AUBURN UNIVERSITY | SAMUEL GINN COLLEGE OF ENGINEERING

Developing a Model Based Enterprise (MBE) Strategy within Army Organizations

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The Question

Is the DoD/Government going to be involved in Defense System Design, Development, Realization, Use, Sustainment, and Disposal in the future?

- If the answer is no then we will simply contract out all system development and sustainment functions.

- But, if the answer is yes, then we must prepare for the tsunami of 3D data and digitalized technical and business processes coming.

The Current State of MBE Capabilities

- A focus on geometric related information with no associativity.
- Multiple CAD/CAM environments in the supply chain.
- Lack of Interoperability among different systems.
- Most operations are in different degrees of ‘silo’ effect.
- Supply chain collaboration is manual at best.
- There is a lack of in-depth model exchange validation capability.

Future State of MBE Capability

- More than just replacing drawing type information exchange to include design intent and context.
- Robust interoperability among disciplines and organizations.
- Responsive and adaptive to the changing market place and technology.
- Improved product life cycle time and costs.
- A building block for accelerating the maturation of the full MBD schema and communications across silos.

Key factors required to implement MBE

- A functioning enterprise Product Data Management (ePDM) system.
- Documented business processes to guide MBE tool selection and configuration.
- Policy regarding the acquisition, contracting and use of 3D MBD.
- Consistent leadership emphasis to affect cultural change, and digital product data management (including fully annotated 3D models).
- MBE tools and processes must be common, but can be tailored to each organization and site based on mission.
- This will not be achieved through chance and random application, it will take a strategic plan to guide and manage the initiative and subsequent culture change.

- Reality
  - MBE has not achieved the level of urgency of other activities and issues within Program Management functions.
  - A concerted effort must be brought to bear on this issue to continue to provide superior service to customers.
  - Even if the PMO wanted to implement MBE they don't have the personnel or skill sets.

Project Approach

- Develop the vision of MBE for a typical Program Management Office and the Army support organizations engaged with a weapon system.
- Document the data processes within a PMO and the support functions that support the PMO.
- Develop a scenario of a typical PMO with MBE capability.
- Create the Business Case for the implementation of MBE at a typical PMO.
- Establish a framework for the implementation of MBE capability.

Additionally,

- Develop requirements for an Army Organic Industrial Base (OIB) MBE solution.
- Coordinate and demonstrate alignment of the Army OIB MBE requirements with the Lifecycle Product Data Management requirements.
- Identify and catalog standards related to Model Based Enterprise.

Status

"For RDECOM overall, we must have a robust PLM/PDM to help us with more than just manufacturing. We need to tie into the logistics and provisioning folks also."

- Current efforts have not actually identified the complete pool of stakeholders in the MBE/Digital technology arena.
- Items we need from the complete (or almost complete) list of stakeholders (in simple terms):
  - What product/process data do you touch?
  - How do you touch it?
  - What systems do you touch it with now?
  - Are there ways in which you wish you could touch the data that would improve your efficiency, quality, costs, etc.?
- From this we will build the requirements document which is the first deliverable, the requirements document.

