



Realizing the Model Based Enterprise

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Advanced Enterprise Concepts

AF Manufacturing Technology

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Outline

- The DoD-wide Manufacturing Technology Program
 - The JDMTP
 - How the Strategic Plan addresses MBE
- Define “MBE” and identify challenges
- Highlight AF Activity
 - AFMC stance on TDP
 - AF ManTech strategy



Manufacturing Technology

- Defense-Wide Manufacturing S&T Mission
 - Concurrently develop and mature cross-cutting manufacturing processes with new and emerging technologies
- Objectives
 - Be a cost-efficient and collaborative development process
 - Reduce cross-cutting manufacturing and technology risk and accelerate product-ready technology insertion
 - Align R&D investments with suitable levels of technology maturity or corrective options in advance of Milestone B decisions
- Metrics
 - Increase affordability, producibility, reliability, and predictability of performance
 - Decrease cycle time, manufacturing cost, life cycle cost



Manufacturing Technology Overview

ManTech carries out its mission through programs in the Military Departments, participating Defense Agencies and OSD.

ManTech Mission:

ManTech anticipates and closes gaps in manufacturing capabilities for affordable, timely, and low-risk development, production, and sustainment of defense systems.

Defense Manufacturing Vision:

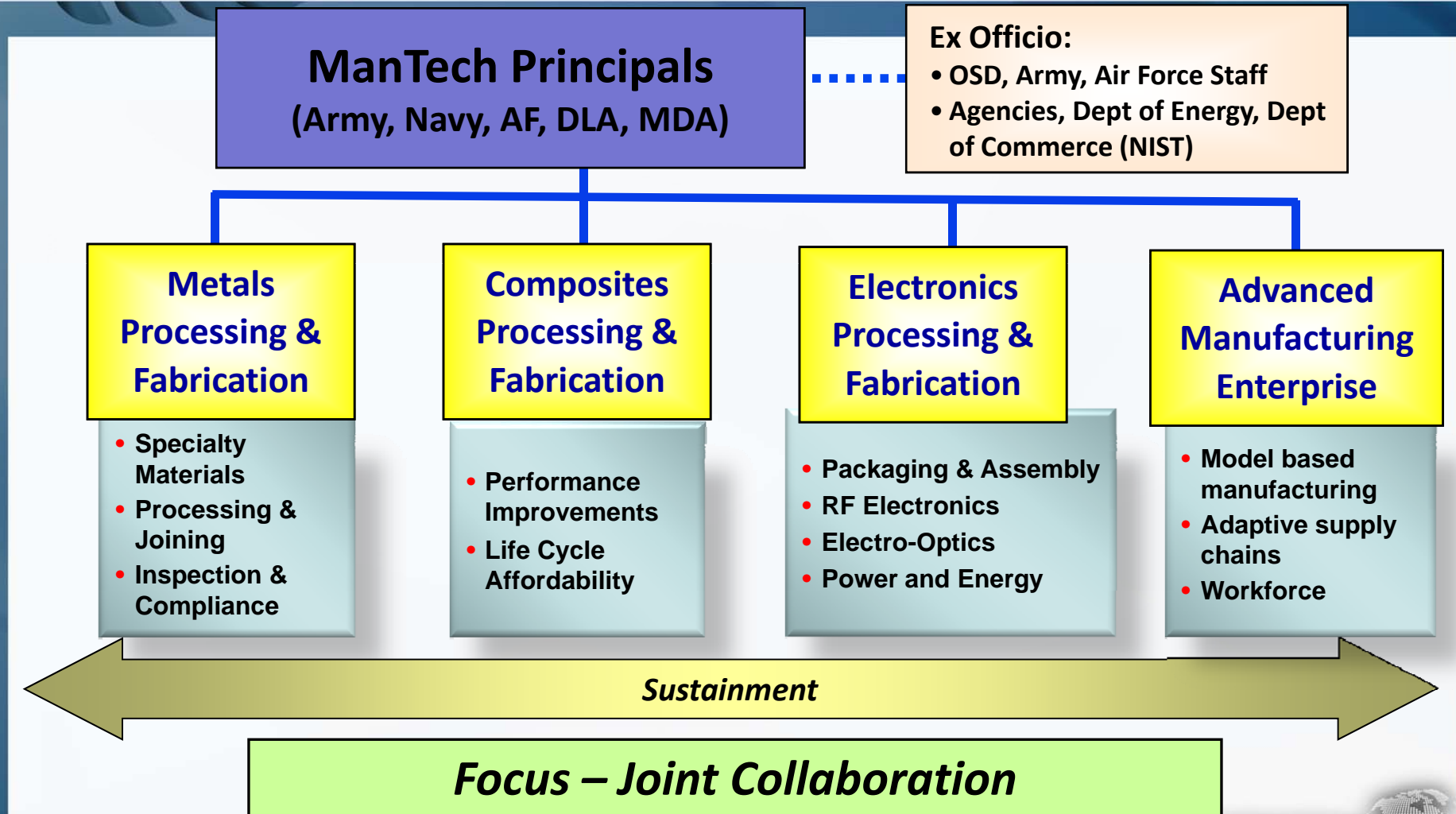
A responsive, world-class manufacturing capability to affordably and rapidly meet warfighter needs throughout the defense system life cycle





