



# Strategy for American Leadership in Advanced Manufacturing

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# Why a National Strategic Plan for Advanced Manufacturing?

A National Strategic Plan for Advanced Manufacturing meets a Congressional requirement under the bipartisan COMPETES Act.

In the face of intense global competition, the Administration has taken strong actions to defend the economy, expand manufacturing employment, and ensure a strong manufacturing and defense industrial base and resilient supply chain.



## STRATEGY FOR AMERICAN LEADERSHIP IN ADVANCED MANUFACTURING

*A Report by the*  
SUBCOMMITTEE ON ADVANCED MANUFACTURING  
COMMITTEE ON TECHNOLOGY  
*of the*  
NATIONAL SCIENCE & TECHNOLOGY COUNCIL

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# Strengthening U.S. Manufacturing and Competitiveness



Rapid advances in technology and economic forces



Growth of advanced manufacturing requires advances in technology-based infrastructure



Investments in advanced manufacturing, STEM education + workforce development



Reliable and predictable intellectual property rights



Manufacturing drives global economies



Trade policies that protect and advance U.S. industry



A solid defense industrial base is a national priority



Federal, State, and local governments working together to support advanced manufacturing

# Strategy Developed with Stakeholder Input

Request for Information (RFI), Office of Science and Technology Policy



Extensive input from the public, including from **ITIF**, NAE and many others



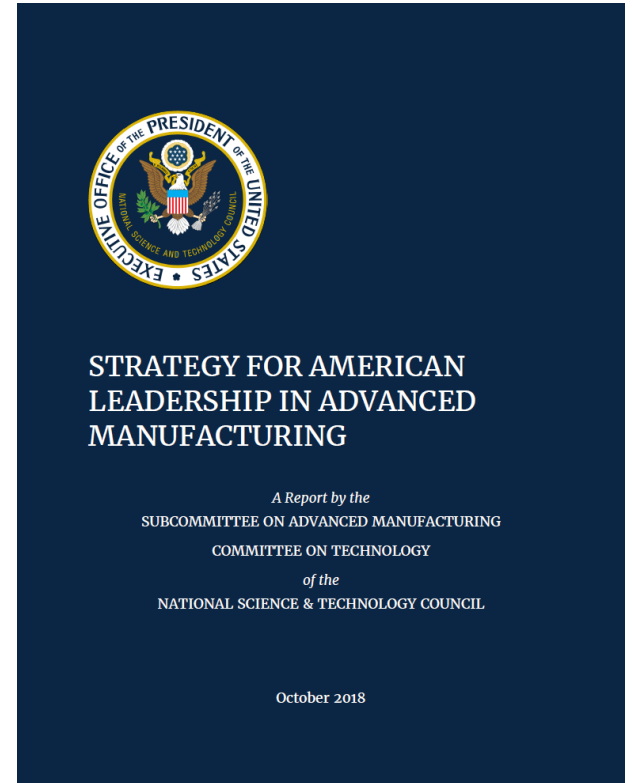
11 roundtables across the nation with industry (large and small across many sectors), academia, state and regional organizations and professional societies

# Strategic Plan Structure

**Vision:** American leadership in advanced manufacturing across industrial sectors to ensure national security and economic prosperity

## Goals

1. Develop and transition new manufacturing technologies – 5 Objectives with 15 priorities
2. Educate, train, and connect the manufacturing workforce – 4 Objectives with 9 priorities
3. Expand the capabilities of the domestic manufacturing supply chain – 4 Objectives with 11 priorities





# Goal 1 Objectives and Priorities

## 1) Intelligent Manufacturing Systems

- Smart and Digital Manufacturing
- Advanced Industrial Robotics
- Infrastructure for Artificial Intelligence
- Cybersecurity in Manufacturing

## 2) Materials + Processing Technologies

- High-Performance Materials
- Additive Manufacturing
- Critical Materials

## 3) Domestic Manufacturing of Medical Products

- Low-Cost, Distributed Manufacturing
- Continuous Manufacturing.
- Biofabrication of Tissue and Organs

