RFP-2 Wave 3 Webinar

SM Innovation Platform™ Capability Projects

Haresh G. Malkani, Ph.D. - CTO
Miguel Corcio, P.E. - Director Technical Programs
Jonathan Wise - VP Technology
• All proposers are strongly encouraged to read the Technical Roadmap and the Request for Proposal (RFP) carefully and adhere to the stated submission requirements

• This presentation summarizes the RFP. Any inconsistencies between the RFP and this presentation or statements from CESMII personnel, default to the RFP

• CESMII website https://www.cesmii.org/questions-and-answers/

• If you believe there is an inconsistency, please contact CESMII at roadmapprojects.info@cesmii.org
Agenda

- CESMII Mission, Strategy, Role, Objectives
- CESMII Technical Roadmap Overview
- CESMII Projects (Roadmap & Application)
- RFP Process Overview & Timeline
- RFP-2 Wave 3 Technical Areas of Interest
- Award Information
- Eligibility Information
- Cost Sharing
- Proposal Templates
- Roadmap Project Evaluation Criteria
- CESMII Links & Questions
CESMII has an Integrated Strategy & Roadmap to Realize its Mission

Vision: Smart Manufacturing is manufacturing in 2030

**MISSION**

Radically accelerate advanced sensor, controls, modeling, simulation, and platform development and adoption in U.S. manufacturing through integrated, industry-led Smart Manufacturing technical, business, and educational methodologies.

**OBJECTIVES**

To enhance U.S. manufacturing productivity, global competitiveness, and reinvestment, significantly:

- **energy productivity**
- **economic performance**
- **environmental sustainability**
- **workforce capacity**

**GOALS**

Demonstrate at least a **15% improvement in energy efficiency** in first-of-a-kind demonstrations at manufacturing plants or major processes **within five years** of Institute operation, supporting a goal of at least **50% improvement in energy productivity in 10 years**.

Develop tools and technologies to **reduce the cost of deploying Smart Manufacturing in existing processes by 50%** relative to the existing state of the art within five years.

Demonstrate **significant industry adoption of Smart Manufacturing technology** in each of the following topic areas within five years: advanced sensors; control systems and data analytics; high-fidelity modeling; and toolkits.

Establish a portfolio for technology RD&D and workforce development that directly replaces the initial Federal funding (i.e., $14 million per year), starting in the sixth year of operation.

**Broad Deployment – “ALL Manufacturing”**
CESMII Overall Objectives

1. **Lead** a national effort to develop, research, test, and widely validate SM technologies and practices in a continuously evolving manner
2. Develop a roadmap for **SM technologies, practices, services, and training** and update the roadmap periodically as needed
3. Support SM Research & Development, to provide capabilities for and collaboration in **open, pre-competitive work** among multiple parties
4. Establish a technical education and **workforce development** program that leverages regional networks
5. Stimulate **growth of a SM** domestic supply chain
6. Demonstrate **participation of underrepresented groups** in CESMII
7. Be financially **self-sustaining** after the five-year period of federal funding
1. **Energy Productivity**: Energy productivity gains in U.S. manufacturing will be doubled in 10 years

2. Energy Efficiency: **15% improvement in energy efficiency** in first-of-a-kind industrial testbeds will be achieved within 5 years

3. Industry Deployment Costs: **Cost of deploying SM technologies** including hardware and software in existing manufacturing processes will be reduced 50% relative to state-of-the-art in 5 years

4. **Adoption Costs**: Installed and operating cost for adoption of SM technologies including hardware and software will be recovered through energy savings and productivity improvements in 10 years

5. Workforce: **SM workforce capacity** in U.S. will be increased two-fold by 2020 and five-fold by 2030

6. Supply Chain: SM supply chain will increase value and participation 40% by 2030
How CESMII Invests to Drive SM Innovation & Research @ Scale

Enabling R&D Projects
- Close specific technology gaps, explore emerging technologies;
- Create apps and information models specific to use case

Innovation Projects
- Solve specific manufacturing problem & develop information models & apps

Application Projects
- Demonstrate platform capabilities through use cases & Identify gaps

