and professional societies to develop specifications and standards.

5 NextFlex Technology Hub

NextFlex members have collaborated to create a shared FHE back-end integration facility for prototyping and low-volume manufacturing in a class 10,000 cleanroom. The facility, known as the “NextFlex Technology Hub,” includes both standard EMS and printing tools, as well as custom FHE manufacturing tools developed through prior Project Calls. Technology Hub capabilities are intended to provide a transition from development to production manufacturing for Institute members. The Technology Hub is an ideal platform to integrate and collaborate across projects to strengthen long-term capabilities for the FHE community. When possible, proposal teams are encouraged to:

- Leverage the FHE manufacturing and testing capabilities in the NextFlex Technology Hub during the execution of the project, and
- Demonstrate newly developed FHE manufacturing processes on the Technology Hub tools. The facility may also be appropriate for TPD projects. Proposal teams may receive more information about the Technology Hub by contacting opencall@nextflex.us.

6 Manufacturing USA—A New Way of Doing Things

Proposers with experience in government funding should take special note that the ways in which NextFlex and Manufacturing USA institutes operate may be quite different than what organizations may be accustomed to.

For small businesses, the NextFlex development projects should not be compared to SBIR, STTR, NIH, or other similar programs. The objective is not to develop a specific product, but rather to solve a common gap that many companies in the space are facing.

Research institutions familiar with NSF or NIH funding should note that NextFlex projects are designed around time-bound and measurable deliverables with clear performance specifications. If these cannot be established at the outset of the project, the subject matter under consideration may be of too low an MRL and thus more suitable for an NSF-type proposal. For those accustomed to government acquisitions, these programs are aimed at co-funded development and thus a cost share element is required. Additionally, project funding will

follow a cost reimbursement agreement with an approved overhead rate methodology. Commercial rates or profit (fee) are not suitable for funded project submissions.

Cross-Institute Collaboration

As of 2017, 14 Manufacturing USA institutes exist in various technology areas. Proposals that enable collaboration between Institute programs and have access to funding from more than one Institute should be identified by the proposers for the consideration of the reviewer base, as collaboration across technology fields with strong market demand is always encouraged. If the proposed work will leverage investments from other consortia or funding agencies, either domestic or international, such information should be indicated in the proposal. In such cases the minimum cost share requirements must be met.

7 Manufacturing Thrust Areas and Technology Platform Demonstrators

NextFlex views efforts falling into two broad categories: **Manufacturing Thrust Areas (MTA)** and **Technology Platform Demonstrators (TPD)**. Each of these have requirements to ensure their use and dissemination by the membership. It is important that white papers clearly indicate whether they are designed to support an MTA or TPD.

7.1 Manufacturing Thrust Area (MTA)

The objectives of this topic area are to develop and qualify manufacturing processes, methods, or tools identified as FHE needs, as determined via roadmapping and discussions with TWG leads and member companies. The processes and the tools developed will have a considerable impact on the manufacture of low-cost, reliable systems for a wide range of military and commercial applications.

Any development of software tools should include licenses or provisions to allow NextFlex member companies and Institute personnel to access and use the tools for development purposes, and it is required that third-party licensing or maintenance costs required to operate the tools will be considered by the proposal team and addressed as part of the proposal.

Process development-oriented projects should document processes at a level of sufficient detail that is reliably replicable and that the developments may be included in manufacturing guidelines for relevant processes in the future.

Specifically, MTA topics shall include, but are not limited to, the following deliverables:

1. Materials Database inputs at quarterly reporting intervals following the acquisition of the data. The Materials Database is a data repository being created by the NextFlex community to capture results from R&D activity.
2. A flow chart of the process steps and design information (such as drawings, CAD files, etc.) for device fabrication or process repetition.
3. Relevant process information including:
 - a. Resolution, thickness, and material properties (e.g., sheet resistance) that can be obtained with the developed recipe.

- b. Tolerance and yield of components, along with a comparison to device manufacturing processes that are currently used in the industry.
 - c. Consistency of print quality (line edge raggedness, loss or gain in dimension, uniformity in thickness and layer roughness) of the layer(s) in the device.
 - d. Consistency in device properties (resistance, capacitance, inductance, etc.), along with a comparison to similar devices that are commercially available.
 - e. Optimized print equipment parameters (print speed, ink volumes, ink viscosity, curing conditions, print environment, etc.).
 - f. Mechanical constraints (e.g., tensile strength, bending) of the printed devices.
4. Details of the method of test and measurement performed during development to establish TRL and MRL advancements.
 5. Identification of the specific task and outcome that results in TRL and/or MRL advancements.
 6. Cost model framework for the proposed manufacturing technique.