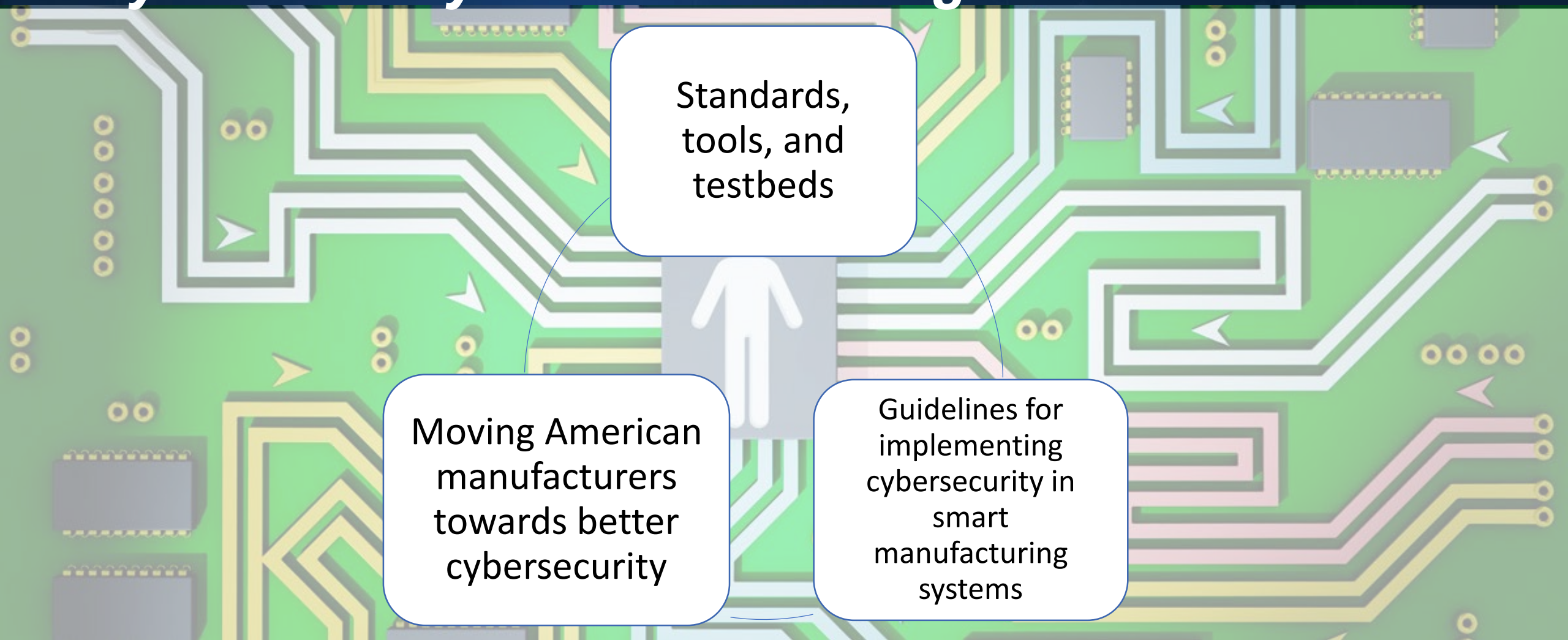
## 4) Electronics Design and Fabrication

- Semiconductor Design Tools and Fabrication
- New Materials, Devices, and Architectures

## 5) Food and Agricultural Manufacturing

- Processing, Testing, and Traceability in Food Safety
- Production and Supply Chain for Food Security
- Improved Cost and Functionality of Bio-Based Products

# Example Technology Priority: *Cybersecurity in Manufacturing*



Standards,  
tools, and  
testbeds

Moving American  
manufacturers  
towards better  
cybersecurity

Guidelines for  
implementing  
cybersecurity in  
smart  
manufacturing  
systems