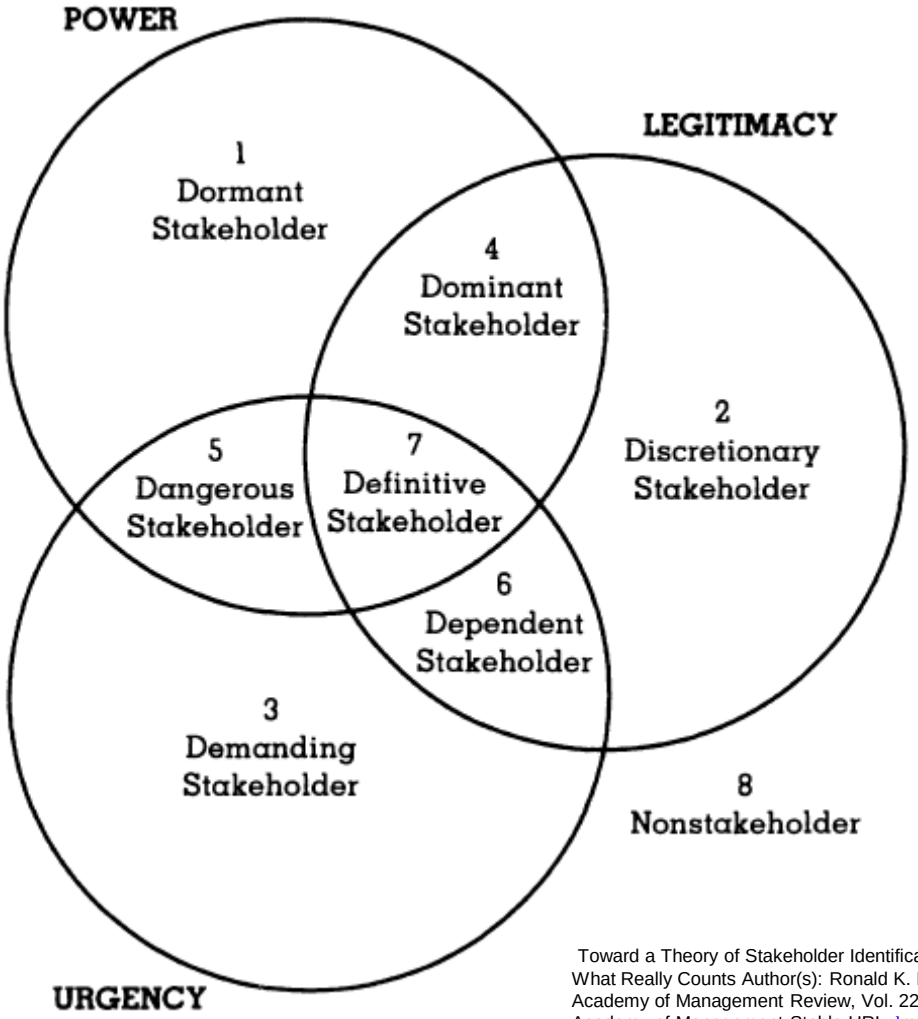
SE Approach to MBE Capability

- Document and Understand Current State
- Clearly Stated Problem Definition
  - Document and Describe Concept of Operations
- Identify ALL stakeholders
  - Identify Stakeholder Needs and System Desires
- Develop a set of Requirements
- Identify Gaps between Current Capability and System Requirements

Current State

- We are in the System Definition phase of the Army Strategy for MBE
- System Definition can come from many directions:
  - Analysis of the Current System
  - Threats
  - Performance Gaps
  - Technical Contacts
  - Projected capabilities
  - Deficiencies
- There are different operating scenarios for management of the information networks within Army
  - Vacated ownership
  - Internally Managed
  - Others????
- It is vital that the IPT understand how the systems are managed and used under each scenario
  - Policy
  - Management
  - Data Flow
    - Charted with explanations
- It is imperative that the team find and document all stakeholders
  - Create a list of Stakeholders in the demonstration system
  - Determine the salience of each stakeholder by understanding and documenting the stakeholder in terms of power, legitimacy and urgency
  - Identify and document Stakeholder needs and desires

Stakeholder Classification and Salience



Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts Author(s): Ronald K. Mitchell, Bradley R. Agle, Donna J. Wood Source: The Academy of Management Review, Vol. 22, No. 4 (Oct., 1997), pp. 853-886 Published by: Academy of Management Stable URL: http://www.jstor.org/stable/259247

So what?????

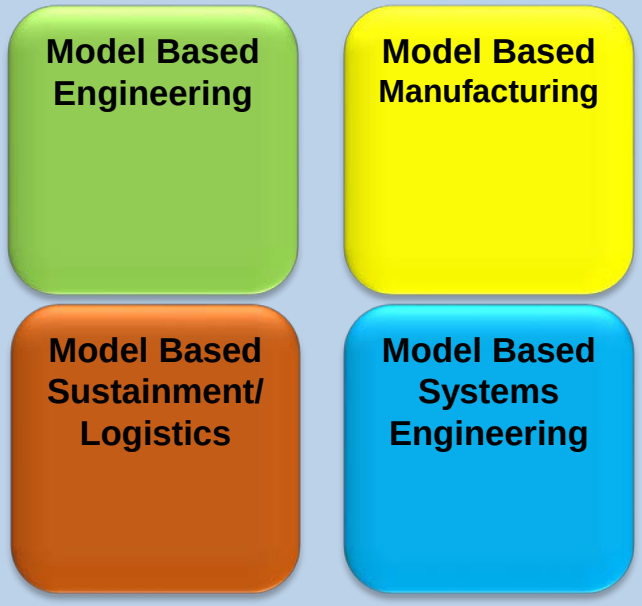
- We develop a strategy and framework for implementation of MBE capability in Program Management Offices and the Organic Industrial Base of the Army.
- How do we actually implement?
- How do you provide the skill sets?