7.2 Technology Platform Demonstrator (TPD)

Flexible Hybrid Electronics TPDs are used to highlight technology capabilities based on FHE manufacturing processes. The technology platform projects are not intended to solve specific technical challenges nor result in product development, but rather are an opportunity to showcase FHE capability and manufacturing technologies broadly with the intention of encouraging designers and OEMs to incorporate these technologies into their future products. TPD programs are encouraged to demonstrate FHE manufacturing relevance to funded DOD programs of record and/or commercial product opportunity. In addition to highlighting technology capability, TPDs will also facilitate the identification of critical and pervasive manufacturing gaps to productize the demonstrated technology. Again, the proposals should fall within a TRL 4 to TRL 7 range. TPD projects should produce a minimum set of functional prototypes as outlined in the topic descriptions and deliver them to NextFlex for testing and demonstration purposes. In addition to the prototypes, TPD projects will provide the following deliverables:

1. Prototype specifications include:
 - a. Description of the capability provided by the TPD or manufacturing process.
 - b. Expected size, weight, and volume of the TPD.
 - c. Expected operating environment and range to be evaluated during the effort.
 - d. The approach to powering the TPD and methods for recharge, or battery replacement, if appropriate.
 - e. Data acquisition approach and communication protocols, if appropriate.
2. Materials Database inputs at quarterly intervals following the acquisition of the data.
3. A flow chart of the process steps and design information (such as drawings, CAD files, etc.) for device fabrication or process repetition for R&D purposes. This information will include, but not be limited to: schematics, component bill of materials, netlist, layouts, print files, materials used, manufacturing methods, tools and process information, as well as programming information and any source code or assembly language code and information on compatible compilers and boot loaders for the microcontroller (if applicable).
4. Details of the method of test and measurement performed during development to establish TRL and MRL advancements.
5. Identification of the specific task and outcome that results in TRL and/or MRL advancements.

8 White Paper Overview

White paper submissions should begin with description of the proposed idea and must answer the following questions:

1. What specific problem will the solution address? What is the current state of the art? And what will be advanced by this proposal (include quantitative metrics wherever possible)?
2. Why is this proposal the best solution to the problem? Why is this the strongest team to accomplish it? And how is the solution economically scalable, including the specific commercialization approach?
3. Why is solving this problem of value to the FHE ecosystem and to the NextFlex mission?

The white paper must also contain a high-level budget, timeline, and description of the teaming partners, and—inclusive of supporting materials—it should not exceed four pages. Preference will be given to industry-led proposals. Providing specific evidence of current TRL and MRL is required, and providing samples is strongly encouraged if invited to submit a full proposal.

This is not a Request for Proposal; this is a Request for Ideas only.

Awards depend on funding availability and the invitation to submit a full proposal. This Open Project Call is not to be construed as a commitment by NextFlex, and the Institute will not pay for the information solicited.

Proposals requesting core federal funding to purchase capital equipment to place at a site other than the NextFlex Technology Hub are not appropriate for the Open Project Call.

Funding Availability

To ensure that the Institute distributes its limited available resources for Open Project Calls to the maximum number of need areas, and to avoid impacting the primary competitive Project Call process, there will be a maximum funding request amount not to exceed \$400,000 of federal funding for Open Project Call submissions.

White papers will be evaluated by Institute staff, government participants, or select technical advisers based on the specific expertise needed to evaluate the proposed topic area. Lower value funding requests for a given scope of work will be given priority, both as a value analysis, as well as the ability to address more needs with available funding.

The Open Project Call may also include government agency-funded projects with total federal funding determined by the sponsoring agency.

Cost Share on Core-Funded Projects

Cost share can be cash or in-kind contributions of at least 1:1 according to the requested federal funding.

Process

Once the white paper is submitted, proposers will receive an e-mail confirming receipt by NextFlex. Once reviewed, a submitted white paper will receive one of three responses:

1. The topic is of interest, and the NextFlex community would be interested in a full proposal for funding consideration.
2. The topic is not of interest based on current NextFlex focus and membership.
3. The topic is of future interest, but is not currently a funding priority.

At its discretion, NextFlex may provide feedback to proposers, but shall have no obligation to produce a written review of white papers.