## Goal 2

# Educate, Train, and Connect the Manufacturing Workforce



Photos: courtesy Manufacturing USA

# Goal 2 Objectives and Priorities

## 1) Manufacturing Workforce

- Manufacturing-Focused Foundational STEM Education
- Manufacturing Engineering Education
- Industry and Academia Partnerships

## 2) Career + Technical Education Pathways

- Career and Technical Education
- Training a Skilled Technical Workforce

## 3) Industry-Recognized Credentials

- Manufacturing Apprenticeships
- Registry of Apprenticeship and Credentialing Programs

## 4) Match Skilled Workers w/Industries

- Workforce Diversity
- Workforce Assessment

# Example Workforce Priority: *Manufacturing-Focused STEM Education*

- Talent pipeline ready for advanced manufacturing
- Investments in manufacturing engineering education
- Two-year, four-year, and advanced degrees
- Technical curricula and research programs
- Prepare graduates to tackle real-life challenges and innovate future novel manufacturing technologies



Photo: courtesy ARM institute/Girls of Steel Robotics



# Goal 3 Priorities

## 1) SMEs in Advanced Manufacturing

- Supply Chain Growth
- Cybersecurity Outreach and Awareness
- Public-Private Partnerships

## 2) Ecosystems for Manufacturing Innovation

- Manufacturing Innovation Ecosystems.
- New Business Formation and Growth
- R&D Transition

## 3) Defense Manufacturing Base

- Disruptive Dual-Use Capabilities
- Buy American
- Leveraging Existing Authorities

## 4) Advanced Manufacturing for Rural Communities

- Advanced Manufacturing for Rural Prosperity
- Capital Access, Investment, and Business Assistance