ManTech Overview

Joint Defense ManTech Panel (JDMTP)





ManTech Strategic Plan

- The DoD ManTech Strategic Plan
 - The Strategic Plan congressionally directed by NDAA (Section 238) 2008 language was signed by AT&L on March 2009
- Strategic messages include:
 - Strong, positive support for ManTech program in all camps
 - Affordability remains an overarching concern
 - Workforce concerns are pervasive
 - Institutional focus on "Manufacturability" is strategically critical
 - Important--keep championing Manufacturing Readiness

Report can be found at www.dodmantech.com

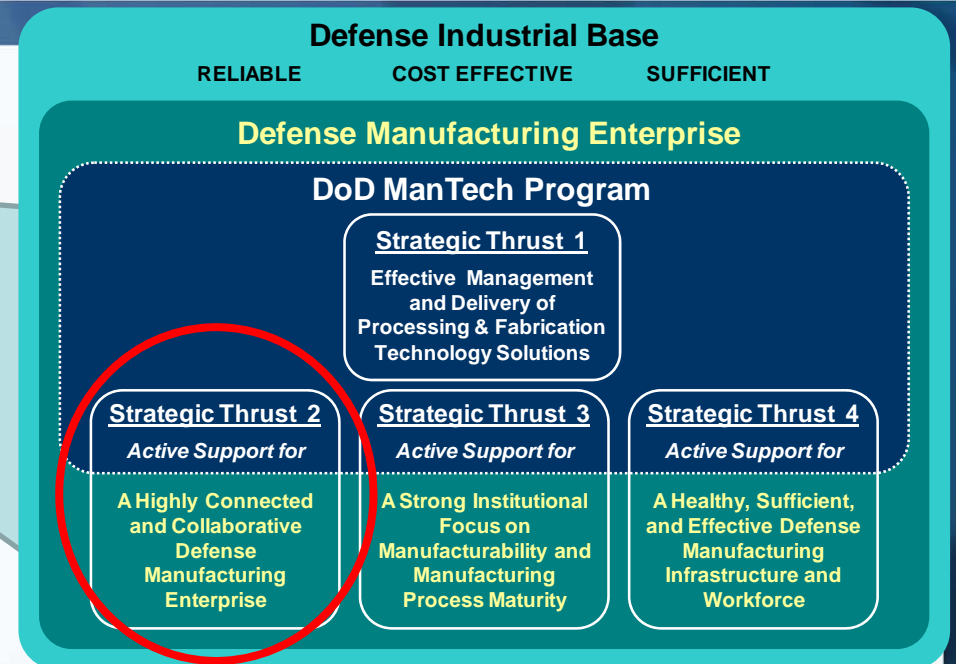
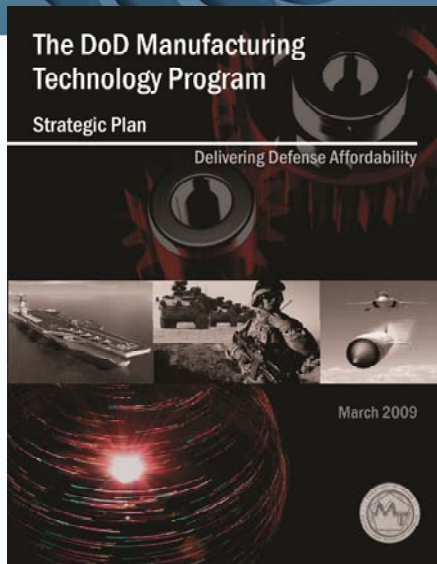


The Strategic Plan reinforces ManTech's critical role in defense acquisition and sustainment.