Format Guidelines

To maintain consistency from submission to review and approval process, please follow the guidelines provided below:

1. **Email** - The proposer shall submit one electronic copy of the white paper to opencall@nextflex.us.
2. **Figures, graphs, images, and pictures** - Figures and tables must be numbered and referenced in the text. They should be of a size that is easily readable and may be in landscape orientation and fit on an 8.5 x 11-inch size paper.
3. **Font** - Use easy to read font, such as Times New Roman or Arial (10-point minimum), single-spaced. Smaller font may be used in figures and tables, but must be legible.
4. **Page Layout** - The white paper and proposal document must be in portrait orientation, except for figures, graphs, images, and pictures. Pages shall be single-spaced, 8.5 x 11 inches, with at least one-inch margins on both sides, top, and bottom.
5. **Page Limit**
 - a. The main body of the white paper is limited to four pages.
 - b. The page limit does not include the coversheet.
 - c. White papers that exceed these guidelines may not be reviewed.
6. **Contents** - The white paper should be comprised of:
 - a. Coversheet. Complete and reproduce the table shown in Appendix A in RFI.
 - b. Main Body / Required Sections
 - i. Background and Need
 - ii. Technical Objectives, Scope, and Approach
 - iii. Work Plan
 - iv. Commercialization Strategy
 - v. Budget and Cost Share

Please do not provide reference appendices or other supporting materials; these will be requested separately if the paper is of interest.

Guidelines Regarding Deliverables

As the definition of MRL 4 indicates, a lab prototype exists, and if the white paper is of interest, submitters will be requested to provide a sample to NextFlex that represents the foundational work being described. If the white paper indicates the creation of demonstrators, proposers should anticipate providing at least 25 units to ensure that scalable manufacturing methods are used.

The white paper should clearly identify current capability and the quantitative target specifications that will determine success of the project.

It is imperative that white papers define milestones/tasks that are tangible, measurable, and demonstrable. Specifications for each milestone/task achievement must be clearly defined, as well as the starting state-of-the-art for the same features that the project improves. Examples of tangible milestones/tasks may include physical samples, written reports containing collected data, or live demonstrations of functionality.

9 Full Proposal Overview

PER SECTION 8 “WHITE PAPER OVERVIEW,” SUBSECTION “PROCESS,” do not submit a full proposal until two conditions are satisfied: 1) a white paper has been submitted, and 2) the white paper topic has been determined to be of interest, and NextFlex has explicitly invited a follow-up full proposal.

Before beginning work on your full proposal, please schedule a conference call with the NextFlex to ensure understanding of the requirements. This is not a typical government grant or contract opportunity—clarifying questions, request for guidance, and dialogue are encouraged during the process of the proposal preparation via opencall@nextflex.us.

The Open Project Call full proposal format follows that of full proposals in the traditional NextFlex competitive Project Call process. It is an expanded version of the white paper with detailed explanation and supporting documents. The funding requested in the full proposal should not exceed the amount requested in the white paper.

The main body of the full proposal should be limited to 25 pages, excluding cover page and appendices. Please ensure that your proposal clearly identifies the current capability and the quantitative target specifications that will determine success of the project.

The full proposal shall comply with the following content and structure, with budget sheets completely filled and consistent with the requested format provided herein:

9.1 Introductory Section

Excluded from 25-page limit.

- Page I: Cover Page (see Appendix A in RFI)
- Page II: Table of Contents
- Page III-IV: Executive Summary—A succinct summary of no more than two pages articulating the big picture problem being addressed, proposal objectives, relevance to FHE, approach that will address all critical technical and non-technical aspects, expected outcome, and overall cost/cost share information.

9.2 Main Body / Required Sections

The main body should not exceed 25 pages, excluding appendices. Page counts included for guidance only; the total number of pages is more important than the page count in each section.

1. **Background and Need** (recommended about 2 pages)
 - 1.1. Identify the FHE Opportunity and Proposed Solution
 - 1.2. Describe Background and Current State-Of-The-Art

