Designing a National Network for Manufacturing Innovation

NNMI
and The Additive Manufacturing Pilot

24 May 2012

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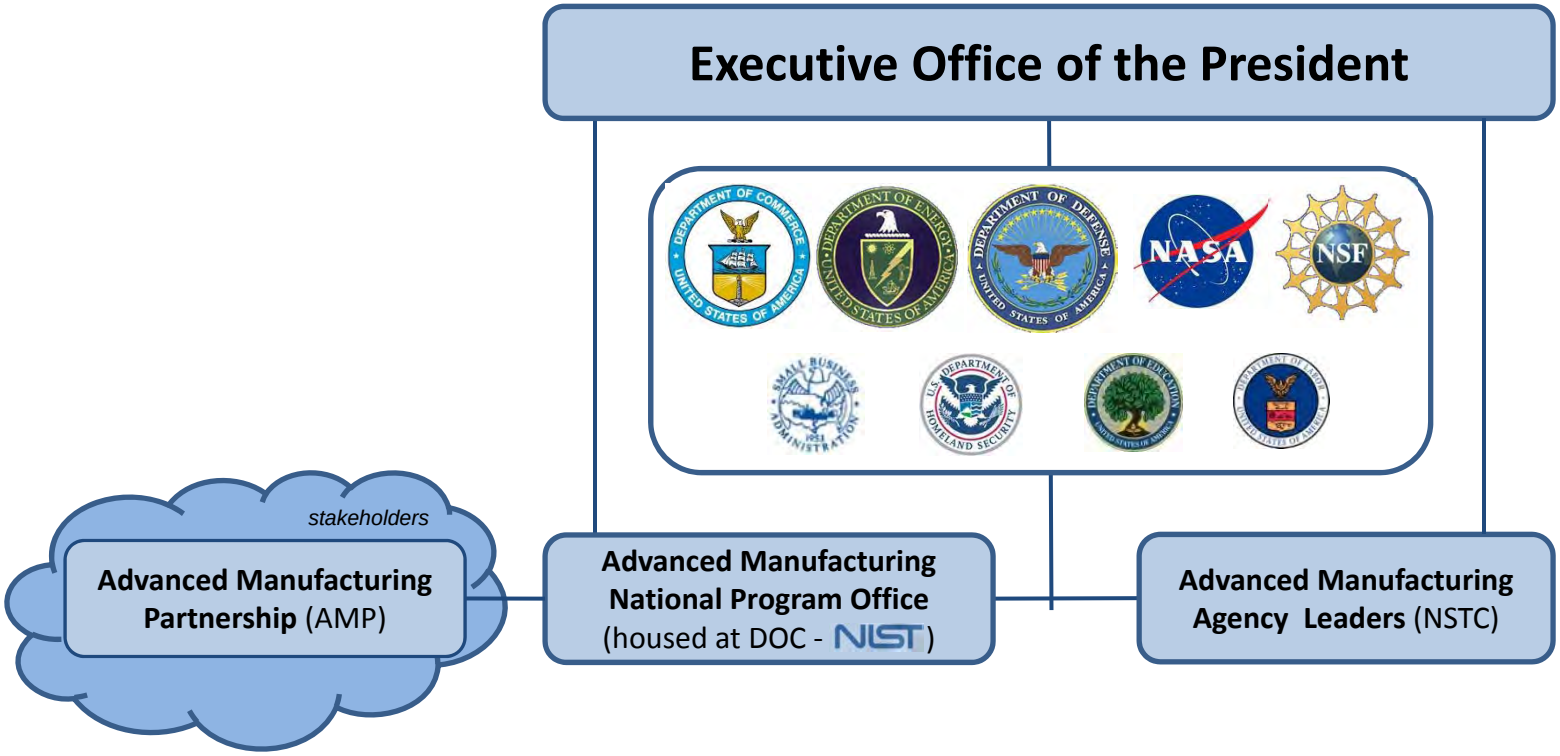
Agenda

- **AMNPO and NNMI Introduction**
- NNMI principles
- Public NMMI Design
- Pilot Institute on Additive Manufacturing

Advanced Manufacturing – National Program Office
Office Structure and Role



NPO composed of members from key federal agencies, industry and academia

Guided by agency leaders within National Science and Technology Council

Works with agencies to create an integrated interface for advanced manufacturing

Works with external stakeholders to establish/strengthen AMP private-public partnerships

President Announces NNMI

"We have got to have this all across the country. I want everybody thinking about how are we making the best products, how we are harnessing the best ideas, and making sure they are located here in the United States. And sparking this network of innovation across the country it will create jobs and will keep America in the manufacturing game."