Strategic Plan and MBE



“...collaborative design environment between engineering and design, production and test, and the manufacturing supply chain...a highly integrated design for manufacturability capability, increased fidelity cost modeling, pre-production test and validation, and first article quality.”

“...the structure required for a synchronized and secure defense manufacturing enterprise, with real-time visibility into both product lifecycle design data and manufacturing and support capabilities.”

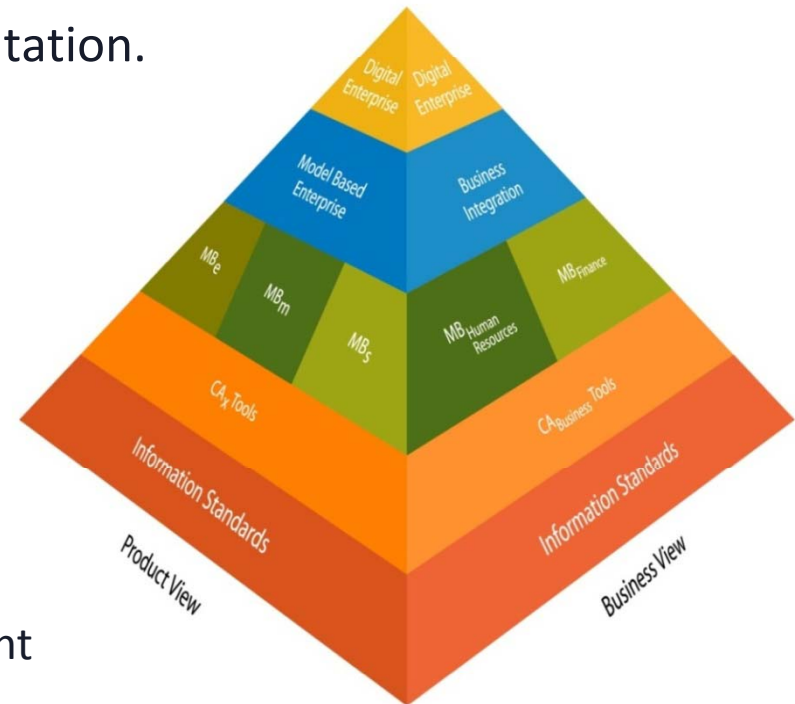
“adoption and integration of commercial manufacturing practices within the defense manufacturing enterprise.”





What is MBE?