- 1.3. Gap Analysis and Problem Definition
2. **Technical Objectives, Scope, and Approach** (recommended about 5 pages)
 - 2.1. Technical Objectives
 - 2.2. Technical Scope and Approach
 - 2.3. Innovative Claims
 - 2.4. Performance Metrics to assess the deliverables for outcome
 - 2.5. Key Target Specifications for critical technical outcome
3. **Work Plan** (recommended about 5 pages)
 - 3.1. Project Schedule
 - 3.2. Detailed Description of Milestones, Tasks, and Deliverables
 - 3.3. Project Risk Assessment and Mitigation Plan
 - 3.4. Project Management Approach—Roles and Relationship of Key Personnel
4. **Commercialization Strategy** (recommended about 4 pages)
 - 4.1. TRL/MRL Assessment (current state of the technology and expected level to be achieved and explanation of how the proposed work will advance the TRL/MRL)
 - 4.2. Market Analysis and Business Case for Proposed Technology, including relevance to the FHE ecosystem
 - 4.3. Manufacturing Partners and Approach
 - 4.4. Tool Accessibility to NextFlex Members and Broader Ecosystem for manufacturing/test tools and software tools only
 - 4.5. IP: Existing Portfolio and Future Strategy (related to the proposal topic)
5. **Budget Justification and Cost Share** (recommended summary about 1 page; Excel workbook referenced in Appendix B)
 - 5.1. Labor (by staff position), materials, overhead, including overhead rates—each divided by source or funds. Must use the NextFlex Cost Calculations spreadsheet for required format. Attach tabs to the spreadsheet with detail behind the summary figures.
 - 5.2. Value and Quality of Cost Share
6. **Capability to Meet Technical and Business Goals** (recommended about 3 pages)
 - 6.1. Key Personnel Experience and Qualifications
 - 6.2. Prior work toward this specific effort
 - 6.3. Relevant Facilities and Equipment Infrastructure
 - 6.4. Three-year Financial Performance Track—not applicable to established corporations/academic institutions
7. **Appendix** (as needed, not included in page total)
 - 7.1. Bio-sketches
 - 7.2. Facilities and infrastructure relevant to the proposal
 - 7.3. Technical references and list of patents
 - 7.4. Letters of support
 - 7.5. Budget workbook per attached workbook template
8. **Single Page PPT Slide Project Description** (found in the Reference Documents section at <https://www.nextflex.us/project-call/open-project-call/>)

10 Administrative Topics

10.1 Confidential Information

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 technical merits. While a best effort will be made to restrict proposal information to those with a need to know during the review

process, it is recommended that the inclusion of proprietary information be clearly marked and be limited to the minimum necessary to convey the highlights of the technical approach.

10.2 Financial and Cost Share Requirements

Development agreements generally will be awarded as cost reimbursement, not-to-exceed contracts, with payments to be made on achievement of tangible milestones or measurable objectives as presented in the proposal. If your company has a U.S. government-approved rate structure, please use it. The methods used to value cost share 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. Overall guidance on the working principles and requirements of cost-share (in-kind cost share, and cash and cash-equivalent cost share), including various regulations governing federally funded programs are available in a separate document, "Cost Share Definitions and Guidance" found in the sidebar of <https://www.nextflex.us/project-call/open-project-call/>.

10.3 Work Requirements

To submit a response to the Open Project Call and subsequently to be considered for an award, the following requirements must be met:

- Proposal teams should include at least one corporate/industrial organization and are encouraged to be industry-led whenever possible and appropriate.
- The company or composite team of companies/government labs/academics must have a significant presence in the U.S. in the form of R&D activities and/or manufacturing. One-hundred percent of the work activity (funds) must be spent within U.S. operations.
- The company or companies must be committed to delivering the developed products and provision to the U.S. Flexible Hybrid Electronics and systems manufacturing 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 the latter case, a pathway to commercialization must be envisioned and described.
- Process development projects should include sufficient documentation that the method is replicable at the NextFlex Technology Hub, NextFlex Node, or member's facility, or all the above, as appropriate.
- Test methods, materials data, or design tools should be foundational and be available for incorporation into tools for the advancement of FHE to foster collaboration.
- Total project funds must be matched at a minimum of 1:1. Teams may determine how to divide that requirement among their members. The cost share is defined in the Membership Participation Agreement to include matching share of the development cost in cash and in-kind contributions, e.g., labor and materials, of at least 50%. The funding requested in the full proposal can decrease but cannot increase by more than 10% of that requested in the white paper and any variance must be explained.

10.4 Membership Requirement

To qualify for funding, companies, organizations, and their partners selected for an award and that are not yet an institute member, must subsequently join NextFlex at the appropriate membership level (not Observer Level). Only suppliers from whom standard parts, components, or materials are acquired based on a part number from their catalog are exempted from this

requirement. It is the responsibility of the project lead(s) to communicate this requirement to their respective partners, and coordinate their membership process with NextFlex. Here is the URL for potential members: <https://www.nextflex.us/get-involved/membership-inquiry-form>.

11 Full Proposal Evaluation Criteria

Full proposals are evaluated based on the criteria as outlined in the table below.

