NEXTFLEX PROPOSER'S DAY:
PROJECT CALL 7.0

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AGENDA

- Additional Resources
- NextFlex Background
- PC 7.0 Process, Schedule, and Themes
- PC 7.0 Topics
- Evaluation Criteria
- Q&A
- PC 7.0 Teaming Event

ADDITIONAL RESOURCES

PC 7.0 Events

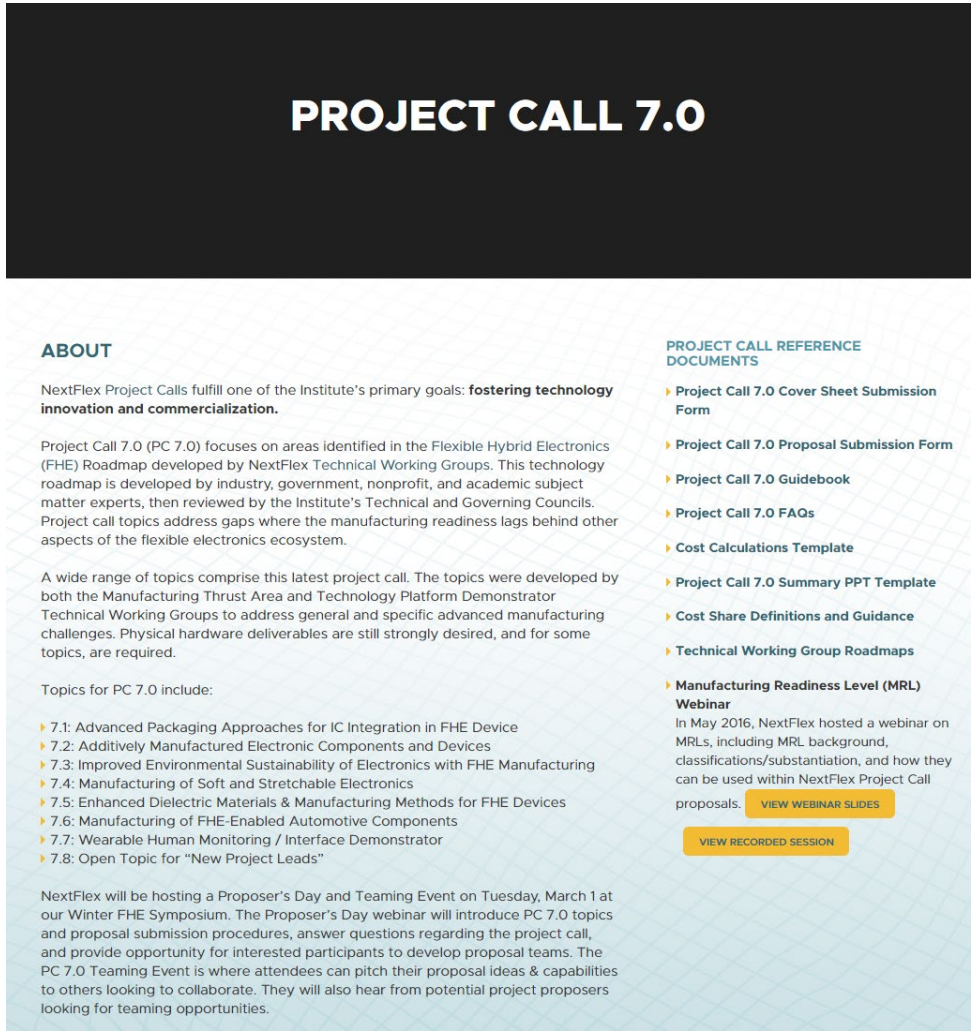
- PC 7.0 Virtual Teaming Event – to follow

PC 7.0 Guidebook

- Definitive reference for PC 7.0

Still have questions?

- proposal@nextflex.us



PROJECT CALL 7.0

ABOUT

NextFlex Project Calls fulfill one of the Institute's primary goals: **fostering technology innovation and commercialization.**

Project Call 7.0 (PC 7.0) focuses on areas identified in the Flexible Hybrid Electronics (FHE) Roadmap developed by NextFlex Technical Working Groups. This technology roadmap is developed by industry, government, nonprofit, and academic subject matter experts, then reviewed by the Institute's Technical and Governing Councils. Project call topics address gaps where the manufacturing readiness lags behind other aspects of the flexible electronics ecosystem.

A wide range of topics comprise this latest project call. The topics were developed by both the Manufacturing Thrust Area and Technology Platform Demonstrator Technical Working Groups to address general and specific advanced manufacturing challenges. Physical hardware deliverables are still strongly desired, and for some topics, are required.

Topics for PC 7.0 include:

- 7.1: Advanced Packaging Approaches for IC Integration in FHE Device
- 7.2: Additively Manufactured Electronic Components and Devices
- 7.3: Improved Environmental Sustainability of Electronics with FHE Manufacturing
- 7.4: Manufacturing of Soft and Stretchable Electronics
- 7.5: Enhanced Dielectric Materials & Manufacturing Methods for FHE Devices
- 7.6: Manufacturing of FHE-Enabled Automotive Components
- 7.7: Wearable Human Monitoring / Interface Demonstrator
- 7.8: Open Topic for "New Project Leads"

NextFlex will be hosting a Proposer's Day and Teaming Event on Tuesday, March 1 at our Winter FHE Symposium. The Proposer's Day webinar will introduce PC 7.0 topics and proposal submission procedures, answer questions regarding the project call, and provide opportunity for interested participants to develop proposal teams. The PC 7.0 Teaming Event is where attendees can pitch their proposal ideas & capabilities to others looking to collaborate. They will also hear from potential project proposers looking for teaming opportunities.

PROJECT CALL REFERENCE DOCUMENTS

- **Project Call 7.0 Cover Sheet Submission Form**
- **Project Call 7.0 Proposal Submission Form**
- **Project Call 7.0 Guidebook**
- **Project Call 7.0 FAQs**
- **Cost Calculations Template**
- **Project Call 7.0 Summary PPT Template**
- **Cost Share Definitions and Guidance**
- **Technical Working Group Roadmaps**
- **Manufacturing Readiness Level (MRL) Webinar**

In May 2016, NextFlex hosted a webinar on MRLs, including MRL background, classifications/substantiation, and how they can be used within NextFlex Project Call proposals. VIEW WEBINAR SLIDES

VIEW RECORDED SESSION

https://www.nextflex.us/project-call/project-call-7-0/

NEXTFLEX BACKGROUND

PROJECT CALL 7.0

INSTITUTES BUILD POWERFUL CONNECTIONS

Manufacturing USA connects people, ideas and technology to solve industry-relevant advanced manufacturing challenges. The 16 Manufacturing Innovation Institutes, 9 of which are funded by the Department of Defense, are enhancing industrial competitiveness and economic growth and strengthening our national security. The Institutes have three shared goals:

1. Advance the manufacturing & technology process to full scale production

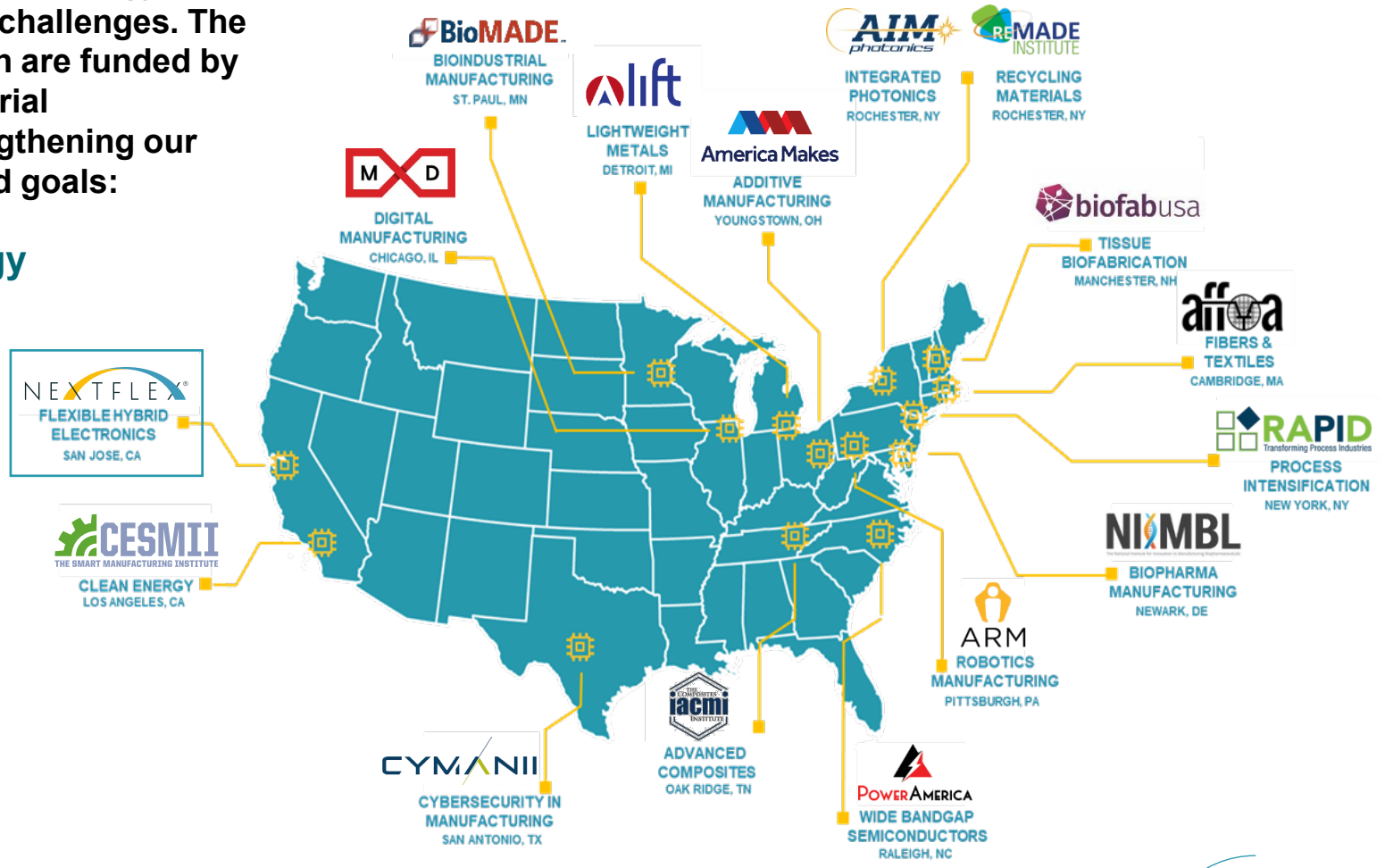
Partner with industry to investment in applied research and industrially-relevant manufacturing technologies

2. Create a robust commercial ecosystem around the technology

Establish regional manufacturing hubs and ecosystems for long-term, national impact

3. Secure human capital

Develop manufacturing-specific education and workforce development resources to ensure innovative technology is manufacturable