# Example Supply Chain Priority: *Ecosystems for Manufacturing Innovation*



New Business Formation  
and Growth

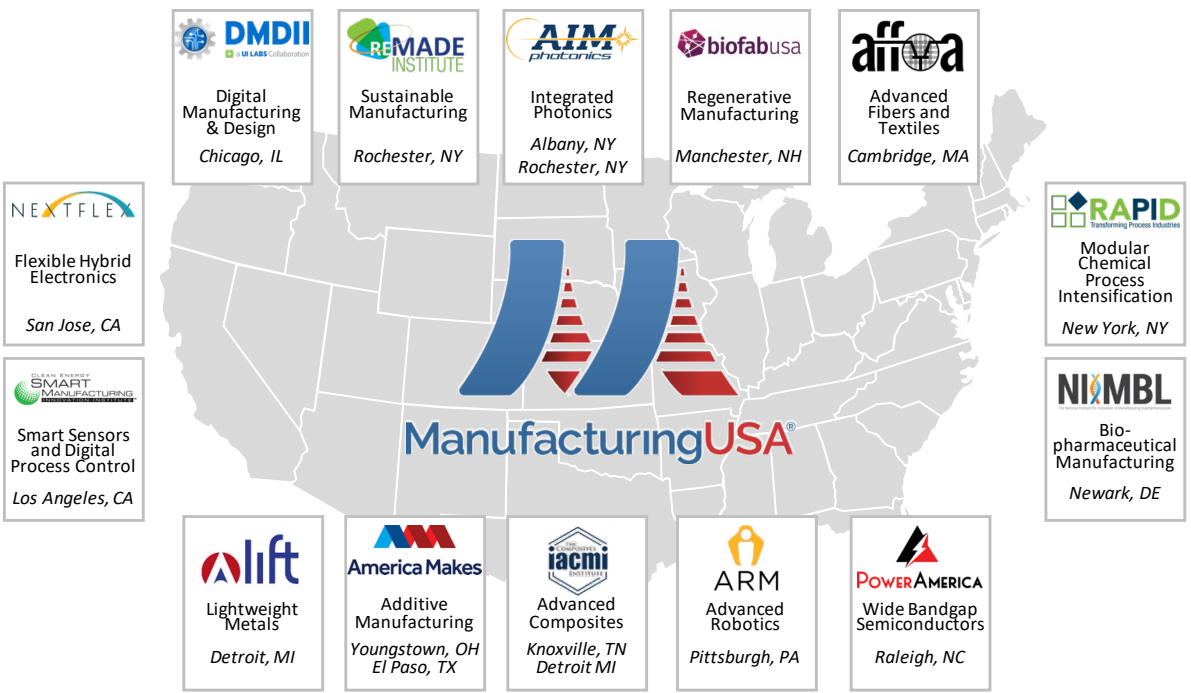


Manufacturing  
Innovation Ecosystems



R&D Transition

## Manufacturing USA and Manufacturing Extension Partnership *Complementary national networks supporting the U.S. Manufacturing Ecosystem*



**ManufacturingUSA**

- DMDII** Digital Manufacturing & Design, Chicago, IL
- REMADE INSTITUTE** Sustainable Manufacturing, Rochester, NY
- AIM PHOTONICS** Integrated Photonics, Albany, NY, Rochester, NY
- biofabusa** Regenerative Manufacturing, Manchester, NH
- affoa** Advanced Fibers and Textiles, Cambridge, MA
- RAPID** Modular Chemical Process Intensification, New York, NY
- NIMBL** Bio-pharmaceutical Manufacturing, Newark, DE
- NEXTFLEX** Flexible Hybrid Electronics, San Jose, CA
- SMART MANUFACTURING** Smart Sensors and Digital Process Control, Los Angeles, CA
- lift** Lightweight Metals, Detroit, MI
- America Makes** Additive Manufacturing, Youngstown, OH, El Paso, TX
- iacmi** Advanced Composites, Knoxville, TN, Detroit MI
- ARM** Advanced Robotics, Pittsburgh, PA
- POWERAMERICA** Wide Bandgap Semiconductors, Raleigh, NC



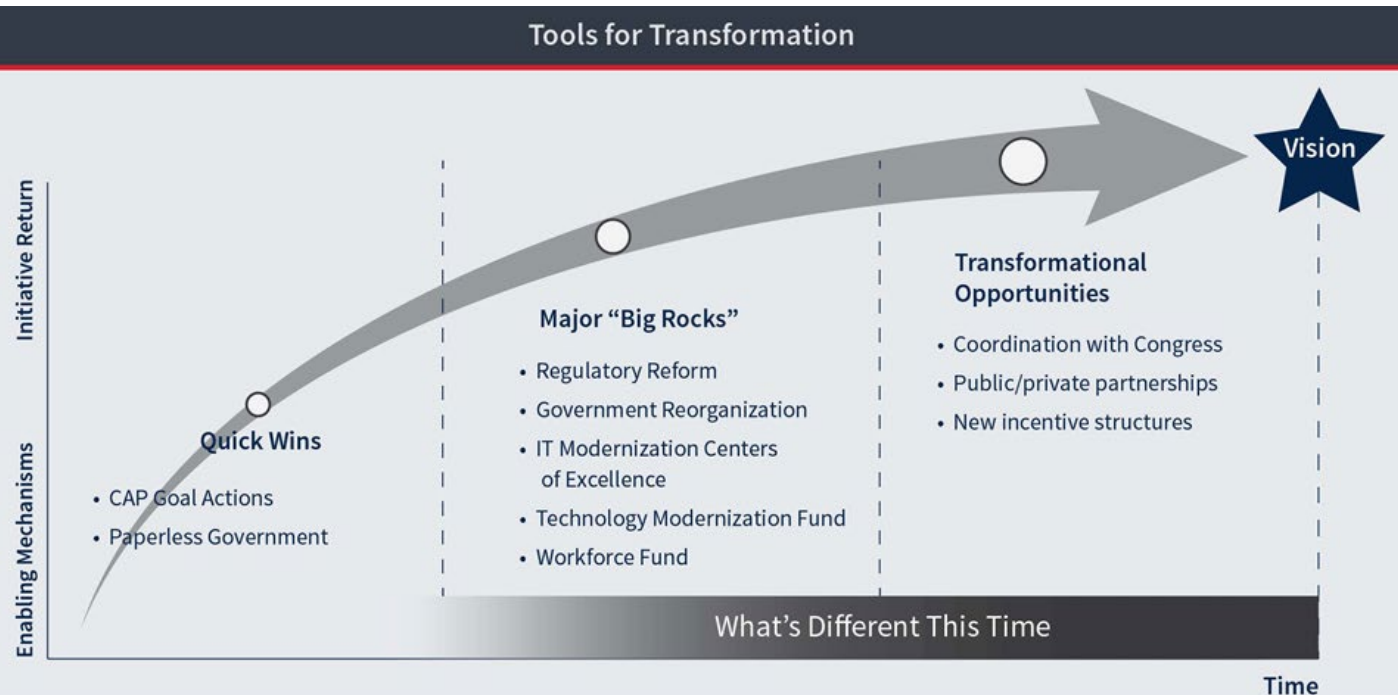
**MEP National Network**  
*The Go-To Experts for Advancing U.S. Manufacturing*