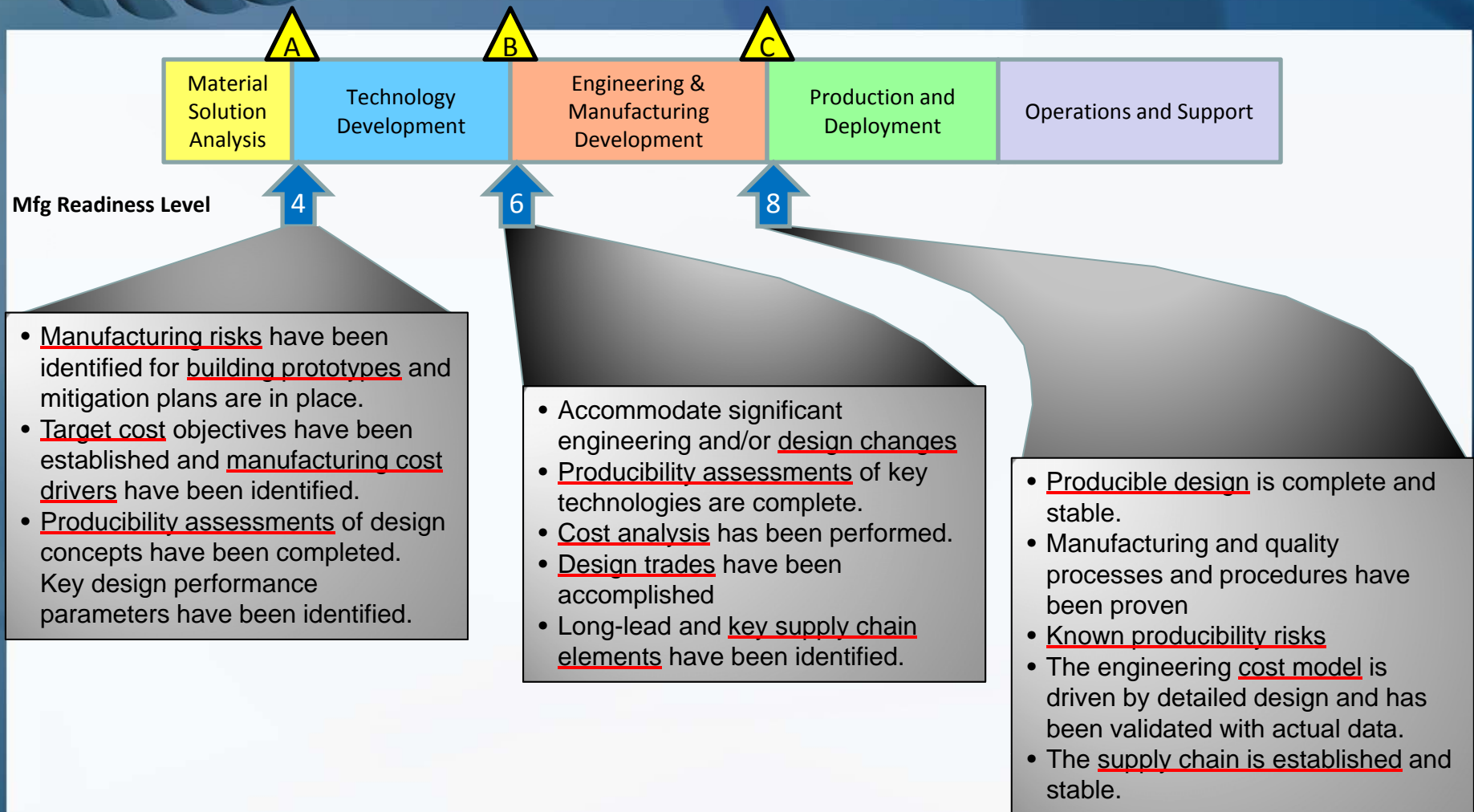
- What is a “model?” Answer: a representation.
 - A physical entity
 - A process or procedure
 - A set of behaviors or rules
 - Static vs. dynamic
 - Simulation
- What is the “enterprise?”
 - Set of all resources necessary for:
 - Development, production, & sustainment
- Therefore, we seek to organize and manage the functions of the enterprise utilizing accurate models to the maximum extent practical





MBE Impacts

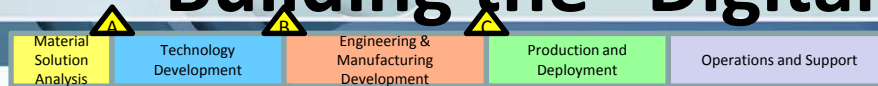
Critical Acquisition Milestones





MBE Impacts

Building the “Digital Thread”



- **Manufacturing risks** have been identified for **building prototypes** and mitigation plans are in place.
- **Target cost objectives** have been established and **manufacturing cost drivers** have been identified.
- **Producibility assessments** of design concepts have been completed. Key design performance parameters have been identified.

- Cost modeling of design alternatives
- Producibility scoring during AoA
- Distributed, collaborative concept development

- Accommodate significant engineering and/or **design changes**
- **Producibility assessments** of key technologies are complete.
- **Cost analysis** has been performed.
- **Design trades** have been accomplished
- Long-lead and **key supply chain** elements have been identified.