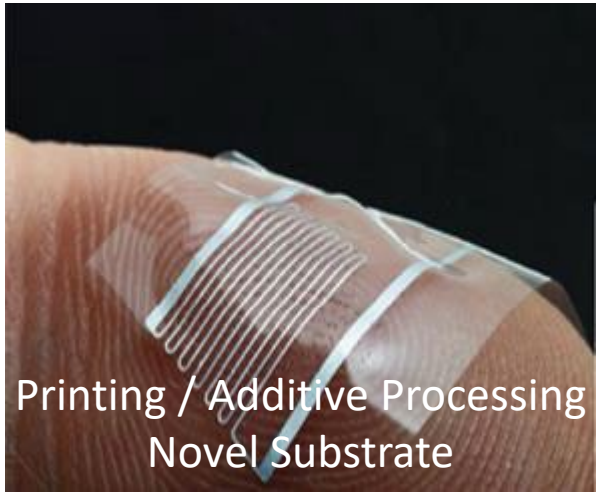


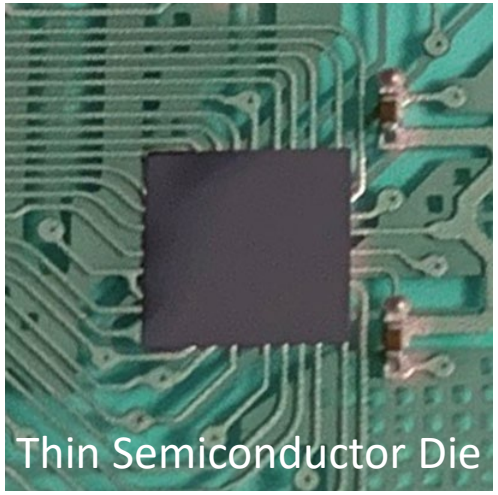
NEXTFLEX: A PUBLIC-PRIVATE PARTNERSHIP

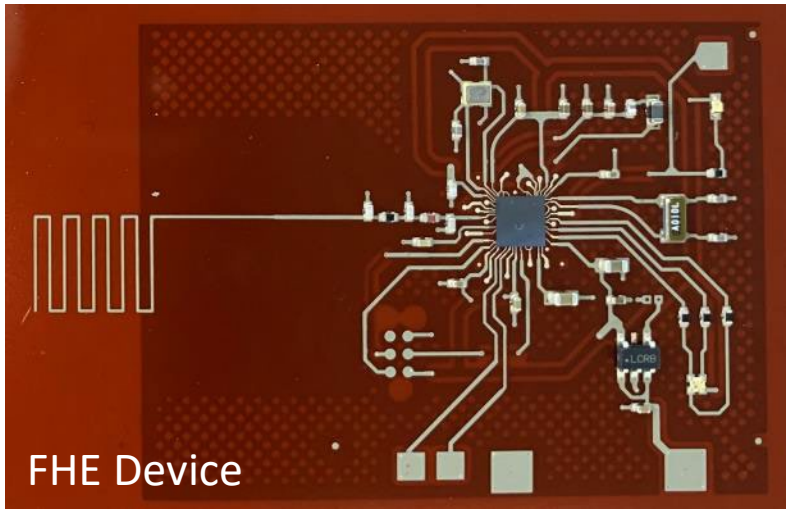
Established	28 August 2015
Hub Location	San Jose, California
Industry & Academic Members	>100
Government Agencies Engaged	>20 DoD & OGAs
First Phase	2015 – 2021
Core Federal Funding	$75 million
Committed Cost Matching	$96 million
Agency Projects	>$41 million
Second Phase	2020 – 2027
Core Funding	$27 million
Committed Cost Matching	$27 million
Planned Agency Funding	$100 million

WHAT IS FHE?

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.

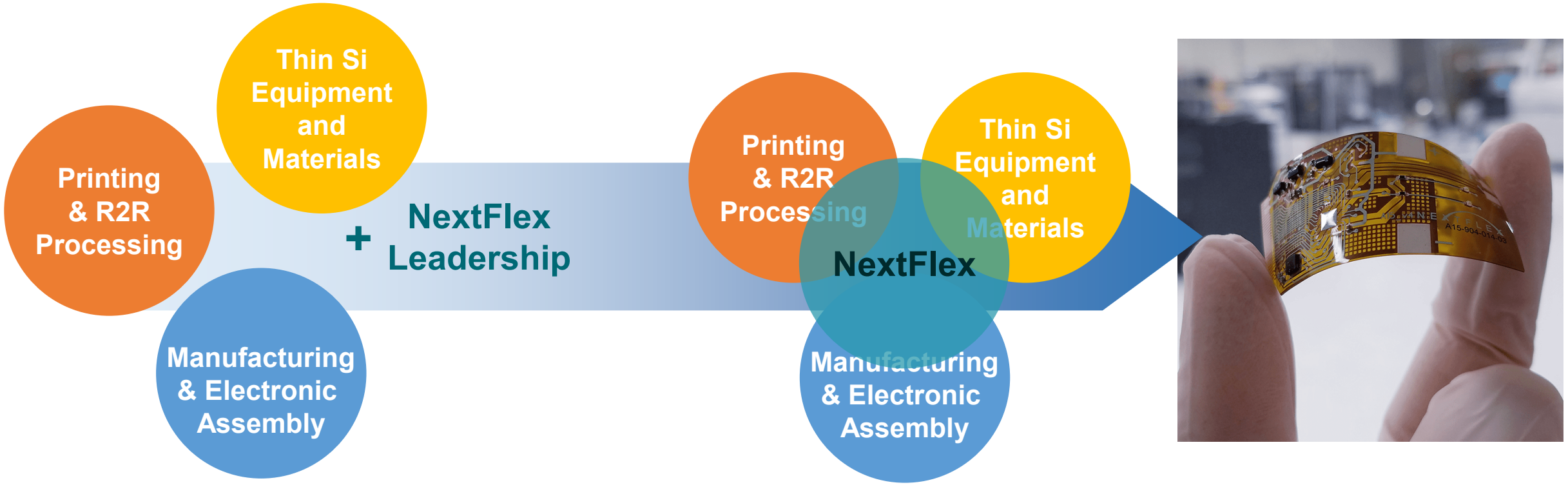






FHE devices conform to any shape, but are also bendable, twistable, and stretchable. We primarily use the term “flexible,” but are also interested in flexible, stretchable, conformable, and direct-deposited circuitry (circuitry applied directly to a 3D surface without the need for a substrate or carrier, also called conformal).

NEXTFLEX FHE VISION



Objectives:

- **Develop the next phase of the FHE manufacturing ecosystem**
- **Accelerate FHE adoption and manufacturing in the United States**
- **Emphasize manufacturing processes leading to DoD technology transitions**
- **Develop a robust FHE workforce**

DIVERSE AND GROWING MEMBERSHIP: 105 MEMBERS

NEXTFLEX

CORPORATE

TIER 1

Lockheed Martin, Boeing

TIER 2

Eastman, GE, Siemens

TIER 3

Acellent, ACI Materials, Aline, Analog Devices, Anthro Energy, Aptima Human-Centered Engineering, Averatek, BASF We create chemistry, Blueshift, Brewer Science, Carpe Diem Tech, Chem Cubed, Croda, Disco, DuPont, E Ink, electroninks, Epicore Biosystems, esi, flex Live Smarter, Dimatix Fujifilm, General Dynamics Mission Systems, Hewlett Packard Enterprise, Human Systems Integration, IDS, Infinite Corridor Technology, innovize let's make it better, Integrity Industrial Ink Jet Integration, ITN Energy Systems, Jabil, Komori Kando Beyond Expectations, Kraetonics, Liquid Wire, Lubrizol, LUX, Matternet, MesoScribe Technologies, MicroConnex, molex, Nano Dimension, NanoOPS, Northrop Grumman, NovaCentrix, NovaGard, nScrypt, ON Semiconductor, Optomec, parc A Xerox Company, plasmatreat, Promex, Raytheon Technologies, SafeSense Technologies, Saint-Gobain, Shoei Chemical Inc., SI2, Space Foundry, Sunray Scientific, Taiyo America, Tapecon, tekna, TTM Technologies, UES Excellence in Science & Technology, Universal Instruments, Vivonics, Gore

ACADEMIC / NON-PROFIT

Auburn University Samuel Ginn College of Engineering, Binghamton University State University of New York, Georgia Tech, Northeastern University, UMass Lowell, Purdue University, University of Washington, Western Michigan University, Boise State University, Drexel University, Evergreen Valley College, EWI We Manufacture Innovation, Lorain County Community College, RIT, Stanford University, University at Buffalo The State University of New York, Berkeley University of California, UC San Diego, University of Delaware, University of Maryland, UMass Amherst, UMass Dartmouth, Penn, The University of Texas at Austin Cockrell School of Engineering, WPI