Platform Capability Projects
- Develop core platform capabilities & Tools

Education & Workforce Development Projects
- Develop content, train, certify

Developing CESMII Integrated Strategy
Optimize Manufacturing and Increase Energy Productivity
- Business Practices
- Enabling Technologies
- Workforce Development
- SM Platform Infrastructure
<table>
<thead>
<tr>
<th>Activity: RFP-2 Wave 3 (SM Innovation Platform Capabilities)</th>
<th>Schedule</th>
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</thead>
<tbody>
<tr>
<td>Request for proposals issue date</td>
<td>May 12, 2020</td>
</tr>
<tr>
<td>1\textsuperscript{st} Information Webinar</td>
<td>May 14, 2020</td>
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<tr>
<td>2\textsuperscript{nd} Information Webinar</td>
<td>May 19, 2020</td>
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<tr>
<td>Submission deadline for full proposals</td>
<td>June 19, 2020</td>
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<tr>
<td>Selection Notifications Issued</td>
<td>August 7, 2020</td>
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<tr>
<td>Negotiation Meetings Completed</td>
<td>August 21, 2020</td>
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<tr>
<td>Projects Final SOPOs, EERE335s, etc Submitted to DOE</td>
<td>September 4, 2020</td>
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<tr>
<td>DOE Technical &amp; Financial Review Completed</td>
<td>September 18, 2020</td>
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<tr>
<td>UCLA SRAs Issued</td>
<td>October 9, 2020</td>
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<tr>
<td>Expected project start date</td>
<td>October 26, 2020</td>
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AREAS OF INTEREST:
SM INNOVATION PLATFORM CAPABILITY PROJECTS

CESMII’S GOAL IS TO ACCELERATE SMART MANUFACTURING (SM) ADOPTION THROUGH THE INTEGRATION OF BUILDING BLOCK TECHNOLOGIES SUCH AS ADVANCED SENSORS, CONTROLS, PLATFORMS AND MODELING (ASCPM) TO RADICALLY IMPROVE PRODUCTIVITY, PRECISION, PERFORMANCE AND ENERGY CONSUMPTION.
In order for SM solutions to be developed and implemented in a fashion that is secure, scalable, reusable and interoperable, the following three key capabilities are required:

- **An environment** (platform) that allows individual functional components to be able to interoperate, and for data to be orchestrated between these components

- **Common information models** that provide the ability to move “data-in-context” from source to consumption, and between components that consume the data to provide a solution

- **A marketplace** from where the information models, and functional components can be “serviced” to create solutions to manufacturing use cases
The SM Profile™ will provide a semantic and structure for defining data models and binding those models to real-world manufacturing technology. While OPC UA will provide the underlying format and the initial connectivity, CESMII is inviting proposals for projects that will help expand connectivity and ingestion to cover a wide array of prevalent communication protocols and egress methods, and in patterns that would ensure simplicity in adding new protocols in the future. Ideally this will include:

- Adapters or drivers for SM Innovation Platform technology, or the extension of existing industry technology to support translation or normalization from proprietary protocols to and from an SM Profile, with a focus on OPC, MQTT, HART, CIP and Profinet, although other protocols are of interest as well.
- Adapters or translators for integrating with the specification embedded in a machine or system, such as PackML, or existing proxies for systems provided by incumbent industry software, such as ThingWorx or PI Asset Framework Templates.
- Support more and smaller edge devices by implementing the SMIP Connector on low-cost Linux based environments, such as Raspberry Pi.
- Packaged SMIP Connectors deployment images for edge hardware devices (Edge "appliance")
SM INNOVATION PLATFORM CAPABILITY PROJECTS

AREA OF INTEREST #2 DATA CONTEXTUALIZATION AND MARKETPLACE

Since the eventual repository of SM Profiles will be brokered by the SM Marketplace, CESMII is also interested in proposals that would support the creation of the Marketplace, including the following capabilities:

• A low-complexity marketing gateway for member technologies, where member applications, profiles and capabilities can be discovered. Initially these offerings may not be tied to the Platform, or may require manual configuration, but should expand to include capabilities for registering and ingesting Profiles and linking them to particular solutions or equipment types, for simplified discovery and acquisition.