Model Based Enterprise Capability Center

PM/Government

- Point Solutions
- Solving Today's Problem Focus
- Process Based

Model Based Enterprise Capability Center (MBECC)



Institutes DMDII/Centers of Excellence

- Industry, Academia, Government, Working Together
- Enterprise Level Solutions
- Technology Based

Foundational Standards

- Focus on Users and the Processes in Government PM Shops
- Overcome Culture
- Feedback Loop from Institute Developments in the Digital Thread
- Improve MB Capability in Government Organizations

Model Based Enterprise Capability Center

Model Based Engineering

- Design
- Planning
- Virtual Evaluation
- Prototype
- Tests
- Simulation

+MB Definition for Design and Development

Model Based Enterprise Capability Center (MBECC)

- **Model Based Manufacturing**
- **Model Based Sustainment/ Logistics**
- **Model Based Systems Engineering**

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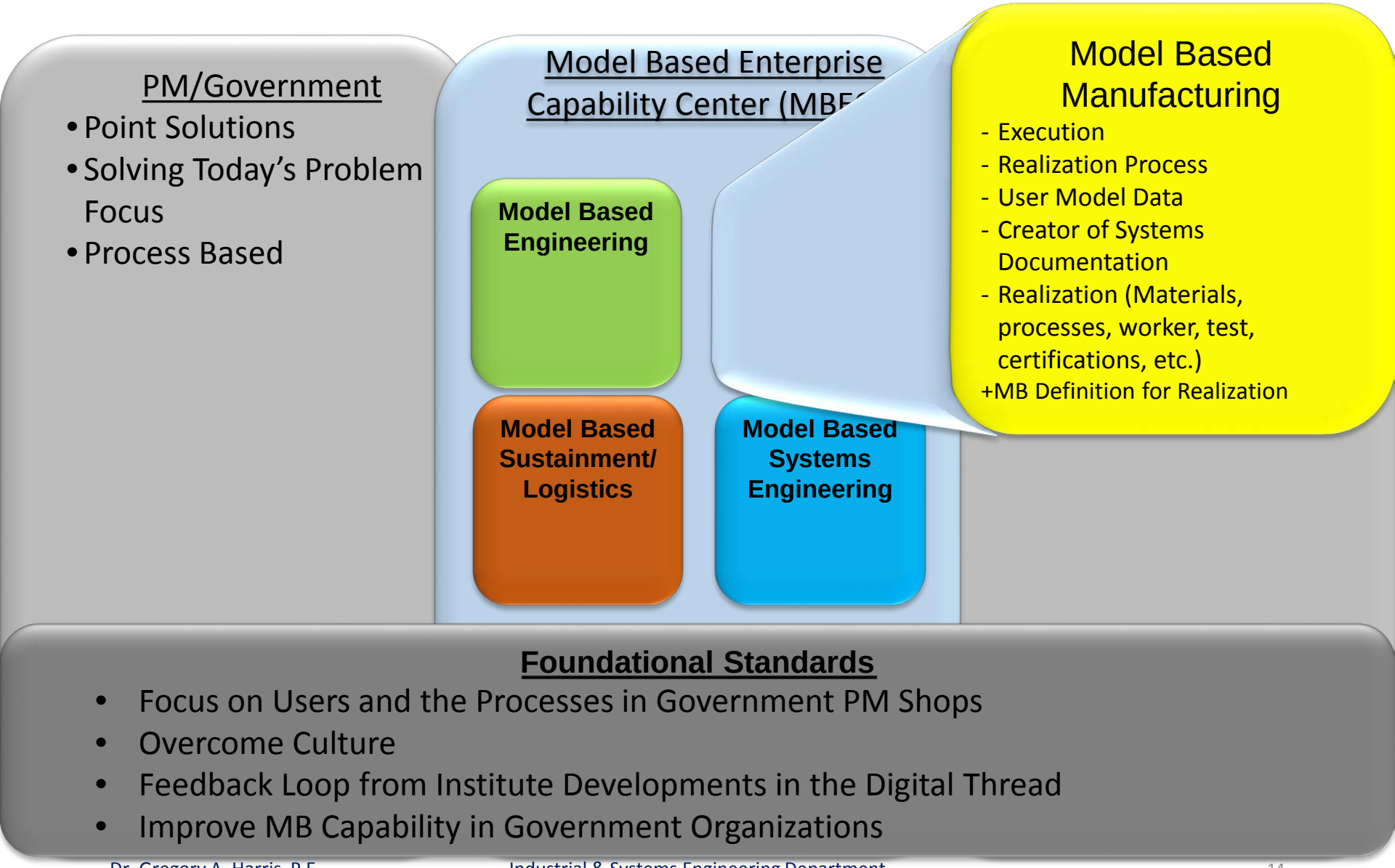