President Proposed a National Network for Manufacturing Innovation

- network of up to fifteen Institutes for Manufacturing Innovation around the country
- serving as regional hubs of manufacturing excellence that will help to make our manufacturers more competitive and encourage investment in the United States.
- The President's Budget proposes a $1 billion investment from mandatory funding to create this new National Network for Manufacturing Innovation.

Announced moving ahead now with 2012 Institute

- Pilot institute will be funded from existing resources and authorities from the Departments of Defense, Energy, and Commerce , NASA and NSF

The Scale-up gap

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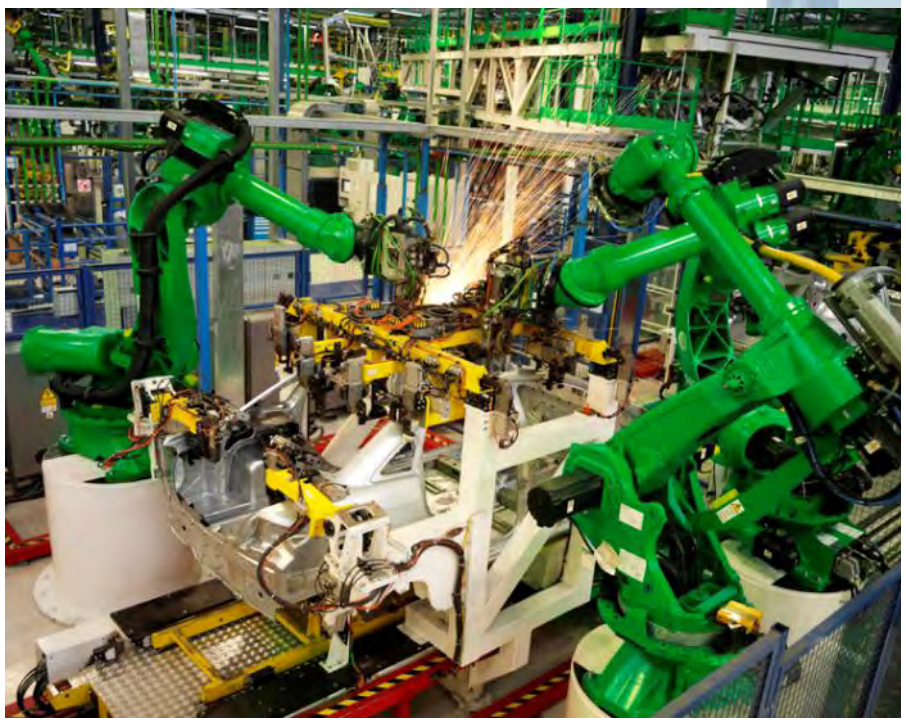

Common terms
The "valley of death"
The "missing Bell Labs"
The "industrial commons"