Logos on map include: impact, OMEP, TECHHELP, MANUFACTURE, IMPACT DAKOTA, ENTERPRISE, WI, MI, ME, MASSMEP, POLARIS, NEW YORK, CT, MA, DE, NIMEP, CONNECTICUT, VA, GENEDGE, WV, OH, KY, AR, MISSOURI, MISSOURI ENTERPRISE, MAMTC, OK, AR, MISSOURI, MISSOURI ENTERPRISE, TN, UT, CO, NM, TX, LA, MEPO, GA, FL, INNOVATE, MAKE, PR, PRIMEX.

# R&D Transition – the ROI Initiative

ROI Initiative designed to be responsive to PMA's long-term vision for modernizing the Federal Government for the 21st Century:

- Enable the Federal Government to **adapt to changing needs** over time
- Pursue **deep-seated transformation** rather than short-term fixes



## Root cause challenges

- Regulatory Burden
- Structural Issues
- Decision-Making and Processes
- Leadership and Culture
- Capabilities and Competencies

# Agency Participation

Goals	Objectives	DoD	DOE	DOC	HHS	NSF	NASA	DOL	USDA	DOEd
<b>Develop and Transition New Manufacturing Technologies</b>	Capture the Future of Intelligent Manufacturing Systems	●	●	●		●	●			
	Develop World-Leading Materials and Processing Technologies	●	●	●		●	●			
	Assure Access to Medical Products through Domestic Manufacturing	●		●	●	●				
	Maintain Leadership in Electronics Design and Fabrication	●	●	●		●	●			
	Strengthen Opportunities for Food and Agricultural Manufacturing	●				●			●	
<b>Educate, Train, and Connect the Manufacturing Workforce</b>	Attract and Grow Tomorrow's Manufacturing Workforce	●	●	●		●	●	●		●
	Update and Expand Career and Technical Education Pathways	●	●	●		●	●	●		●
	Promote Apprenticeship and Access to Industry-Recognized Credentials	●	●	●		●	●	●	●	●
	Match Skilled Workers with the Industries that Need Them	●			●			●	●	
<b>Expand the Capabilities of the Domestic Manufacturing Supply Chain</b>	Increase the Role of Small and Medium-Sized Manufacturers in Advanced Manufacturing	●	●	●	●	●	●		●	
	Encourage Ecosystems for Manufacturing Innovation	●	●	●	●		●			
	Strengthen the Defense Manufacturing Base	●	●	●	●		●			
	Strengthen Advanced Manufacturing for Rural Communities								●	



Thank you for your  
engagement and support