OBSERVER

AIONX clean SURFACES, IMPRINT ENERGY, Micro Materials, Millibatt, NTV TSA, SAFI-TECH, systeMECH, New Dalton Group Development Consulting

HONORARY

BESTRONICS, BLACH CONSTRUCTION, FlexTech, nbmc Nano-Bio Manufacturing Consortium, City of San Jose Capital of Silicon Valley, SEMI Technology Program Innovating Manufacturing

BRINGING TOGETHER THE FHE ECOSYSTEM

NEXTFLEX

DESIGN/MANUFACTURING

JABIL, EWI (We Manufacture Innovation), flex (LIVE SMARTER), Averatek, innovize (let's make it better), Mentor (A Siemens Business), TTM Technologies, molex, tekna., MESOSCRIBE TECHNOLOGIES, INFINITE CORRIDOR TECHNOLOGY, TC TAPECON, SAFESENSE TECHNOLOGIES, Promex (Microelectronics Assembly Technologies)

EQUIPMENT

OPTOMEC, NOVACENTRIX, Universal Instruments, SCHMID, Space Foundry, APPLIED MATERIALS, systeMECH, Nano PS, CARPE DIEM TECH, FUJIFILM (Value from Innovation), KOMORI (Kando: Beyond Expectations), NANODIMENSION (Electrifying Additive Manufacturing), esi (Designed for Brilliance. Engineered for Production.), MICRO MATERIALS, Micro Materials Inc. (Think Thinner), plasmatreat, DDS

INDUSTRIAL/AEROSPACE

LOCKHEED MARTIN, GE, Raytheon, BOEING, GENERAL DYNAMICS (Mission Systems), NORTHROP GRUMMAN

MEDICAL/WEARABLE DEVICES

HUMAN SYSTEMS INTEGRATION, EPICORE BIOSYSTEMS, SMI, Vivonics, ALINE, APTIMA (Human-Centered Engineering), AIONX (makers of clean SURFACES)

RESEARCH

Hewlett Packard Enterprise, UES (Excellence in Science & Technology), parc (A Xerox Company)

DESIGN/COMPONENT MANUFACTURING

Acellent, ITN ENERGY SYSTEMS, Millibatt, IMPRINT ENERGY, E Ink, SRG GLOBAL (A Sensata Company), S2

MATERIALS

DUPONT, brewer science, CRODA, SUNRAY SCIENTIFIC, EASTMAN, BASF (We create chemistry), SHOEI, Lubrizol, SAINT-GOBAIN, BLUESHIFT, electroninks, TAIYO AMERICA (UNMATCHED INNOVATION), ACI MATERIALS, GORE, NOVAGARD, Liquid Wire, DISCO (Kiru-Kezuru-Migaku Technologies)

PROCESS TECHNOLOGY

MicroConnex, LUX

SERVICES

MATTERNET, NTV USA

INDUSTRY STANDARDS

semi | FlexTech

SEMICONDUCTOR

ON Semiconductor, ANALOG DEVICES

GOVERNMENT PARTNERS AND SUPPORTERS

NEXTFLEX

BARDA

CENTRAL INTELLIGENCE AGENCY

DARPA

DEFENSE CONTRACT MANAGEMENT AGENCY

DEFENSE INNOVATION UNIT

DEFENSE MICROELECTRONICS ACTIVITY

DEFENSE THREAT REDUCTION AGENCY

DEPARTMENT OF THE AIR FORCE

DEPARTMENT OF THE ARMY

DEPARTMENT OF DEFENSE

DEPARTMENT OF DEFENSE MANUFACTURING TECHNOLOGY PROGRAM

DEPARTMENT OF EDUCATION

DEPARTMENT OF ENERGY

NASA

NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

MISSILE DEFENSE AGENCY

LPS LABORATORY FOR PHYSICAL SCIENCES

FDA

DEPARTMENT OF THE NAVY

National Nanotechnology Initiative

NIH National Institutes of Health

NIST National Institute of Standards and Technology

NSF

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

Walter Reed National Military Medical Center

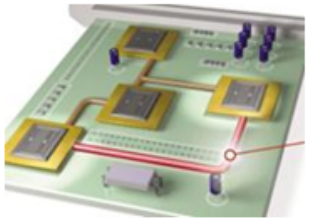
MANUFACTURING READINESS LEVELS

Definitional		Material Solution Analysis		Technology Development & Commercial Merit		Engineering & Manufacturing Development		
MRL 1 Mfg feasibility assessed	MRL 2 Mfg concepts defined	MRL 3 Proof of Mfg concept	MRL 4 Breadboard & manufacturing processes in a laboratory environment	MRL 5 Breadboard & component manufacturing in a relevant environment	MRL 6 Prototype, system & subsystem in production relevant environ-ment	MRL 7 Prototype, system & subsystem in operations and production environ-ment	MRL 8 Pilot line capability demon-strated; Ready to begin low-rate initial production	MRL 9 Low-rate production demon-strated; capability in place to begin full-rate production

MRL AND TRL RELATIONSHIPS

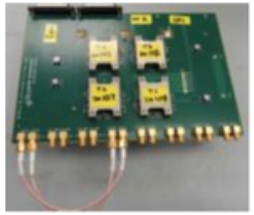
Pre-Material Solution Analysis			Materiel Solution Analysis	Technology Maturation and Risk Reduction		Engineering & Manufacturing Development		Production & Deployment	
MRL 1 Basic Mfg Implications Identified	**MRL 2** Mfg Concepts Identified	**MRL 3** Mfg Proof of Concept Developed	**MRL 4** Manufacturing Processes In Lab Env't	**MRL 5** Components In Production Relevant Env't	**MRL 6** System or Subsystem In Production Relevant Env't	**MRL 7** System or Subsystem In Production Representative Environment	**MRL 8** Pilot Line Demonstrated Ready for LRIP	**MRL 9** LRIP Demonstrated Ready for FRP	**MRL 10** FRP Demo'd Lean Production Practices in Place
TRL 1 Basic Principles Observed	**TRL 2** Concept Formulation	**TRL 3** Proof of Concept	**TRL 4** Breadboard in Lab	**TRL 5** Breadboard in Representative Environment	**TRL 6** Prototype in Representative Environment	**TRL 7** Prototype in Operational Environment		**TRL 8** System Qual	**TRL 9** Mission Proven

Breadboard



Focus Examples:
- **Technology and Industrial Base**
- **Materials**
- **Cost and Funding**

Brassboard



Focus Examples:
- **Design**
- **Process Capability and Control**
- **Quality Management**

