

MBE AND U.S. MANUFACTURERS: IMPLEMENTATION THROUGHOUT THE DOD SUPPLY BASE

MBE Education & Training Summit

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Manufacturing Extension Partnership (MEP)

National Institute of Standards and Technology (NIST)

U.S. Department of Commerce



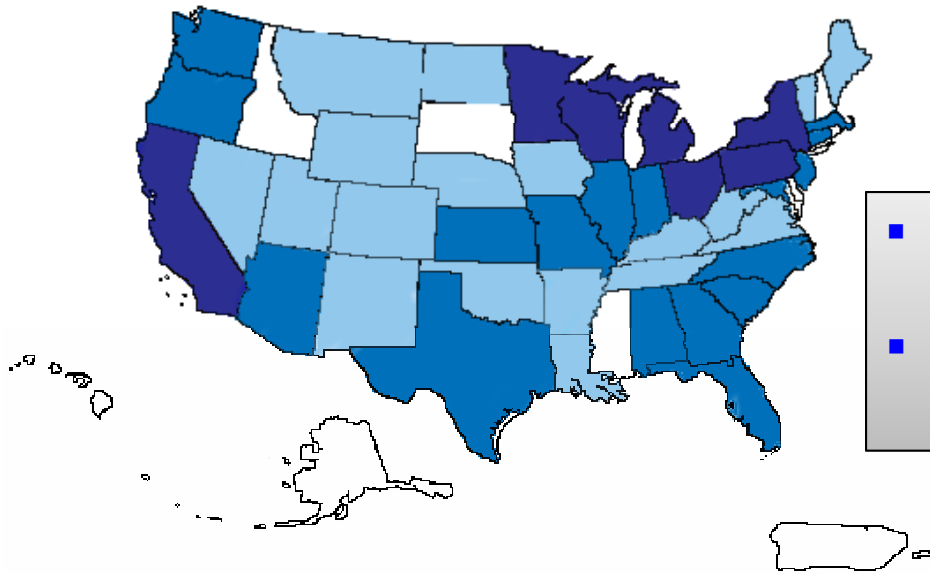
BRIEFING OUTLINE

- MBE Supplier Capabilities Assessment, Documentation Pilots
 - Results and Conclusions

- Suppliers: Understanding MBE Capabilities
 - Self Assessment, Potential MBE Capabilities Certification
 - Assistance in Determining Appropriate Level of Capabilities and Transition to that Level – Local MEPs

- Summary and Next Steps

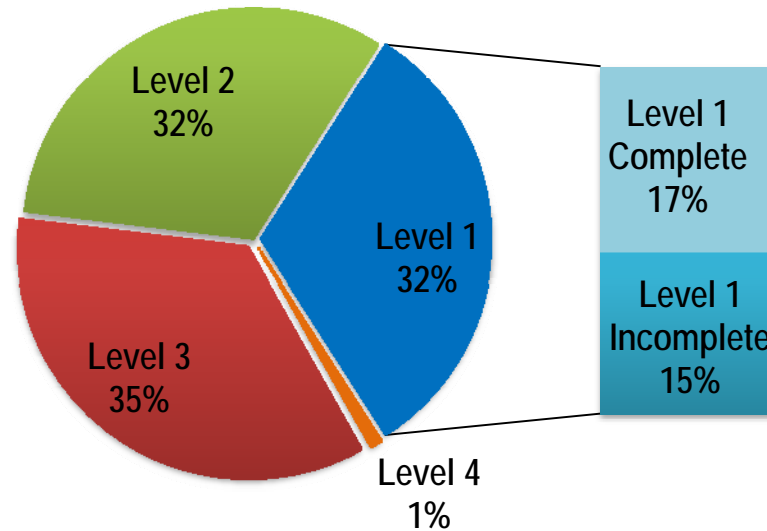
2009 MBE SUPPLIER CAPABILITIES ASSESSMENT



White: 0 Suppliers
Lt. Blue: < 5 Suppliers
Med. Blue: 5-10 Suppliers
Dk. Blue: >10 Suppliers

- MBE Assessment Team: ARL, NIST MEP, BAE Systems, MEP Centers
- Capabilities assessment performed for 445 military ground vehicle suppliers

- MBE Analysis Metric
- Analysis & Results: **2/3 of participating suppliers are ready to operate in an MBE environment**



More information on this assessment can be found in its report, located at www.model-based-enterprise.com

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MBE CAPABILITIES METRIC

- The MBE capability levels below on the left are for interpretation of the MEP 2009 Summer Assessment data only.
- The ManTech MTO MBE Capability Levels below on the right are the metrics that will be used for assessing MBE capabilities.