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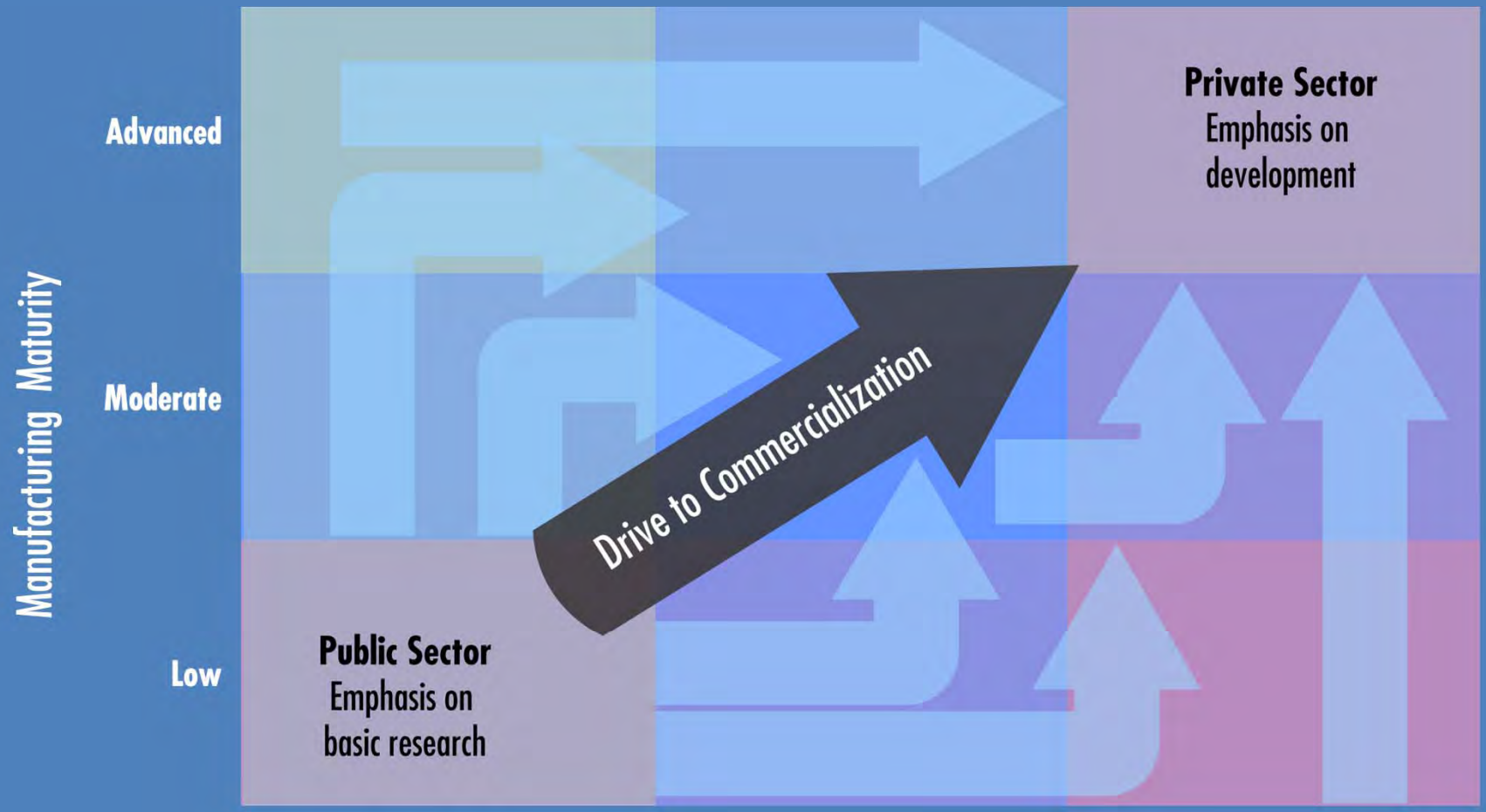