#	Section	Criteria
1.0	Background and Need	(1) Problem statement and innovative solution
2.0	Technical Objectives	(2) Technical scope and approach
		(3) Logical technical plan; key deliverables and specifications
3.0	Work Plan	(4) Project organization
		(5) Probability of success
4.0	Commercialization Strategy	(6) Business case/value proposition
		(7) MRL/TRL assessment
		(8) Manufacturing approach
		(9) Tool accessibility (hardware and software proposals only)
5.0	Budget Justification and Cost Share	(10) Cost and cost realism
		(11) Value and quality of cost share
6.0	Capability to Meet Technical and Business Goals	(12) Experience of personnel; quality of relevant facilities

Proposers are encouraged to discuss plans to utilize the NextFlex Technology Hub or leverage NextFlex technical staff while developing their proposals.

12 Contact Information

Communication and questions during the proposal period and submission of proposals should be directed by email to opencall@nextflex.us.

13 Reference Documents Kit

The following reference documents are in the sidebar of the Open Project Call webpage at <https://www.nextflex.us/project-call/open-project-call/>:

1. Open Project Call
2. MRL/TRL Definitions

3. MRL Webinar
4. Cost Calculations Template
5. Cost Share Definitions and Guidance
6. Membership/Partnership: <https://www.nextflex.us/get-involved/membership-inquiry-form/>
7. Summary PPT Submission Template
8. Online Cover Sheet: https://nextflex.formstack.com/forms/openpc_coversheet (white paper cover sheet; full proposal cover sheet)

14 Glossary of Terms

No.	Term	Definition
1	ADP	Agency Driven Project
2	DOD	Department of Defense
3	EMS	Electronic Manufacturing Services
4	FHE	Flexible Hybrid Electronics
5	GC	Governing Council
6	IOT	Internet of Things
7	MRL	Manufacturing Readiness Level
8	MTA	Manufacturing Thrust Areas
9	PC	Project Call
10	RFI	Request for Ideas
11	SME	Subject Matter Expert
12	TC	Technical Council (comprised of SMEs and Tier 1 and Tier 2 members from industry and academia)
13	TPD	Technology Platform Demonstrator
14	TRL	Technology Readiness Level
15	TWG	Technical Working Group

15 Appendix A: Coversheet Template

A coversheet must be attached to the front of the white paper and the full proposal (if invited to submit a full proposal). Here is how:

- Go to https://nextflex.formstack.com/forms/openpc_coversheet.
- Fill out the form and click the “Submit” button.
- A copy of the completed coversheet will be emailed to the Project Leader listed in the form.
- Attach that email to front of the white paper or full proposal.

The following information should be readily available before completing the coversheet online:

Project Title	
Date of Submission	
Proposal Stage (White Paper or Full-Proposal)	
Project Leader	
Organization, Department, and Address	
DUNS/Cage Code	
Phone Number	
Email Address	
Non-Industry Partnering Organization(s)	Provide full name, location, and other details
Industry Partnering Organization(s)	Provide full name, location, and other details
Supplier/Subcontract Organization(s)	
Project Topic Category	
MRL Level - Start/Finish	Include both start and finish levels
TRL Level - Start/Finish	Include both start and finish levels
NextFlex Membership Status & Level	
Total Project Cost:	\$
Cost Share (in-kind, labor, material, etc.)	\$
Cost Request from NextFlex	\$
Project Duration	XX months

16 Appendix B: Instructions for Filling Out Full Proposal Cost Calculations Excel Workbook

Due to the nature of federal funding for Institute projects, there are specific requirements for planning and tracking project-related spending. To support those, please lay out the project financials in the provided format. While budget details will be inputted into the Excel tables provided, the following should serve to clarify what needs to be documented and how:

Overall the following areas are important for the Institute to understand:

- Total Project Cost
- Total Cost Share, Including Percent and Amount of Funding Requested from NextFlex
- Type of Costs
- In-kind Contributions and Types Thereof
- Hours and Rates for Labor
- Any Equipment Purchases Planned
- Materials Purchases
- Travel Expenses

In addition to the above detail, the Institute will need to understand spending by each calendar year and a breakdown by lead and partners.

The primary objective of this supporting workbook is to ensure that reviewers can adequately identify all details of the proposal. Proposals that are awarded will be subject to further documentation and record retention requirements which will be detailed to the project lead following the award announcement.

If the lead or any partners of the proposal team have audited indirect rates for labor, please use those.

If you have any additional questions on how to prepare the cost calculations workbook, contact opencall@nextflex.us.