# MBE Supplier Capabilities Assessment & Potential Certification Development

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**Montana Mallett**
Business Specialist
301-975-3856
mmallett@nist.gov

**David C. Stieren**
Manager, Technology Acceleration
201-975-3197
david.stieren@nist.gov

# AGENDA

- 2009 MBE Supplier Capabilities Assessment
  - Process
  - Results
  - Conclusions
  - Phase 2

- Potential MBE Supplier Capabilities Certification Development
  - Purpose
  - Benefits
  - Process

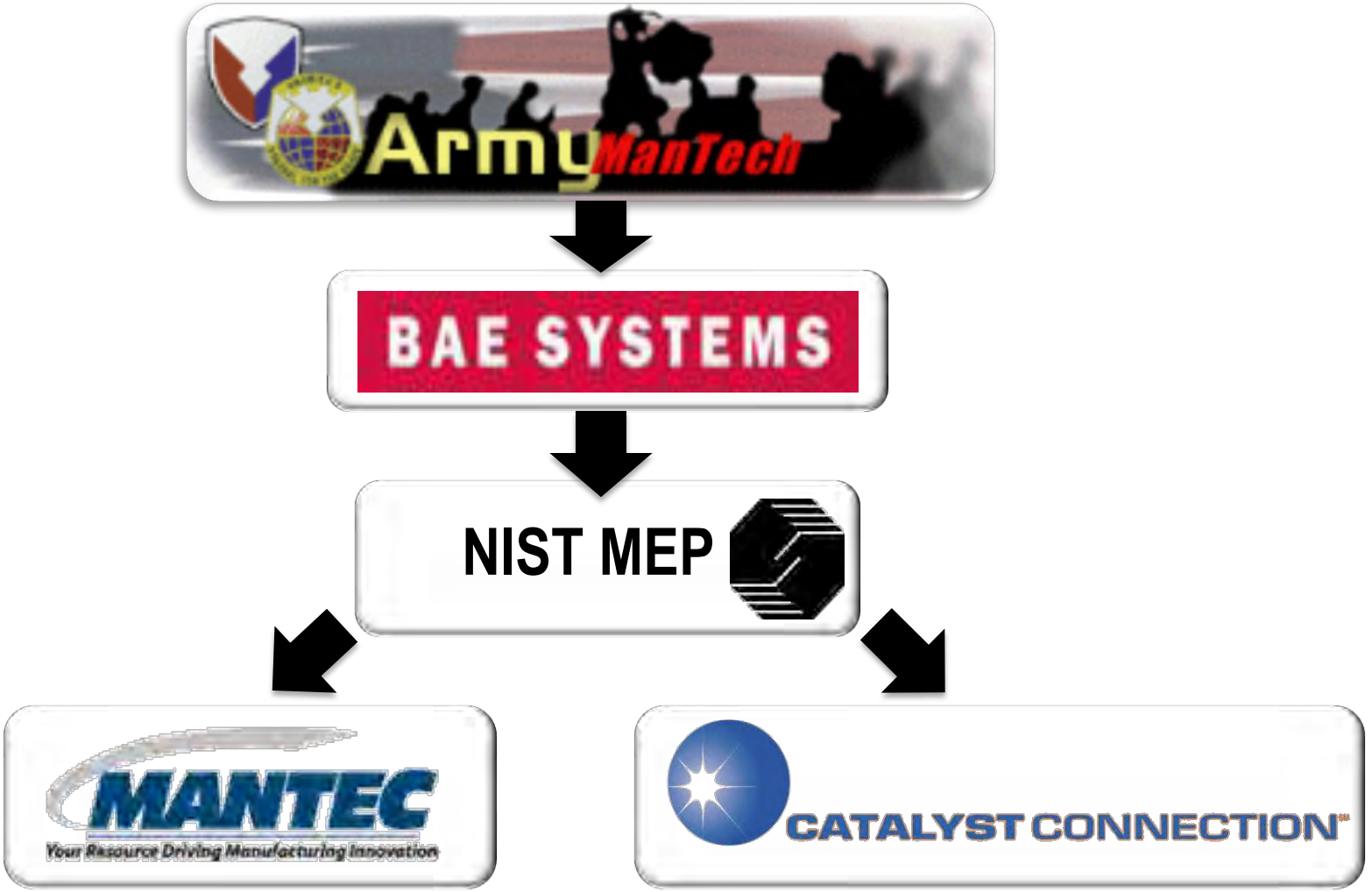
# 2009 MBE CAPABILITIES ASSESSMENT

- **Spring 2009:** 10 onsite assessments of BAE selected military ground vehicle suppliers

- **Summer 2009:** Online Assessment
  - 850 military ground vehicle suppliers contacted
  - 455 suppliers assessed