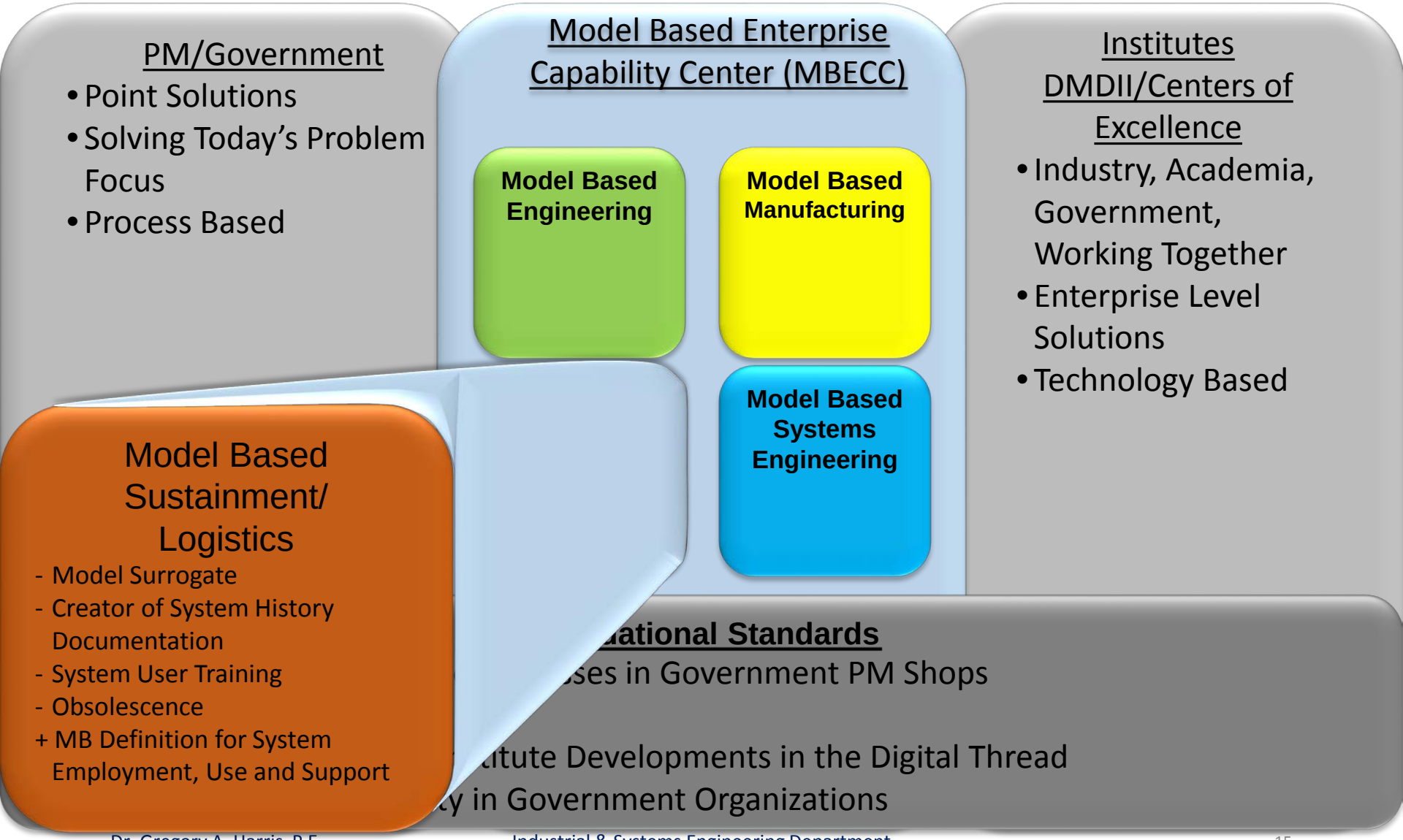
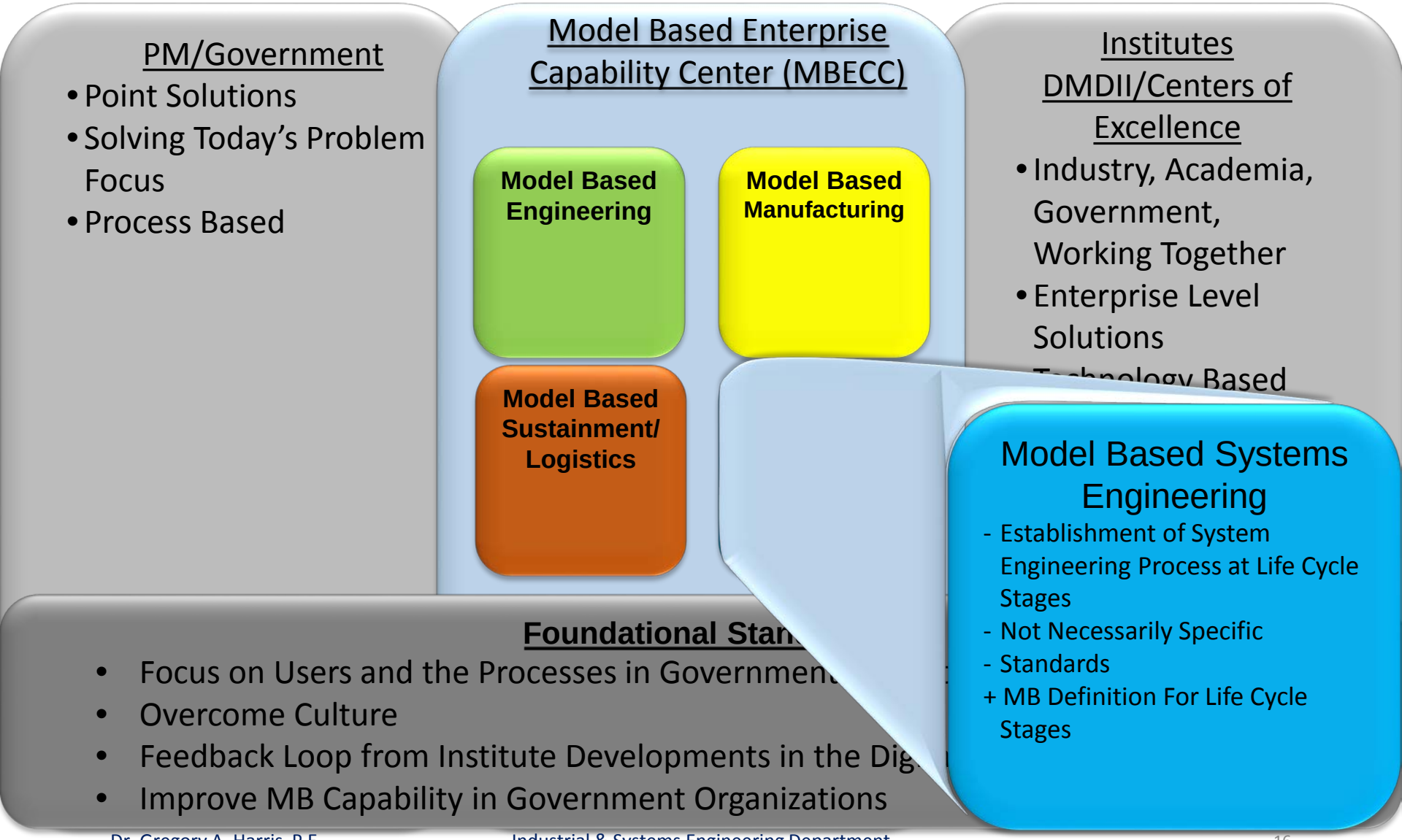


Model Based Enterprise Capability Center



Model Based Enterprise Capability Center



What Would We Need?

- Authority and approval to establish a center that consists of:
  - Government and Contract Subject Matter Experts
  - Model Based Engineering
  - Digital Manufacturing and Design
  - Verification and Validation
  - Testing
  - Training
- Funding for Support
- Chartered to Assist PMs with Becoming MB Capable

Questions?