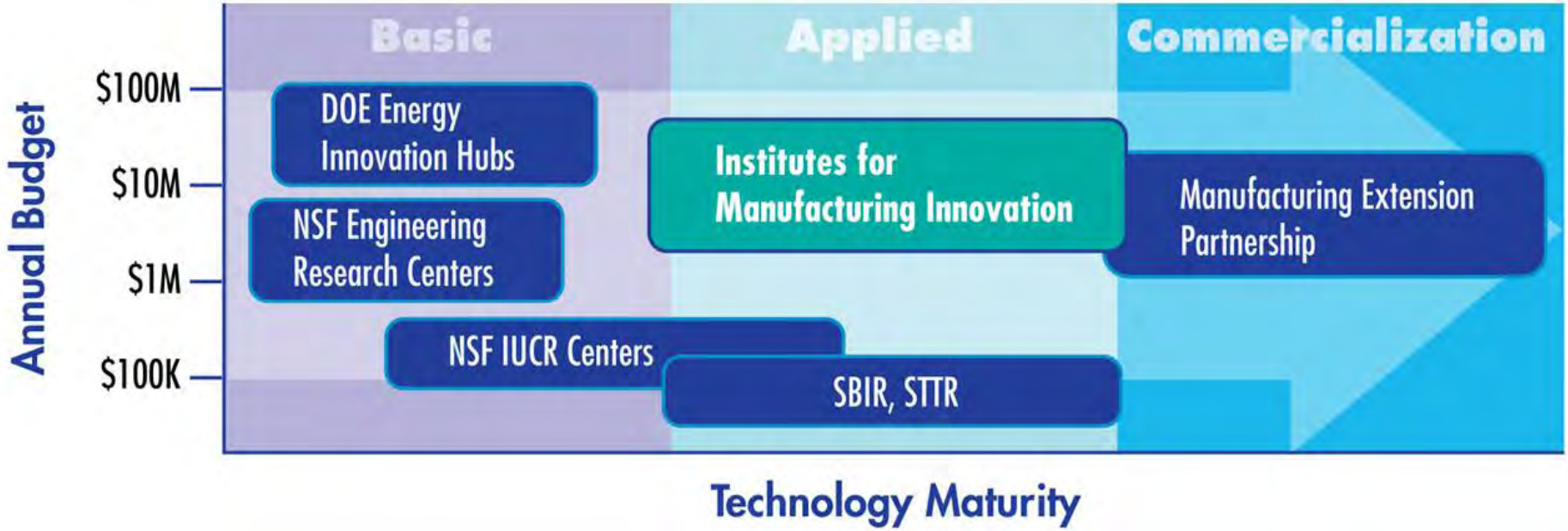
Scale up involves innovation, processes and systems development