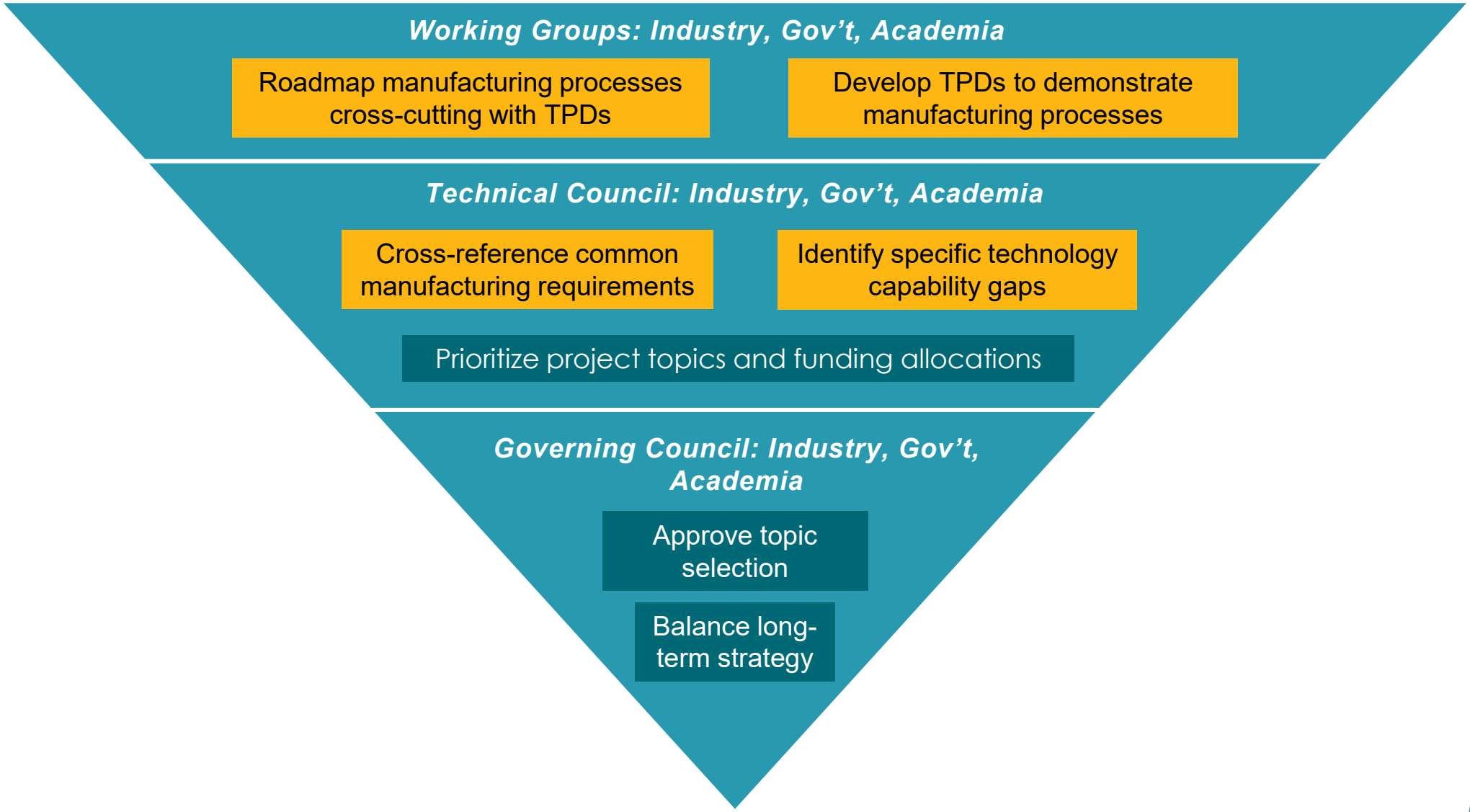
Production

Focus Examples:
- **Manufacturing Workforce**
- **Facilities**
- **Manufacturing Management**

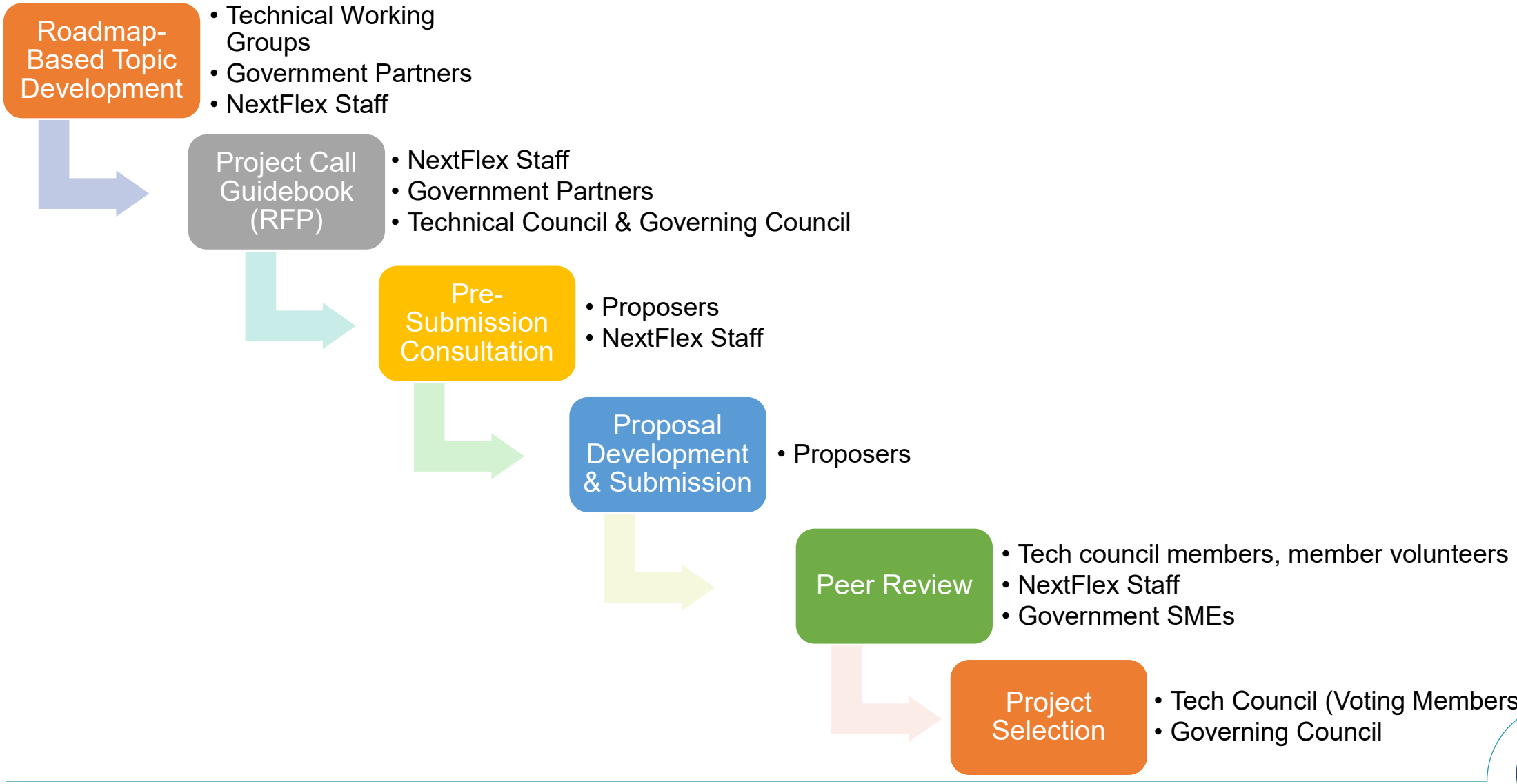
Slide adapted from AFRL Materials and Manufacturing Directorate