- Cost modeling and analysis integrated with 3D CAD
- Producibility tool integration
- Distributed, collaborative design for virtual prototyping
- Verified product & process models
- Supply network optimization

- **Producible design** is complete and stable.
- Manufacturing and quality processes and procedures have been proven
- **Known producibility risks**
- The **engineering cost model** is driven by detailed design and has been validated with actual data.
- The **supply chain is established** and stable.

- Fully annotated 3D tech data package
- Verified producible design
- Distributed manufacturing process simulation
- Verified component and process cost models
- Visualization of end-to-end production and test processes

Model Based Manufacturing, Network Centric data environments, Collaborative Modeling and Simulation capabilities, Commercial practices





Current AF State

- AFI 63-101, Acquisition and Sustainment Life Cycle Management
 - Rendered prior guidance obsolete, but mute on 3D tech data
 - AFMC evaluating next steps
- Support for MIL-STD-31000
- More CLS confounds tech data issues
- Infrastructure Issues
 - Consolidating JEDMICS at single site (WR-ALC)
 - Dwindling expertise (1 Engineering Data Management Officer (EDMO) left out of 12 @ WPAFB)



AF ManTech Strategic Planning

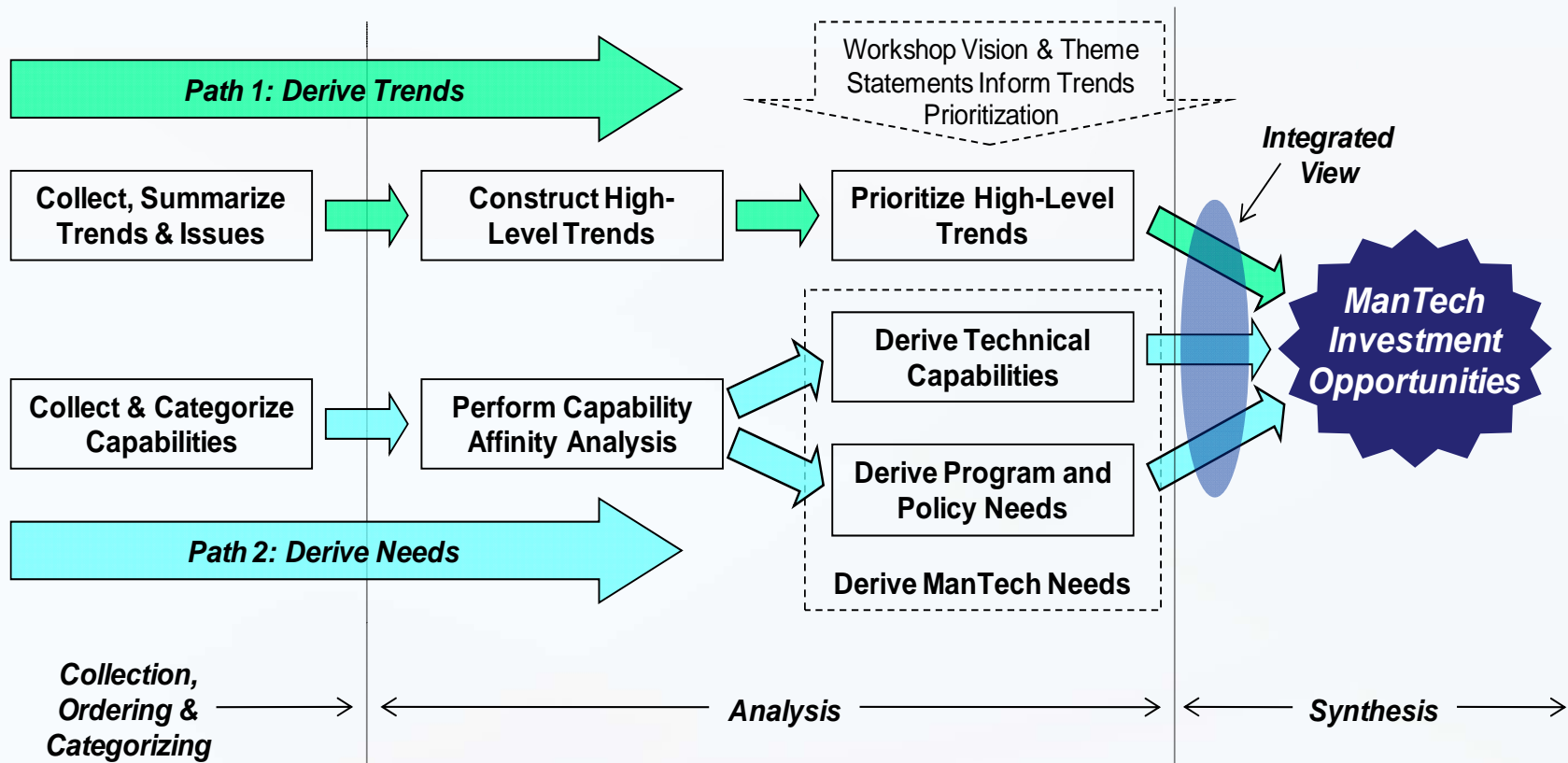


Figure 1. Synthesis of AF ManTech Opportunities, Derived from Workshop Outcomes



AF ManTech Vision & Strategy



VISION

An Agile, Next Generation Manufacturing Industrial Base
Strategic Thrusts

- Moving Manufacturing to the Left