• A mechanism for registering and ingesting Profiles and linking them to particular solutions or equipment types.

• A means for Apps to identify which Profiles they work against or a means to submit new Profiles, and a means for Apps to identify which Permissions they require. A manifest-based declaration should be created to automate ingestion.

• A mechanism by which a new App can be added to the Marketplace. Includes collecting all necessary information about the app.
In the context of the SM Innovation Platform, this area of interest includes ensuring secure access to the data, establishing secure methods of data exchange between data acquisition, data management and data consumption through the platform, and establishing trusted processes for communications between applications. CESMII is seeking proposals for projects that support the integration of enterprise and Cloud directory services into the SMIP, as well as tools that facilitate the application of permissions to Marketplace end-points leveraging those directories. Specific capabilities include:

• Integrating the Platform into a variety of Directory Services (e.g.: Active Directory, Google, etc...) based on prioritization from membership.
• An administrative toolset or User Interface for scaling up or down a platform instance, potentially including automatic scaling, to manage costs and growth.
• An approach to maintaining compatibility as CESMII Marketplace Apps are revised.
• Creating application permission records in the acquirer's platform instance.
• Automate the connection between the acquired app and the acquirer's app instance end-point
AWARD INFORMATION:

Estimated Funding
$1,000,000 of federal funding available for new awards under Wave 3. Projects will also be required to provide a minimum of 50% cost share.

<table>
<thead>
<tr>
<th>Technical Areas of Interest</th>
<th>Number of Awards Anticipated</th>
<th>Total Federal Funding Available (RFP-2 Wave-3 Only)</th>
<th>Member cost-share</th>
<th>Period of Performance</th>
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<tbody>
<tr>
<td>SM Innovation Platform Capabilities</td>
<td>8</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
<td>6-12 Months</td>
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PERIOD OF PERFORMANCE

For this RFP Wave, CESMII anticipates making awards with period of performance up to 12 months.

- All projects are stage-gated
- At least one Go/No-Go decision point is required for every BP
- Expected first phase of project is from November 2020-January 2021 with a Go/No-Go decision point required at this point (Budget Period 3)
- *The second phase will begin in February 2021.*

Additionally, **UCLA will negotiate a sub recipient agreement with lead organizations of each of the project teams.**
Eligible Applicants...

MUST BE IN GOOD STANDING BY THE TIME THE PROJECT IS AWARDED TO CESMII

- Good standing means a completed membership agreement and are current with their annual dues
- Information regarding CESMII Membership can be found at the CESMII website, https://www.cesmii.org/membership-information/

- Approved CESMII members who are foreign entities may apply for project funding. If any project work will be done in a foreign country, CESMII will work with the project team to complete a Foreign Work Waiver (FWW) that will be submitted to DOE for review and approval.
- All work to be performed in the US unless a Foreign Work Waiver (FWW) is approved by the DOE
Non-Responsive Proposals

• The following types of proposals will be deemed nonresponsive and will not be reviewed or considered for an award:
  • Proposals that fall outside the technical parameters specified in the RFP
  • Proposals for technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics)
  • Proposals focused on the deployment of commercialized technologies
Cost Share

• The cost share component must be at least 50% of the total allowable costs for the project (i.e., the sum of the CESMII share and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law
• Each Project Team is free to determine how best to allocate the cost share requirement among the team members
• The Team members may provide cost share in the form of cash or in-kind contributions
• Upon selection for award negotiations, all Project Team Members are required to provide written assurance of their proposed cost share contributions in their final SOPOs. Each organization providing cost share in support of the Project must submit a Letter of Commitment
What is Cost Share?

- Cost share are in-kind contributions ("donations") that the Project Recipient(s) will contribute towards achieving the Work Scope and Milestones of the project.

- These in-kind contributions are financially valued to quantify the Project Recipient(s) co-investment in the project along with the federal funding they receive from CESMII.

- For every $1 of Federal funding Project Recipient(s) receive they must also contribute $1 of cost share contribution.

- The Federal regulations on cost-share accounting can be found at 2 CFR 200, 2 CFR 200.29, and 2 CFR 200.306.