PROJECT CALL 7.0
PROCESS, SCHEDULE, AND THEMES

PROJECT CALL TOPIC DEVELOPMENT



PC 7.0 PROCESS



PROJECT CALL 7.0 OVERVIEW

New for PC 7.0

- Minor changes to proposal evaluation criteria and scoring to prioritize technical impact to the ecosystem
- Release of public summary of FHE Manufacturing Roadmap to provide non-members insight into technical areas of interest

Important Considerations

- Proposal process will be 1-stage (straight to full proposal) – there is no pre-proposal round
- Discussion with NextFlex during proposal development is strongly encouraged to ensure that proposals align to the goals of the topics
- NextFlex anticipates funding one or more project in each topic area; however, other outcomes are possible depending on the cost and quality of the projects proposed
- Given the clear focus on projects that have a near-term commercial impact, teams that are industry-led or have a strong industry partner as part of the commercialization plan will be favorably considered in the evaluation process.
- Proposals that fall within the topics area definitions that address DoD Modernization Priorities will be viewed favorably
- Prior to final granting of awards, recipients and their partners who are not already NextFlex members will be required to become members of the Institute and execute a development agreement
- NextFlex always welcomes suggestions for future project call topics; recommendations should be brought to the attention of the NextFlex TWGs

TECHNICAL TOPICS: ITEMS TO CONSIDER

- Proposals should build on and take advantage of developments from prior project calls, where appropriate, as well as the best available technology.
- Topics are focused on addressing manufacturing gaps identified in roadmaps.
- Total NextFlex + Agency Funds $5.4M
- Estimated total project value (with cost share) $11.5M
- NextFlex/Agency Funding ≤ $350k – $800k per topic
- Duration: 12 – 24 months (maximum varies by topic)

PROJECT FUNDING & NEXTFLEX MEMBERSHIP

- Minimum of 50% of each project's cost must be cost-share provided by recipients
- 50% minimum cost-share requirement is based on entire team – not individual contributors
- Cost share can include labor, materials, use of equipment, travel
- Any recipient of NextFlex funding must be a member
  - This applies to sub-recipients / project partners
  - Companies supplying standard COTS components or services (e.g. build-to-print) to team members are not required to be members of NextFlex.

MANUFACTURING USA – A NEW WAY OF DOING THINGS

Submitters 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 those to which proposers may be accustomed.

NextFlex development projects should not be compared to SBIR, STTR, NIH, or other similar programs, nor should they be compared to commercial customer activities. Unlike acquisitions programs, these efforts are aimed at co-funded development; thus, a cost share element is required.

NextFlex projects are designed around time-bound and measurable deliverables with clear performance metrics. 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 another funding mechanism.

The objective is not to develop a specific product, but rather to solve a common gap that many companies in the FHE manufacturing ecosystem are facing. Developments are reported to and benefit all members, so the approach taken is as important as the promised outcomes. The proposal evaluation criteria reflect this.

Project funding will follow a cost reimbursement mechanism. If the lead or any team partners have audited indirect rates, please use those. Commercial rates or profit (fee) may not be included in project submissions.

PC 7.0 IMPORTANT DATES

Event	Date
Project Call Announcement and Posting	02/22/2022
Optional PC 7.0 Proposers Day Webinar	03/01/2022
Teaming Event	03/01/2022
First date for optional pre-submission consultation	03/07/2022
Proposal Online Cover Sheet Due	04/07/2022
Proposal Submission Deadline	**04/14/2022**
Anticipated Technical Council Review	05/26/2022
Anticipated Governing Council Review	06/02/2022

PROJECT TOPICS

These projects focus on developing and qualifying manufacturing processes, methods, or tools identified as FHE needs via the roadmapping process and discussions with TWG leads and members. The processes and the tools developed will have a considerable impact on the manufacture of low-cost reliable systems for a wide range of defense and commercial applications.

Any development of software tools should include licenses or provisions to allow NextFlex members and Institute personnel.

Projects focused on process development must document those processes with enough detail that they are reliably replicable and that they may be included in manufacturing guidelines for relevant processes in the future.

These projects shall include, but are not limited to, the following deliverables:

- Material & Process Database inputs at quarterly reporting intervals following the acquisition of the data.
- A flow chart of the process steps and design information for device fabrication or process repetition.
- Relevant process information including material properties obtained, tolerance and yield with comparison to current industry processes, consistency of process specifications and device performance, and optimized equipment parameters.
- Details of the method of test and measurement performed during development to establish TRL and MRL advancements.
- Identification of the specific task and outcome that results in TRL and/or MRL advancements.
- Cost model framework and associated assumptions for the proposed manufacturing technique.

Reliability and standards cut across all topics; although not called out in every topic, all PC 7.0 proposals are encouraged to address these needs within their project plans.

PROJECT CALL 7.0 TOPICS

Topic #	Topic Description	Max Duration (months)	Max Funding *	Technical Working Group Alignment										
				Printed Components & Microfluidics	Materials	Device Integration & Packaging	Modeling & Design	Standard, Test & Reliability	Human Monitoring Systems	Asset Monitoring Systems	Integrated Array Antennas	Soft & Wearable Robotics	Flexible Power	Automotive
7.1	Advanced Packaging Approaches for IC Integration in FHE Devices	18	$450k	X		X								
7.2	Additively Manufactured Electronic Components and Devices	18	$450k	X		X								
7.3	Improved Environmental Sustainability of Electronics with FHE Manufacturing	18	$450k		X		X	X						
7.4	Manufacturing of Soft and Stretchable Electronics	18	$450k	X								X		
7.5	Enhanced Dielectric Materials & Manufacturing Methods for FHE Devices	18	$450k		X	X					X			
7.6	Manufacturing of FHE-Enabled Automotive Components	18	$450k			X		X		X				X
7.7	Wearable Human Monitoring / Interfacing Demonstrator	24	$800k						X			X		
7.8	Open Topic for "New Project Leads"	12	$350k	X	X	X	X	X	X	X	X	X	X	X

* Funding is from NextFlex or US Government agencies (indicated in topic description). Total program value must include the required minimum 1:1 cost share.