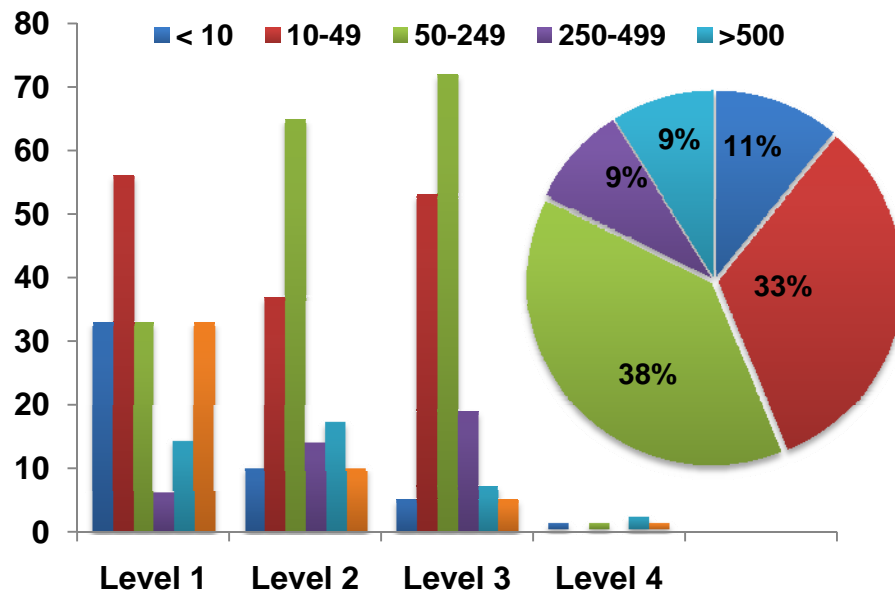
MBE Capability Level 1	MBE Capability Level 2	MBE Capability Level 3	MBE Capability Level 4	MBE Capability Level 5	ManTech MTO MBE Capability Level	Notes
Very little computer-driven/automated/CNC ops	Both CNC, manual ops	Majority of mfg processes are computer-driven / automated / CNC operations	All manufacturing processes are planned / programmed based upon 3D model info	All manufacturing processes are planned / programmed based upon 3D model info	Level 0: Model-centric drawings for design and manufacture, 2D drawing	Correlates to Capability Level 1 on the 2009 scale Operational basis is 2D drawings
Most or all ops based upon 2D drawings	Can accept 3D models from customers, but convert to 2D drawings to drive manufacturing processes	Planning, programming for manufacturing processes is performed using combination of 3D models, 2D models, 2D drawings	Significant cross-dept integration, re-use of info exists via extensive use of MRP, ERP systems	All company ops are integrated, driven by the same 3D model info	Level 1: Model-based manufacturing, 2D drawing and neutral CAD model	Correlates to Capability Level 2 on the 2009 scale Operational basis is 2D drawings, but have CAD capabilities, which implies CAD capabilities at some level
Receive, send electronic manufacturing files in .pdf or other 2D format	Small amounts of electronic cross-dept integration / re-use of info exists	Cross-dept integration exists via use of MRP system (or "MRP-like" software)	Some use of PDM / PLM systems occurs	- PDM / PLM systems serve as the data integration hub for company ops	Level 2: Native CAD based manufacturing, 2D drawing and native CAD model	Correlates to Capability Level 3 on the 2009 scale Operational basis is 3D models Still likely to see use of 2D data in operations Software systems assist in management and re-use of 3D model data across company operations
Use s/w to assist business/management functions, but little or no electronic cross-dept integration/re-use of data					Level 3: Model-based definition, 3D annotated model and light weight viewable	Correlates to a Capability Level 4 Operational basis is 3D models No 2D conversions Extensive electronic integration of data across company operations, most of which are automated
					Level 4: Model-based definition with data management, 3D annotated model and light weight viewable via PLM	Correlates to a Capability Level 5 Operational basis is 3D models Fully integrated company operations for asset visibility up and down the supply chain
					Level 5: Model-based definition with automated technical data package, digital product definition package and TDP	
					Level 6: MBD with automated TDP and on-demand enterprise access, digital product definition package and TDP via the web	