Focus on Scale Up–Missing Middle

Basic science
Largely government funded

Commercialization
private sector owned/funded



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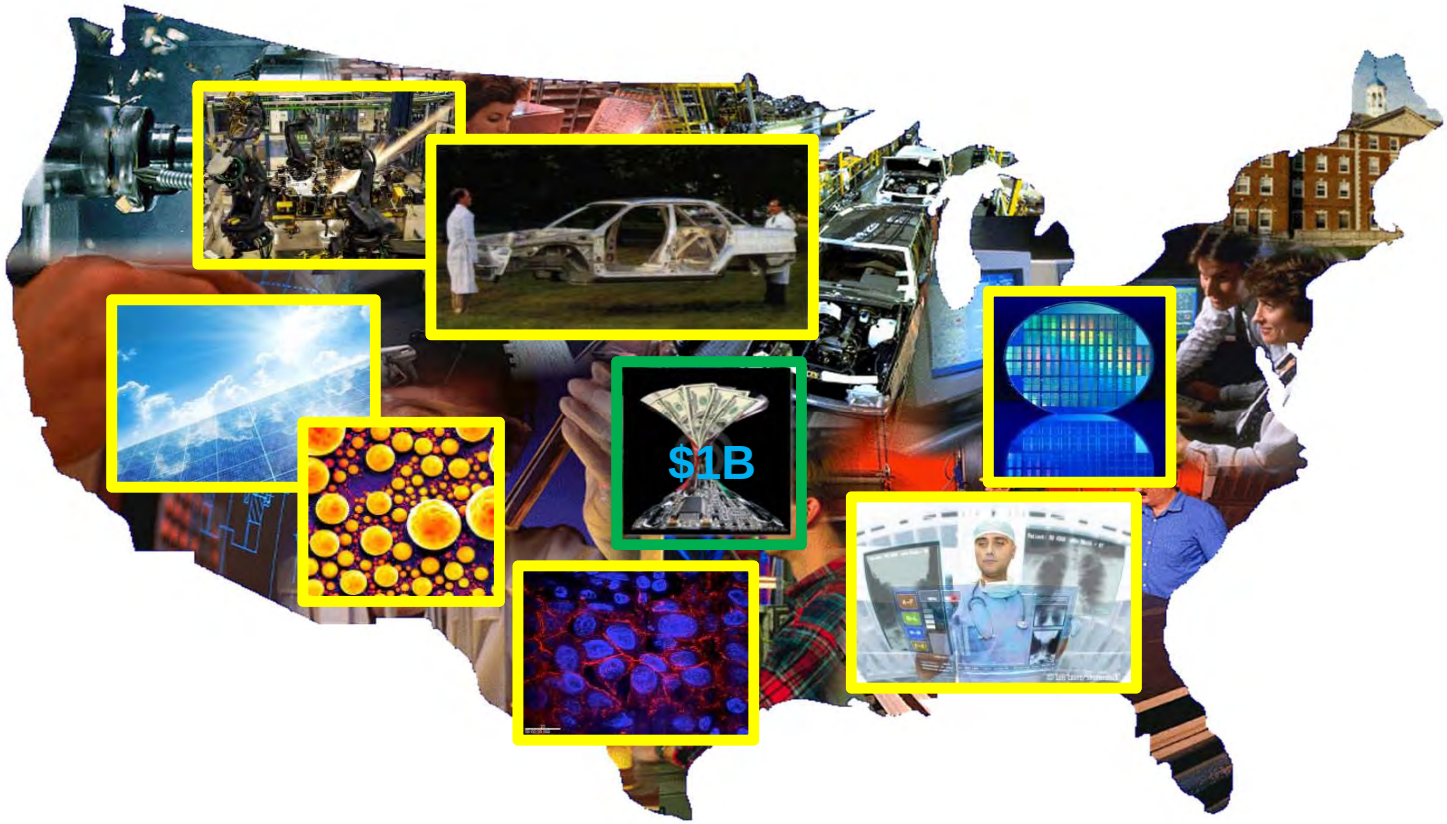
IMI Mission



Serve as manufacturing technology/business/education hub

- Integrate capabilities and facilities to address cross-cutting manufacturing challenges
- Focus on advanced manufacturing opportunities to expand industrial production in the United States via sustainable competitive advantages

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IMI Major Activities

Applied Research & Demo projects for

- reducing cost/risk on commercializing new tech.
- Solving pre-competitive industrial problems

Tech Integration - Development of innovative methodologies and practices for supply chain integration

Small/Medium Enterprises

- Engagement with small and medium-sized manufacturing enterprises (SMEs).

Institute

Education, technical skills and Workforce development

Education and training at all levels for workforce development

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Partnerships Essential

- **Grantee is self-assembled team of organizations**
  - Industry – large + SME's
  - Research organization
- **Partners may include**
  - Career and technical education institutions (e.g. Comm. Coll)
  - State, regional, or local economic development organizations
  - Professional associations; industry associations; or other not-for-profit organizations.

Courtesy: Univ. of Toledo

Governance

- **Independent Director and Board**
- **Network Leadership Council**
- **Support from Program Office**

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Beyond Research, Development & Deployment

- **Engage with Small Enterprises**
- **Multidisciplinary Approach**
- **Build the Workforce Industry Needs**
- **Catalyze and Foster Local Growth**

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All proposals welcome

IMI topic category examples

A Manufacturing Process e.g. Additive Manufacturing (IMI FY12 pilot)	**An Advanced Material** e.g. lightweight, low cost carbon fiber composites
An Enabling Technology e.g. smart, sensor enabled manufacturing for productivity and sustainability	**An Industry Sector** e.g. bio-manufacturing to enhance safety, quality, cost and consistency of bio products

Key Evaluation Criteria

- Technology focus
- RD&D plan
- Broad Impacts
- Partner resources
- Partner investments
- Sustainability plan