- The cost-share contributions must be aligned to achieving the Project Work Scope and Milestones. Some examples are:
  - Personnel costs
  - Raw materials or laboratory supplies
  - Hardware or software
  - Facilities or administrative costs
  - Rental/usage cost of facilities or equipment
  - Value of a service, other resource, or third-party in-kind contribution.
SELECTION CRITERIA
Proposals Selection:
1. **General Criteria**
2. Technical evaluation Criteria
3. Portfolio Selection Criteria

<table>
<thead>
<tr>
<th>1- General Criteria</th>
<th>Metrics</th>
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| **Business Impact** | % improvement in energy reductions % manufacturing productivity  
|                     | Other financial savings  
|                     | Alignment with CESMII goals |
| **Technical significance** | Identification of key technical barrier(s) to be overcome  
|                        | Reusable technologies and Components for Platform  
|                        | Alignment with the CESMII technical roadmap |
| **Project Execution** | Clear project objectives and scope statement  
|                       | High-level project plan to meet milestone dates  
|                       | Key resources identified and confirmation of availability.  
|                       | Integration requirements defined  
|                       | Project deliverables identified.  
|                       | Complete cost breakdown including sub recipient budget  
|                       | Measure of success  
|                       | Project risks |
Proposals Selection:
1. General Criteria
2. **Technical evaluation Criteria**
3. Portfolio Selection Criteria

<table>
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<tr>
<th>2- Technical Evaluation Criteria</th>
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<tr>
<td>Technical Merit (Weight: 40%)</td>
<td>The extent to which the project addresses the areas of interest stated in this RFP. The extent to which the project, if successfully carried out, will make a valuable contribution to the field of smart manufacturing, SM Platform, CESMII and its members. The project objectives are clearly stated, challenging, well-conceived, and technically feasible. The degree to which this project will provide valuable new tools, engineering processes, devices, or hardware/software/data to support adjacent Institute activities. Project will materially advance the mission of the Institute.</td>
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<tr>
<td>Technical Approach (Weight: 35%)</td>
<td>Adequacy and feasibility of the applicant’s approach to achieving the stated objectives of the project. The extent to which the project plan, methods, analysis, and technology are properly developed, well integrated, and appropriate to the objectives of the project. Appropriateness rationale, and completeness of the proposed Project Proposal. Degree to which the applicant has identified high risk challenges and presented reasonable mitigation strategies. There is a high degree of innovation, novelty or originality in the approach. Adequacy and appropriateness of the proposed schedule, staffing plan, and proposed travel.</td>
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<tr>
<td>Technical and Management Capabilities (Weight: 25%)</td>
<td>Likeliness that the proposed work can be accomplished within the proposed budget and performance period by the technical team, given their experience, expertise, past accomplishments, available resources, institutional commitment, and access to technologies. Clarity, completeness and appropriateness of the project plan and timeline. Clarity, logic, and effectiveness of the project organization, including sub awardees to successfully complete the project. Credentials, capabilities, experience of the key personnel. Adequacy and availability of personnel, facilities, and equipment (both hardware and software) to perform the proposed project within the budget specified.</td>
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Proposals Selection:
1. General Criteria
2. Technical evaluation Criteria
3. **Portfolio Selection Criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>To create a balanced portfolio CESMII will select projects that are complementary and support the accomplishment of CESMII objectives. This will include but not limited to the following criteria:</th>
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<tbody>
<tr>
<td>1.</td>
<td>Meets strategic goals of the Institute</td>
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<tr>
<td>2.</td>
<td>Fit with current Budget Period (BP) funding profiles</td>
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<td>3.</td>
<td>Cross-industry applicability and broad-based impact</td>
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<tr>
<td>4.</td>
<td>Utilization and enhancement of the SM Platform core capabilities and SM Marketplace</td>
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<tr>
<td>5.</td>
<td>Full compliance with DOE and CESMII requirements</td>
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<tr>
<td>6.</td>
<td>Broader base application across other industries for reusability</td>
</tr>
<tr>
<td>7.</td>
<td>High-level fit to create balance in the Institute’s project portfolio</td>
</tr>
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<td>8.</td>
<td>Whether the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty</td>
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CESMII LINKS AND FREQUENTLY ASKED QUESTIONS REGARDING RFP-2 WAVE 3

The application templates and instructions are available on the CESMII website: https://www.cesmii.org/resources

Questions can be submitted to roadmapprojects.info@cesmii.org

Questions & Answers can be found at www.cesmii.org/questions-and-answers/.