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2009 ASSESSMENT RESULTS

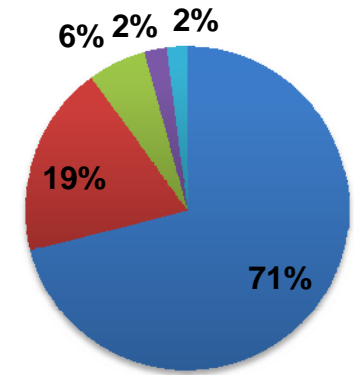
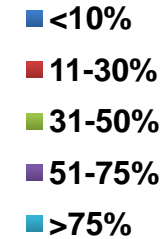
Supplier Demographics and Business Dynamics

Company Size



% of Business to a Single OEM

In this case BAE Systems



Participating Suppliers' Quality Certifications

ISO	258	TS	34
AS	75	QS	2
MIL	40	NADCAP	9

Information was also gathered on the participating suppliers' set-aside categories and product lines

MBE Level	Contract Manufacture/ Build-to-Print	Design & Build	Design, Outsource, & Assemble
1	6	21	8
2	99	78	38
3	132	85	41
4	4	3	2

Information was also gathered on % of participating suppliers' business that goes to defense vs. commercial customers

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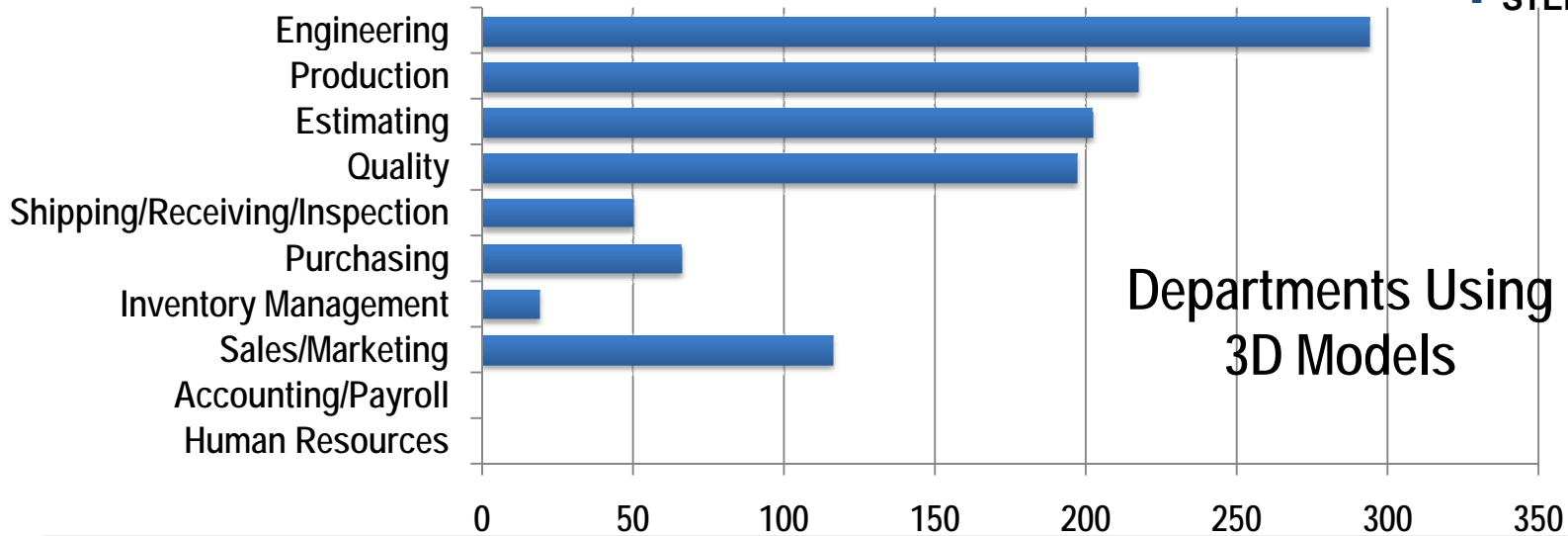
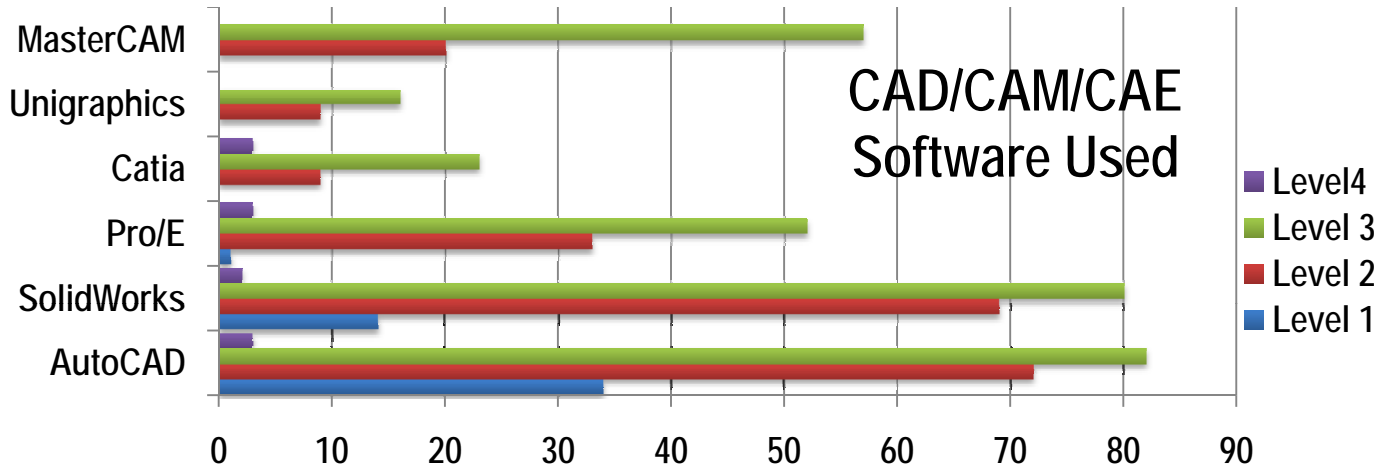
Use of 3D Software & Models