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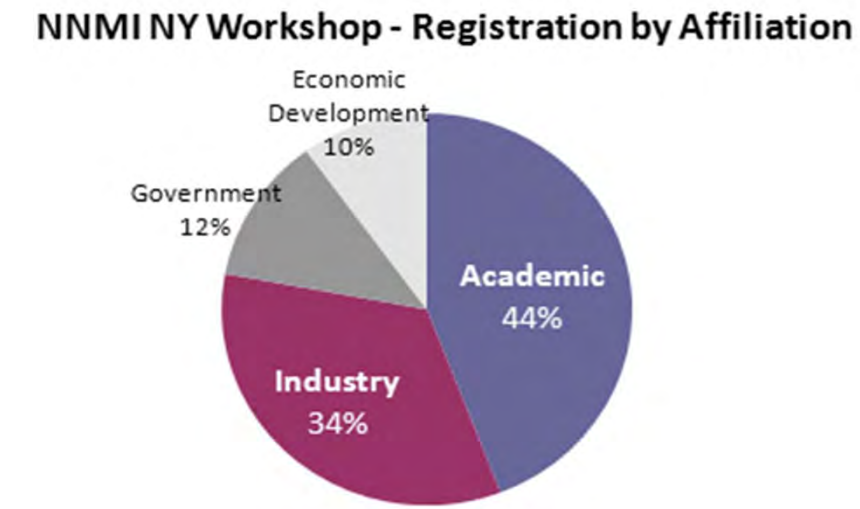
Seeking Broad Public Input

- Formal RFI issued – May 4th
- Public workshops around the nation
  1) Troy NY – April 25th at Rensselaer Polytechnic Institute
     - 252 leaders from Academia, Industry, regional government and economic development
     - Report to be issued on input, used as basis for future workshops

  2) Cleveland OH – July 9th

  Additional workshops TBA
- Inputs on manufacturing.gov
- Online NNMI wiki
- All proposals welcome



www.manufacturing.gov

ABOUT THE ADVANCED MANUFACTURING NPO

To maintain the partnership's momentum, U.S. Commerce Secretary John Bryson has initiated formation of the National Program Office (Advanced Manufacturing NPO). Hosted by the National Institute of Standards and Technology (NIST), the office will be staffed by representatives from federal agencies with manufacturing-related missions as well as fellows from manufacturing companies and universities.

Also recommended in PCAST's advanced manufacturing report, the Advanced Manufacturing NPO is charged with:

- *Convening and enabling industry-led, private-public partnerships focused on manufacturing innovation and engaging U.S. universities, and*
- *Designing and implementing an integrated whole of government advanced manufacturing initiative to facilitate collaboration and information sharing across federal agencies.*

By coordinating federal resources and programs, the Advanced Manufacturing NPO will enhance technology transfer in U.S. manufacturing industries and help companies overcome technical obstacles to scaling up production of new technologies.

WHO IS PART OF THE ADVANCED MANUFACTURING NPO?

Advanced Mfg. Wiki for NNMI

https://collaborate.nist.gov/amnpo/bin/view/AdvancedManufacturingNPO/WebHome

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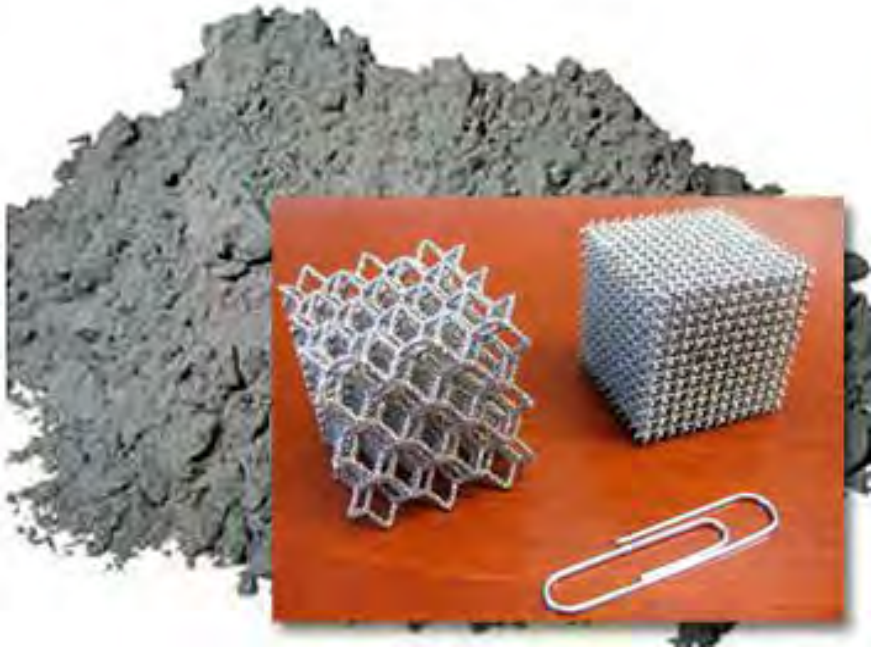
Additive Manufacturing