RFP 2 wave 3 related information (Templates, forms, etc.) can be found at www.cesmii.org/request-for-proposal

Membership eligibility can be found at https://www.cesmii.org/membership-information/

The documents regarding the model-sub agreement can be found at https://www.cesmii.org/model-subagreement/.
## Join this Innovative, Smart Manufacturing Ecosystem

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>App Vendor</th>
<th>OT System Integrator</th>
<th>IT System Integrator</th>
<th>Device, Sensor, Robot, CNC, Machine Builder</th>
<th>Academia/Labs</th>
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<tbody>
<tr>
<td>Scalable, sustainable secure Mfg IT strategy for the enterprise (Plants &amp; Supply Chain)</td>
<td>Dramatically shorter Time to Value for developing Mfg Apps</td>
<td>Leverage their domain expertise to build SM Profiles</td>
<td>Their IIoT Practices can now effectively scale into OT (build credibility in Operations)</td>
<td>Leverage their domain expertise to build SM Profiles</td>
<td>Engage in and contribute to leading edge Mfg IT R&amp;D</td>
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<tr>
<td>Prioritize the development of Device, Machine &amp; Process Profiles</td>
<td>Dramatically shorter Time to Value for implementing Mfg Apps</td>
<td>Support the critical mass adoption of standards in the SM market</td>
<td>Can leverage their domain expertise to build apps (no longer required to build complex sw infrastructure)</td>
<td>Devices &amp; Machines differentiated - become ‘SMART’</td>
<td>Additional credibility with Industry (the entire ecosystem)</td>
</tr>
<tr>
<td>Funded POC/R&amp;D support for the most challenging Mfg IT challenges in Operations</td>
<td>Dramatically improve License $ : Implement $ (improve margin)</td>
<td>Build a certified, Smart Manufacturing competency</td>
<td>Build a sanctioned, Smart Manufacturing competency</td>
<td>Can offer new/better support services (SLA’s)</td>
<td>Create and offer officially sanctioned Manufacturing IT curriculum</td>
</tr>
<tr>
<td>Enable all employees to innovate &amp; create value - not spend time on data management infrastructure</td>
<td>Lower implementation complexity = lower risk = higher customer satisfaction</td>
<td>OT domain expertise much more relevant to IT SI’s and enterprise SM initiatives</td>
<td>Effective way for business model to scale down</td>
<td>Products that can be supported in an enterprise-wide Manufacturing-sanctioned Platform environment</td>
<td>Expanded relationships with manufacturing in new industries</td>
</tr>
<tr>
<td>Real time, data-driven collaboration with OEM, SI, Academia &amp; Device ecosystem</td>
<td>Rolling out and scaling solutions (beyond large plants) to medium &amp; small plants</td>
<td>Create and offer Apps &amp; services with recurring revenue streams (support SLA)</td>
<td>Drive Supply Chain optimization strategies based on real time access to Operations</td>
<td>Can leverage their domain expertise to build apps (no longer required to build complex sw infrastructure)</td>
<td>Enable students to innovate &amp; create value - not spend time on data management infrastructure</td>
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<td>Plant AND Supply Chain optimization</td>
<td>Reduce investment in building data collection &amp; contextualization infrastructure</td>
<td>Can leverage their domain expertise to build apps (no longer required to build complex sw infrastructure)</td>
<td>Drive Enterprise Cybersecurity strategies that incorporate Operations</td>
<td>Vendor-specific Apps can sit on ‘Standard’ SMP infrastructure</td>
<td>Fund additional research (more, agile, smaller)</td>
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</table>
ENGAGE WITH US!

Democratizing SMART MANUFACTURING

EDUCATED, DATA-DRIVEN CULTURE
SMART ASSETS
SMART DECISIONS
OPERATIONS & SUPPLY CHAIN VISIBILITY