Which of the following data formats can your company utilize?

- PDF: 80%
- DXF: 70%
- IGES: 64%
- STEP: 62%

Which do you use most often?

- PDF: 24%
- DXF: 12%
- IGES: 11%
- STEP: 26%



2009 ASSESSMENT RESULTS

MBE Familiarity & Interest

- **Are you familiar with the concept of MBE?**
 - Level 1: 42% Yes; 49% No; 9% No Answer
 - Level 2: 77% Yes; 22% No; 1% No Answer
 - Level 3: 91% Yes; 9% No
 - Level 4: 100% Yes

- **Are you aware of the DOD move to 3D?**
 - Level 1: 51% Yes; 40% No; 9% No Answer
 - Level 2: 73% Yes; 26% No; 1% No Answer
 - Level 3: 100% Yes
 - Level 4: 100% Yes

- **Are you interested in learning about MBE and how it works?**
 - Yes 89%
 - No 8% (*37 of the 38 suppliers that answered "No" were Level 1 companies*)
 - No Answer 3%

- **Would you be willing to operate your production facility or line as an integrated part of an MBE environment?**
 - Level 1: 37% Yes; 16% No; 47% No Answer
 - Level 2: 73% Yes; 22% No; 5% No Answer
 - Level 3: 93% Yes; 7% No
 - Level 4: 100% Yes

2009 MBE Supply Base Assessment and 2010 MBE Documentation Pilots *Observations and Conclusions*

- MBE “capabilities” and “readiness” are not the same thing
- Not all companies need to operate at highest MBE capability levels
- MBE / 3D TDPs are not yet perfect – NEED model validation
 - *Strongly supports DOD MBE Model Validation/Certification work*

- 3D Models are helping overall manufacturer efficiencies...somewhat
 - Companies streamlining certain engineering, business functions because of 3D MBE models ... BUT ...
 - Companies generally not changing overall operational approach to fully capitalize on benefits of 3D models