Additive Manufacturing



"20% of output of 3D printers is now final products, rather than prototypes.
By 2020 it may be 50%." – *The Economist*

"Additive manufacturing will be a $5.2B industry by 2020" - *Terry Wohlers*

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BENEFITS OF ADDITIVE MANUFACTURING

Revolutionary Production

Efficient use of Resources	Fewer processing steps, net-shape, less assembly, post-processing, less waste material, less energy
Small lot productions	Production in lot size of 1, mass customization
Rapid manufacturing	Tool-less, extreme cycle time reductions
Agile Manufacturing	Spare parts on demand, no stockpiles, simplified supply chain / logistics
Reverse Engineering	Scan and manufacture parts for legacy systems
Cost Reduction	Expendable / Disposable products

Enabling New Technology

Lightweight Structures	Weight removal increases mission capabilities
Modularity	New Designs to switch components in and out
Complexity	Exotic structures, Functionally-graded materials, fabricate moving joints, embedded electronics

Distribution A: Cleared for Public Release

BENEFITS OF ADDITIVE MANUFACTURING

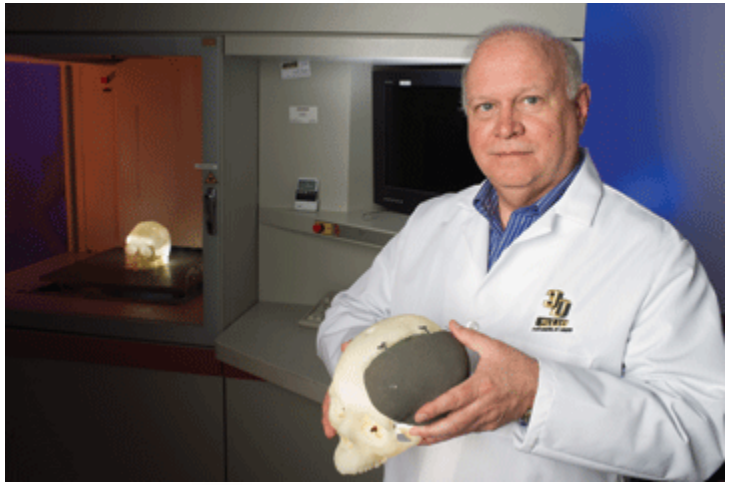
Local Production

Factory-less Production	Remote, mobile fabrication
Agility / Flexibility	Rapid response to changing missions
Shortening of Supply Chain	Potential use of local raw materials

Additive Manufacturing could enable "focused logistics":
Right part, quickly, but only when needed

Distribution A: Cleared for Public Release

DEPARTMENT OF DEFENSE APPLICATIONS



Custom cranial plates – Walter Reed

- *High value, complex parts*
- *Low and medium volume part production*
- *Legacy parts and electronics*
- *Remote, mobile fabrication*
- *Custom medical implants and devices*

Distribution A: Cleared for Public Release

BAA Process

Award Schedule
BAA released on 8 May 2012
Proposer's Day held on 16 May 2012
Proposal Due Date: 14 June 2012
Agreement Award ~ 15 Aug 2012

Questions: NNMI2012@wpafb.af.mil

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Thank you

For questions or comments please contact

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