Industry Perspectives on Manufacturing USA

The National Academies Innovation Policy Forum

Washington, DC
23 May 2017
The Secretary of the Treasury in obedience to the order of the House of Representatives, of the 15th day of January 1790, has applied his attention, at as early a period as his other duties would permit, to the subject of Manufactures; and particularly to the means of promoting manufacturing will tend to render the United States, independent on foreign nations, for military and other essential supplies.
Lockheed Martin by the Numbers

97,000 Employees

400+ Facilities Worldwide

49,000 Scientists and Engineers

Operating in over 58 Countries
With 7,100+ Employees
Emerging Capabilities at LM

Advanced Design Synthesis
Cognitive Assistants
Human Augmentation

Designer Materials
Intelligent Machines
Transformative Computing
Lockheed Martin Investment in MfgUSA
Materials & Manufacturing Benefits

- Technical projects have significantly advanced the field of thin-wall castings
- Members may access free online training classes for experienced professionals, such as advanced welding and inspection
- 5-year institute goal of 25% lower cost of carbon fiber composites will benefit industry supply chains and increase US competitiveness
- Joint LIFT/IACMI research center with $47M of equipment for member use
Digital Manufacturing Benefits

- “Partner Innovation Projects” allow members to collaborate quickly on projects (e.g., Block Chain for Mfg, Aug. Reality)
- ‘101’ series of massive open online courses (MOOCs) about digital manufacturing and design are available
- Membership agreement facilitates agile, quick-start collaboration amongst members
Advanced Electronics Benefits

- Pilot production and prototyping facility developed for flexible hybrid electronics manufacturing, open to all members
- Ability to participate in Technology Roadmapping and Industry Working Groups
- Community College-focused work force program feeds industrial talent base

- Industry-led 10-year roadmaps developed to advance SiC and GaN in the U.S
- Established open-source domestic SiC foundry to support fabless SiC power device companies
- Professional development courses available for WBG Power

- Industry developing the next generation of Engineering talent through AIM Academy
- AIM Leadership and Institute Partners engaged in regular dialogue to shape the Integrated Photonics technical roadmap
- AIM Photonics partners to participate in 2017 Summer Academy at MIT
Overall Value and Benefits of MfgUSA

• Demonstrated ability to collaborate with non-traditional partners, large and small

• Realized significant project ROI when leveraging resources from industry, academia, and the Institutes

• Industry-driven research projects ensures industry relevance and facilitates tech transition/commercialization

• Education and training programs provide opportunities for member companies’ workforce development

• Access to advanced manufacturing equipment at institute facilities and partner sites
Manufacturing USA: Partnerships through Embedding MEP Center Staff at Institutes

Current MEP/MFG USA Embedding Projects

Shaded states have major participants in Manufacturing USA Institutes

Flexible Hybrid Electronics
San Jose, CA

Lightweight Metals
Detroit, MI

Advanced Robotics
Pittsburgh, PA

AIM Photonics
Rochester, NY

REMADE Institute
Rochester, NY

Advanced Tissue Biofabrication
Manchester, NH

AFFOA - Fibers and Textiles
Cambridge MA

AIM Photonics
Rochester, NY

Advanced Robotics
Pittsburgh, PA

Digital Mfg & Design
Chicago, IL

Advanced Fiber-Reinforced Polymer Composites
Knoxville, TN

America Makes
Youngstown, OH

PowerAmerica
Raleigh, NC

Wide Bandgap Semiconductors
Raleigh, NC

Modular Chemical Process Intensification
New York, NY

NI-MBL
Bio-pharmaceutical Manufacturing
Newark, DE

RAPID

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# MEP / Institute Embedding Pilot

<table>
<thead>
<tr>
<th>MEP / Institute Embedding Pilot</th>
<th>Clean Energy Smart Manufacturing Innovation Institute</th>
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<tbody>
<tr>
<td>California Manufacturing Technology Center</td>
<td>NextFlex, Flexible Hybrid Electronics</td>
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<tr>
<td>Illinois Manufacturing Excellence Center</td>
<td>Digital Manufacturing and Design Innovation Institute (DMDII)</td>
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<td>New York State Department of Economic Development</td>
<td>American Institute for Manufacturing Integrated Photonics (AIM Photonics)</td>
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<td>North Carolina State University</td>
<td>Power America</td>
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<td>The University of Tennessee (Center for Industrial Services)</td>
<td>Institute for Advanced Composites Manufacturing Innovation (IACMI)</td>
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<td>Massachusetts MEP</td>
<td>Advanced Functional Fabrics of America (AFFOA)</td>
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<td>Pennsylvania MEP</td>
<td>America Makes</td>
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<tr>
<td>Michigan Manufacturing Technology Center</td>
<td>Lightweight Innovations for Tomorrow (LIFT)</td>
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Objectives of Manufacturing USA

- Initiated as recommendation from April 2011 PCAST Report
- Envisioned a National Network for Manufacturing Innovation
  - Up to 15 Manufacturing Innovation Hubs
  - Focused on maturing technologies from TRL 4 – 7
  - Education and Workforce Development is key tenet for each Institute
- Architected as a Public-Private partnership bringing together Government, Industry, and Academia
- Intended to foster pre-competitive collaboration
- Grow the US economy (i.e., more jobs)
- Increase US competitiveness in Manufacturing
# Rollout of Manufacturing USA Institutes

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
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