PROJECT CALL 7.0 TOPICS

BROADLY DEFINED TOPICS WITH EXAMPLE AREAS OF INTEREST

- Topics aim to advance FHE technology and fill gaps identified by the TWGs in the FHE Roadmaps. The outcomes of the projects that are selected are expected to have broad impact on both commercial and defense applications and to advance U.S. FHE manufacturing capability.
- Each topic has a maximum funding and duration; proposals that seek lower levels of funding and shorter duration are welcome.
- Topics are structured with a description that include all requirements followed by examples of proposal areas that would meet the topic area requirements and align to prioritized roadmap gaps. These examples are not sub-topics into which proposals must fit, and any proposal that meets the overall topic area requirements will be equally considered whether it addresses one of the examples or not. Moreover, a proposal may address only part of an example area and still be responsive to the Topic so long as it meets all requirements of the Topic.

TOPIC 7.1: ADVANCED PACKAGING APPROACHES FOR IC INTEGRATION IN FHE DEVICE

$450,000 maximum Institute funds / Up to an 18-month duration

Significant opportunities exist for development within the electronics packaging industry, as components continue to increase their capabilities, while shrinking in size. This enables system-on-chip architectures with high performance, multiple functionalities, all in significantly reduced footprints. Packaging approaches including heterogenous integration, 3D package-on-package component stacking, active interposers, and high-density interconnect component attach all show promise toward wide adoption of 2.5D and 3D electronic architectures. This topic seeks development and evaluation of advanced packaging approaches for IC integration in hybrid electronic devices, including those that are mechanically flexible, and based on FHE manufacturing processes, with specific interest in processes that can be transitioned to volume manufacturing-scale. Proposers must identify why the advanced packaging process is preferred over the state-of-the-art. Examples of possible approaches of interest include, but are not limited to:

a. High Density Flex Interconnects

b. Heterogenous Integration

TOPIC 7.2: ADDITIVELY MANUFACTURED ELECTRONIC COMPONENTS AND DEVICES

$450,000 maximum Institute funds / Up to an 18-month duration

Traditional printed circuit board (PCB) manufacturing is poised for a paradigm shift as additive hybrid electronics approaches to manufacturing increase in capability, yield, and throughput. There is significant demand from traditional PCB manufacturers to integrate additive processes and tools into existing workflows, though further development and standardization is needed for process integration to be widely adopted by domestic manufacturers. This topic seeks to address this gap and advance the development and integration of additive tools for electronic component manufacturing. Example areas of interest relating to additive electronics manufacturing are listed below but are not restricted to those specified.

a. Reliability Testing and Standardization of Additively Manufactured Circuits

b. Manufacturing of Embedded Printed Passive Components

c. Digital Manufacturing of Reliable Multilayer FHE Electronics

TOPIC 7.3: IMPROVED ENVIRONMENTAL SUSTAINABILITY OF ELECTRONICS WITH FHE MANUFACTURING

$450,000 maximum Institute funds / Up to an 18-month duration

FHE manufacturing technology presents opportunities to adopt materials and processes that are friendlier to the environment and ecologically sustainable. The full product life cycle from design to recycle / disposal all directly and indirectly have an environmental impact that needs to be evaluated so that cleaner, more sustainable materials and methods can deliver a near-term impact. This topic seeks to address sustainability in FHE and printed electronics manufacturing, which is an area with rapidly growing interest, but limited foundational efforts that establish the current state-of-the-art. Examples of possible approaches of interest include, but are not limited to:

a. Full Product Life Cycle Modeling for FHE and Printed Electronics

b. Repair of Printed FHE Devices for Reduced E-Waste Generation

c. Physical Integration of Flexible Batteries for Improved Electronics Recycling

TOPIC 7.4: MANUFACTURING OF SOFT AND STRETCHABLE ELECTRONICS

$450,000 maximum Institute funds / Up to an 18-month duration

Soft electronics show significant promise in several application spaces including wearable and textile-integrated electronics, soft robotics, and human-machine interfacing. This topic seeks development and evaluation of manufacturing techniques that will further enable soft and stretchable electronics. Examples of possible topics include:

a. FHE Interfaces for Rigid, Flex, and Stretch Components

b. 3D Printing of Active Soft Materials with Embedded FHEs

c. Manufacturing Soft Embedded Microchannels for FHE Devices

TOPIC 7.5: ENHANCED DIELECTRIC MATERIALS & MANUFACTURING METHODS FOR FHE DEVICES

$450,000 maximum Institute funds / Up to an 18-month duration

FHE require the use of materials (substrates, conductors, dielectrics, encapsulants/overmolds) that can reliability and predictably bend/flex depending on their intended application. This topic seeks demonstration and evaluation of dielectric materials and associated manufacturing workflows that will advance the space of a specific application field by utilizing advanced material sets with performance metrics not previously shown by FHE systems. This project will help to (a) define material properties to enable FHE at low and high-volume manufacturing, (b) expand material database inputs to include “real world performance” data and (c) develop product design guides which define materials, printing processes, and post-processing and assembly methods. Performance demands and packaging requirements are highly depended on their intended application/use-case and must be clearly defined by proposers. Example areas of interest are listed below but proposers are not restricted to those described.

a. Printable Dielectric Materials for RF Packaging

b. Encapsulation of Thin Dies on Flex / Stretch Substrates

TOPIC 7.6: MANUFACTURING OF FHE-ENABLED AUTOMOTIVE COMPONENTS

$450,000 maximum Institute funds / Up to an 18-month duration

Automotive platforms increasingly use electronics for several critical functions including communications, guidance, charging, operator interaction, and the acquisition of signals from sensor networks. Significant opportunities exist for adoption of FHE technologies to enable these functions by seamless, fully integrated systems. This topic seeks demonstration and evaluation of FHE manufacturing technologies that are highly relevant to the automotive industry. Proposers should describe the performance and reliability requirements associated with the described process and/or applications. Alignment of testing protocols with existing automotive standards is highly desired. Projects with automotive original equipment manufacturers (OEMs) and/or tier suppliers are strongly preferred. Examples of possible topics of interest include, but are not limited to:

a. Evaluation of In-Mold Electronics Manufacturing Processes and Reliability

b. Film-on-Structure FHE Integration for Automotive Applications

c. Connectors for Printed Electronic Circuits for Module-to-Module Interconnection