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Suppliers: Understanding MBE Capabilities

- MBE Website: www.model-based-enterprise.org
 - Developed by Catalyst Connection to house info, resources to keep defense suppliers informed of MBE implementation efforts, development opportunities, events, etc.
 - Designed for suppliers to consult for info, updates, guidance

- MBE Assessment
 - Suppliers should 1st conduct self assessment to determine baseline MBE capabilities
 - *Self assessment tool on MBE website*
 - Suppliers should consider market implications of their MBE capabilities state to determine if they are at appropriate level
 - Should involve interactions with and consideration of current, future customers
 - *Consider consultation with local MEP Center*

ManTech MTO MBE Capability Level	Notes
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THE MEP PROGRAM IN SHORT....

- **MISSION** – “To act as a strategic advisor to promote business growth and connect manufacturers to public and private resources essential for increased competitiveness and profitability. ”
- Program started in 1988 to address “market failures” affecting competitiveness of small U.S. manufacturers.
- 60 centers with ~ 400 field locations
 - System wide, Non-Federal staff is ~ 1,600
 - Contract with over 3,000 third party service providers
- MEP System budget ~ \$300M – Federal / State / Industry
 - 1/3 Federal (\$124.7M FY10), ~1/3 State and ~1/3 Industry (fees for services)
- MEP Program and Center performance measured per impact of services on client firms.
 - Approximately 33,000 manufacturing client interactions in FY09 (projects, workshops, etc.)
 - Aggregate impacts include \$9.1B increased/retained sales; \$1.7B new client investment; \$1.4B cost savings; 52,948 jobs created and retained *



**MEP • MANUFACTURING
EXTENSION PARTNERSHIP**

**Based on 2009 independent survey of clients w/projects completed in FY08*

MBE SUPPLIER CAPABILITIES CERTIFICATION

A Potential Next Step to Pull it all Together

An MBE Supplier Capabilities Certification would allow:

1. DOD Agency/OEM customers to have a *reliable system of MBE capabilities evaluation for the supply base*.
 - *could also have commercial applicability*
2. The DOD to clarify its intent regarding MBE and *provide a clear path forward for suppliers* looking to develop business relationships with defense customers
3. A *fair and reliable way for manufacturers to demonstrate, advertise their commitment to MBE operations and their capability* to operate in an MBE environment
 - *potentially for both defense and commercial markets*
4. A *coordinated DOD implementation path to ensure supply base transformation* as intended by the DOD's significant MBE investments.

POTENTIAL MBE CERTIFICATION PROCESS FOR COMPANIES

- Certification could occur via appropriate registrar(s) / enforcement using the selected, adopted national standard
 - (Mil-Std, Industry/ASME/ISO, hybrid)
- Assistance could be made available to companies to help:
 - understand and navigate certification process
 - understand appropriate certification level to target for each individual company in line with business strategies, objectives
 - progress toward desired, advanced levels

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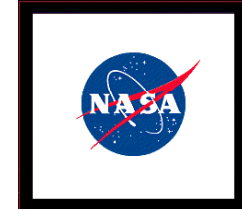
SUMMARY AND NEXT STEPS

- MBE enables streamlined, computed integrated manufacturing operations
- MBE is the future of DOD supply chain ops
- Work conducted to date relating to MBE Supplier Assessment and Development indicates DOD supply base is ready to implement MBE at a basic level
- Significant work is occurring and progress is being made to develop the technical and program/policy infrastructure for MBE



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SUMMARY AND NEXT STEPS



- Supplier Capabilities Assessment is appropriate 1st step for manufacturers interested in pursuing MBE as part of their approach to supplying to the DOD
 - *could eventually lead to MBE Capabilities Certification*
- MEP is natural resource to assist supplier MBE implementation and raise “Supplier MBE Literacy”
 - *national coverage – interact with tens of thousands of U.S. manufacturers each year*
 - *significant participation in Supply Base Assessment, Supplier awareness, MBE pilots*
 - *additional MBE Supplier Summits being planned for 2011*
 - *already serve similar functions for Lean, Quality certification programs*
- *MBE Website contains relevant info, resources, updates, announcements that suppliers will need to implement MBE.*