- Cradle to Cradle Digital Thread for Manufacturing
- Responsive, Integrated Supply Base
- Factory of the Future

AF ManTech MISSION

*Strengthening Defense
Manufacturing Capabilities*

Enduring Priorities

- Manufacturing Assurance
- Manufacturing Innovation
- Affordable Acquisition
- Affordable Sustainment
- Quality People & Infrastructure

**LONG-TERM
INFLUENCE ON
PLANS & EXECUTION**

Technology Roadmaps

- Adv Mfg Enterprise
- Propulsion
- Structures
- C4ISR
- Sustainment
- Armament



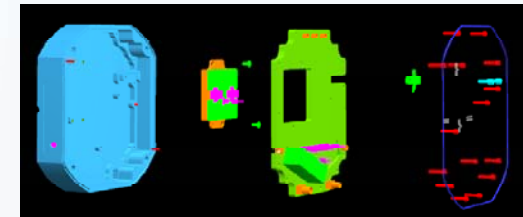
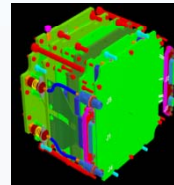
Annual Business Plan



AF Advanced Mfg Enterprise

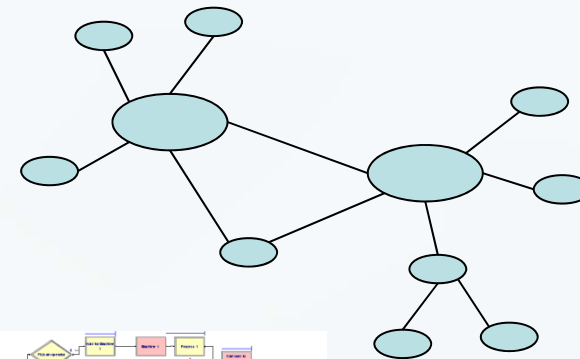
- Virtual Manufacturing Thrust

- Product and process modeling
- Visualization capabilities
- Technologies enabling the digital thread



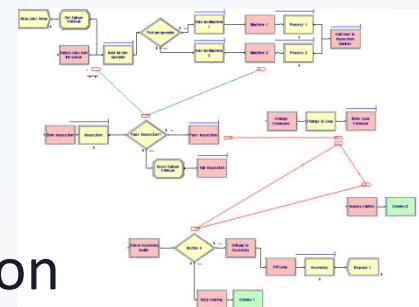
- Integrated Enterprise Thrust

- Reassessment of SCM
- Modeling and design of supply networks
- Advanced understanding and mgmt of risk



- Advanced Operations Thrust

- Renewed emphasis on robotics
- Smaller, modular production capability
- DDM, SLS, SLA, etc. – lot size insensitivity



- Emphasis on pilot demonstration



Final Thoughts

- Gov't must become a better customer
 - Modern supply chain mgmt principles
 - Smarter buyer...not just hardware
- Technology has outpaced practice
 - Extraordinary capability exists now
 - Entire enterprise needs to ask better questions
- Academia is a willing and (very) able partner
 - The distance from research to implementation is smaller
- The Defense Mfg Technology community is energized



Thank you