TOPIC 7.7: WEARABLE HUMAN MONITORING / INTERFACE DEMONSTRATOR

$800,000 maximum Institute funds / Up to a 24-month duration

This topic seeks demonstration and evaluation of human monitoring systems enabled by state-of-the-art FHE components. Proposed manufacturing and system integration methods should be transferrable to volume manufacture with the development of scalable and cost-efficient manufacturing workflows. Proposers must identify why FHE is the preferred approach for their specific application(s) and why such a demonstrator advances the technology field. Projects should be careful not to duplicate prior efforts. Examples of possible demonstrators of interest include, but are not limited to:

a. Biopotential Electrodes with Improved Signal Quality for Dynamic Environments

b. Low-Cost Single Use Vital Sign Monitoring Devices

c. Textile-Integrated Electronics and Wearables for Operator Comfort / Human Robot Interfacing

TOPIC 7.8: OPEN TOPIC FOR “NEW PROJECT LEADS”

$350,000 maximum government funds / Up to a 12-month duration

Delivering the NextFlex mission requires participation from across the U.S. FHE ecosystem. The purpose of this topic is to encourage participation from organizations that have not led a NextFlex PC project in the recent past.

Projects must align to the NextFlex Technical Working Group FHE Roadmaps and may address either manufacturing thrust or technology demonstrator topics. In the case of technology demonstrator development, the project should, at least in part, address the challenge of manufacturing such a demonstrator. For this open topic, proposals must clearly identify the technical working group(s) to which the project aligns, and the manufacturing capability gaps to be addressed.

Eligibility requirements: The lead proposer organization for this project must not have led a NextFlex project call project under either of the two most recent project calls (PC 5.0 and PC 6.0). As with all proposals, teaming is strongly encouraged; organizations that have led projects under PC 5.0 and/or PC 6.0 may be project partners, however at least 60% of the NextFlex funding for projects in this category must be allocated to organizations that meet this criterion (there is no restriction on allocation of cost share).

Multiple awards are anticipated under this topic subject to number and quality of submitted proposals.

EVALUATION CRITERIA

PROJECT CALL 7.0

PROPOSAL EVALUATION PROCESS

- Proposals are distributed to a slate of reviewers. These include:
  - NextFlex members
  - Government subject-matter experts
  - NextFlex staff
  - NextFlex may occasionally engage other persons as part of the proposal review process (e.g., third-party SMEs)
- Reviewers evaluate the proposals, score each proposal in several categories, and provide comments.
- NextFlex compiles and analyzes the reviews and summarizes comments for the NextFlex Technical Council.
- TC votes a set of recommendations to the NextFlex Governing Council.
- GC votes to select projects for award negotiation.

PROPOSAL EVALUATION CRITERIA

PC7.0 Full Proposal Project Review Criteria / Score Card

Criteria for all Project Call topics	Score Guide: Low=1, High=5; refer to scoring rubric worksheet
Reviewer Name:	ADD YOUR NAME HERE
Reviewer Organization:	ADD YOUR ORGANIZATION HERE

	Proposal Section	Proposal Section	Criteria	Explanation of Criteria	Example Proposer Name Example Proposal Title Example Score
Technical Merit & Transition Potential	1.0	Background and Need	(1) Problem statement, innovative solution, and potential impact on technical gap and/or DoD priorities	Evaluate the problem definition in line with the background information and the gap analysis provided. Is the proposal aligned with TWG roadmaps and/or DoD modernization priorities?	3
	2.0	Technical Objectives	(2) Technical scope and approach	Is the objective, scope and approach aligned with the problem definition? Are performance and reliability metrics and standards appropriately addressed? For demonstrator projects, what are the value to the ecosystem and the advantage of an FHE solution for this problem?	5
			(3) Logical technical plan; key deliverables and specifications	Do the specifications and deliverables meet the proposed objectives and final deliverables? What are the key tangible deliverables & how do we assess success?	5
	3.0	Work Plan	(4) Project organization	Is the project organized well with milestones and tasks; Are the task descriptions clearly articulated: Is the schedule aligned well with critical interdependencies identified?	4
			(5) Probability of success	Based on all of the above, including the cost and the team capability, assess the feasibility to achieve the stated goals within the planned timeline.	3
	4.0	Commercialization Strategy	(6) Business case/value proposition	What is the targeted application or market? How is the technology/product a differentiator or a game changer? Is the appropriateness of an FHE solution explained?	5
			(7) Manufacturing approach	Is the technology/approach matured and ready for manufacturing? Is it the right approach? Does it help advance the MRL/TRL goals? Does the team have the right partners? Are they US-based? How the mature is the process and/or manufacturing infrastructure? How does it impact US manufacturing?	4
Non-Technical Factors		Manufacturing Readiness and Accessibility	(8) MRL/TRL assessment	Are the starting MRL/TRL accurate? Are the end MRL/TRL assessed correctly, and is it realistic considering the overall quality of the project and maturity of technology and approach?	5
			(9) Tool accessibility (for proposals developing tool hardware and software proposals only)	Will the equipment/tool/software developed as part of the proposal be available to the ecosystem, and where they will be located?	3
	5.0	Budget Justification and Cost Share	(10) Cost and cost realism	Evaluate if the cost assessment is pragmatic based on the overall assessment of the project relative to its objective, team, advancement, timeline etc.	4
			(11) Value and quality of cost share	Assess based on the cost share value, cost share source and the purpose of the cost share.	4
	6.0	Capability to Meet Technical and Business Goals	(12) Experience of personnel and quality of relevant facilities	Assess the strength of the PI team as well as the partner/subcontract organizations to achieve the proposal's goals.	4
	7.0	Workforce Development	(13) Quality of WFD section	What aspects of WFD is proposed? Is it intern, graduate student, or training etc.?	2
				Technical Score	**4.14**
				Technical Ranking	**#3**
				Non-Technical Score	**3.67**

Technical Criteria

Non-technical Criteria

PROPOSAL EVALUATION AND SELECTION

- Technical Score and a Non-Technical Score are determined by averaging the scores in from each category. Scores from all reviewers produce average scores and a Technical Ranking.
- Project selection will rely heavily on the Technical Score and Ranking; Non-Technical Score and reviewer feedback are particularly useful to distinguish proposals that are rated closely to each other, as well as to identify potential outliers (high or low).
- Scores and comments from reviewers will be compiled, ranked, and prioritized for consideration by the Technical Council in voting.
- The Governing Council will consider input from reviewers, Technical Council recommendations, and factors such as alignment with the NextFlex dual mission to promote development and U.S. manufacturing of FHE and support DoD technology transitions, and balance of the project portfolio in selecting proposals.

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