From Concept to Practice: The Manufacturing USA Annual Report

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An interagency team building partnerships with U.S. Industry and Academia
Agenda

• Take-off – Mission/Vision/Goals, status
• Journey – 2016 Program Results
• Landing – Building on External Assessments
Manufacturing USA Strategic Goals

**Vision**
- U.S. global leadership in advanced manufacturing

**Mission**
- Connecting people, ideas, and technology to solve industry-relevant advanced manufacturing challenges, thereby enhancing industrial competitiveness and economic growth and strengthening our national security

**Program Goals**

<table>
<thead>
<tr>
<th>Competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Advancement</td>
</tr>
<tr>
<td>Workforce Development</td>
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<tr>
<td>Sustainability</td>
</tr>
</tbody>
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Participant members in Manufacturing USA Institutes

- Digital Manufacturing & Design
  - Chicago, IL
- Sustainable Manufacturing
  - Rochester, NY
- Integrated Photonics
  - Albany, NY
- Regenerative Manufacturing
  - Manchester, NH
- Advanced Fibers and Textiles
  - Cambridge MA
- Advanced Robotics
  - Pittsburgh, PA
- Advanced Composites
  - Knoxville, TN
- Additive Manufacturing
  - Youngstown, OH
- Lightweight Metals
  - Detroit, MI
- Modular Chemical Process Intensification
  - New York, NY
- Bio- pharmaceutical Manufacturing
  - Newark, DE
- Wide Bandgap Semiconductors
  - Raleigh, NC
- Integrated Photonics
  - Rochester, NY
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• Take-off – Mission/Vision/Goals, status

• Journey – 2016 Program Results
  – Impact to U.S. innovation ecosystem
  – Leverage
  – Technology Advancement
  – Workforce

• Landing – Building on External Assessments
Measuring Performance

<table>
<thead>
<tr>
<th>Institute Metric Category</th>
<th>Specific Metric</th>
<th>Units of measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact to U.S. Innovation Ecosystem</td>
<td>Number of partner organizations with institute membership agreement</td>
<td>Total number of memberships, Large manufacturers, Small manufacturers, Academia, Other entities</td>
</tr>
<tr>
<td></td>
<td>Diversity of members</td>
<td></td>
</tr>
<tr>
<td>Financial Leverage</td>
<td>Total co-investment</td>
<td>Cost share expended</td>
</tr>
<tr>
<td></td>
<td>Number and value of active R&amp;D projects</td>
<td>Number of projects completed, started and spanning FY 2016</td>
</tr>
<tr>
<td>Technology Advancement</td>
<td>Percentage of key project technical objectives met</td>
<td>Total institute expenditures, Percentage of key milestones met</td>
</tr>
<tr>
<td>Development of an Advanced Manufacturing Workforce</td>
<td>STEM activities</td>
<td>Number of students participating in institute projects, internships, and training</td>
</tr>
<tr>
<td></td>
<td>Educator/trainer engagement</td>
<td>Number of workers completing an institute-led certificate, apprenticeship or training program</td>
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<td></td>
<td>Number of teachers or trainers participating in institute-led training</td>
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1) Impact to U.S. Innovation Ecosystem

- Manufacturing USA Institutes Have **830** Members – 66 % are Manufacturers
- 66 % of manufacturers (341) were small manufacturers.
- Other participants included:
  - **177** universities, community colleges, and other academic institutions
  - **105** other entities, including federal, state, and local government agencies, federal laboratories, and not-for-profit organizations.
2) Financial Leverage

- FY 2016 matching was nearly 2 to 1
- Of $333,808,455 in total institute expenditures
  - 66% of Institute Came from Non-Federal Matching Funds
  - 34% came from non-program matching expenditures

- Expenditures funded all aspects of institute operation (e.g. technology advancement projects, education and workforce training efforts, and capital equipment)
FY 2016: 191 active research and development projects at institutes.

Example Project at PowerAmerica

In under a year, researchers from John Deere and the Department of Energy National Renewable Energy Laboratory developed a prototype high power inverter for hybrid motors in heavy duty construction vehicles and trucks.

- Higher efficiency and lower heat-related breakdowns compared with traditional transformer-based inverters.
- Deere plans to hire American production workers in Fargo, ND to manufacture and sell inverters starting in 2019.

“Through our collaboration with PowerAmerica, we believe our silicon carbide technology work has been advanced by five years.” — Brij Singh, John Deere
3) Technology Advancement: Collaboration Improves Efficiency

**Example Project at PowerAmerica**

- Digital Manufacturing Commons Hackathon
  - Participants developed and tested Digital Manufacturing Commons apps using 4.5 years worth of real-world factory floor data from Indiana-based ITAMCO
  - ITAMCO benefits from community analysis of their data, suggesting ways to optimize utilization, improve energy usage and manage machine health

“To develop new ideas and remain competitive, we need to break out of our silos - and that’s exactly what we’re able to do by working with DMDII. The DMDII network connects us with people we wouldn’t have been able to access otherwise - from large OEMs to entrepreneurs and hackers,” Joel Neidig, ITAMCO
Nearly 28,000 participated in institute-led workforce programs, including

- **23,560 students** in institute research and development projects, internships, or training
- **3,386 workers** completed institute-led certificate, apprenticeship, or training programs
- **1,023 teachers** and trainers in institute-led training for instructors
4) Workforce: The Role of the Network

- The Manufacturing USA Education and Workforce Development team identified common skills needed across advanced manufacturing technologies.
- They developed a common training model, built around those core competencies.
- Each institute then adopts, refines, or develops technology-specific modules to meet their industry’s needs.
- The model evolves as institutes improve and share common materials across the network.
Agenda

• Take-off – Mission/Vision/Goals, status

• Journey – 2016 Program Results

• Landing – Building on External Assessments
  – Deloitte/private sector views
  – GAO/public sector views
Deloitte Recommendation: Develop strategies for long-term growth and sustainability, maintaining focus on U.S. national priorities.

Manufacturing USA will build on Deloitte’s recommendation for expanding and modifying metrics as the program matures.
• GAO: work with all non-sponsoring agencies whose missions contribute to or are affected by advanced manufacturing
  – Manufacturing USA has added Department of Labor, and Department of Health and Human Services (FDA and BARDA) to its interagency working team

• GAO: expand the Manufacturing USA governance document to detail roles and responsibilities of participating agencies that do not sponsor institutes
  – All participating agencies agree with this recommendation
• Manufacturing USA is successfully achieving its program goals
• Manufacturing USA institutes are convening a diverse array of members and coordinating project activities
• Small business stand to benefit specifically
• Leveraging and collaboration improve effectiveness of institutes and provide multiplier effect for members
Thank you!

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