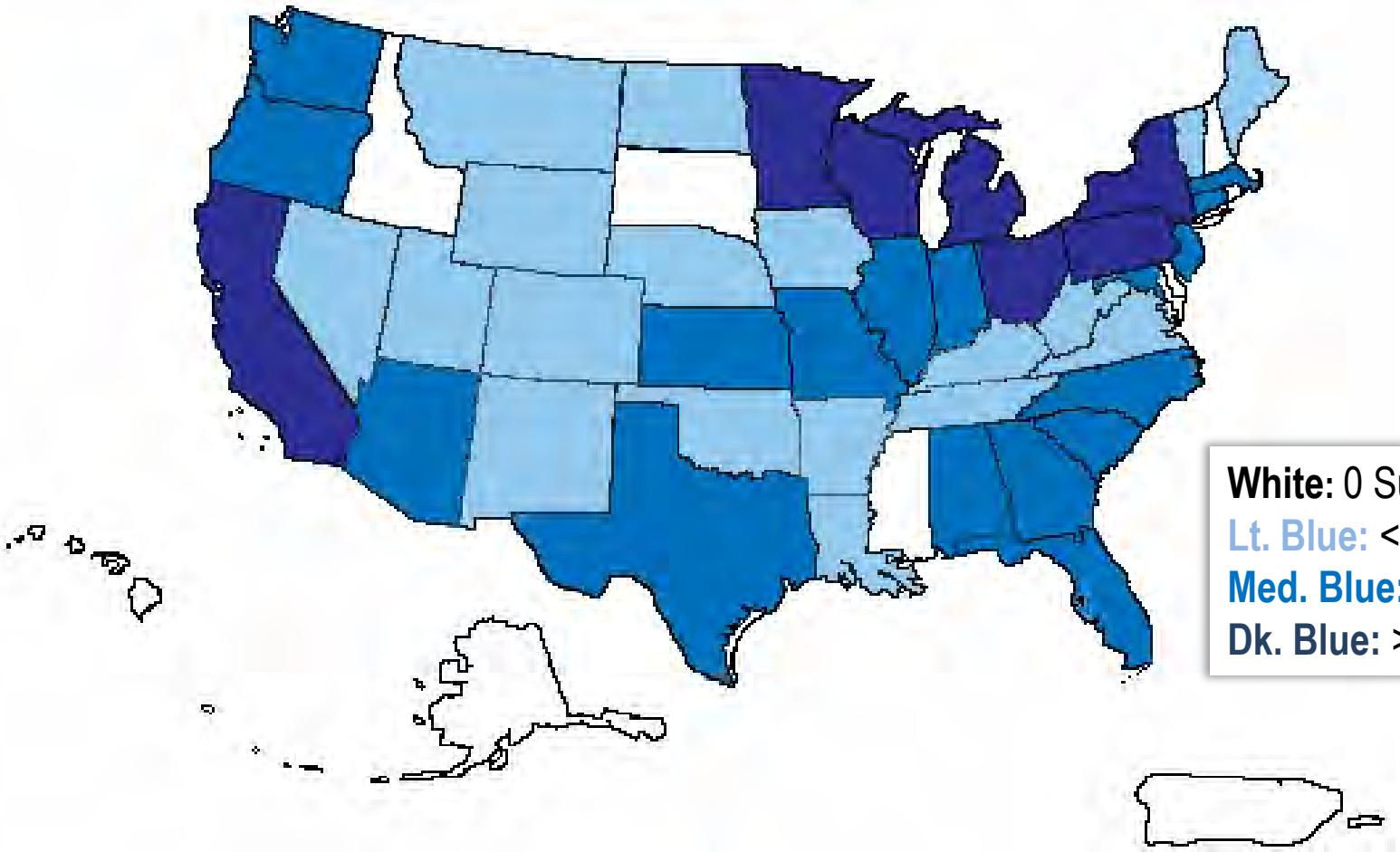
- **Fall 2009:** Final Report
  - Small and medium sized suppliers can and are working in this space
  - Distributed to various DOD stakeholders
  - Implications for DOD MBE implementation

# MBE PROJECT TEAM



# ASSESSMENT PARTICIPANTS

***445 Suppliers – 52% Participation Rate***



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

# MBE CAPABILITIES METRIC

| MBE Capability Level 1 | MBE Capability Level 2 | MBE Capability Level 3 | MBE Capability Level 4 | MBE Capability Level 5 |
|---|---|---|---|---|
| Very little computer-driven/automated/CNC ops<br><br>Most or all ops based upon 2D drawings<br><br>Receive, send electronic manufacturing files in .pdf or other 2D format<br><br>Use s/w to assist business/management functions, but little or no electronic cross-dept integration/re-use of data | Both CNC, manual ops<br><br>Can accept 3D models from customers, but convert to 2D drawings to drive manufacturing processes<br><br>Small amounts of electronic cross-dept integration / re-use of info exists | Majority of mfg processes are computer-driven / automated / CNC operations<br><br>Planning, programming for manufacturing processes is performed using combination of 3D models, 2D models, 2D drawings<br><br>Cross-dept integration exists via use of MRP system (or "MRP-like" software) | All manufacturing processes are planned / programmed based upon 3D model info<br><br>Significant cross-dept integration, re-use of info exists via extensive use of MRP, ERP systems<br><br>Some use of PDM / PLM systems occurs | All manufacturing processes are planned / programmed based upon 3D model info<br><br>All company ops are integrated, driven by the same 3D model info<br><br>- PDM / PLM systems serve as the data integration hub for company ops |

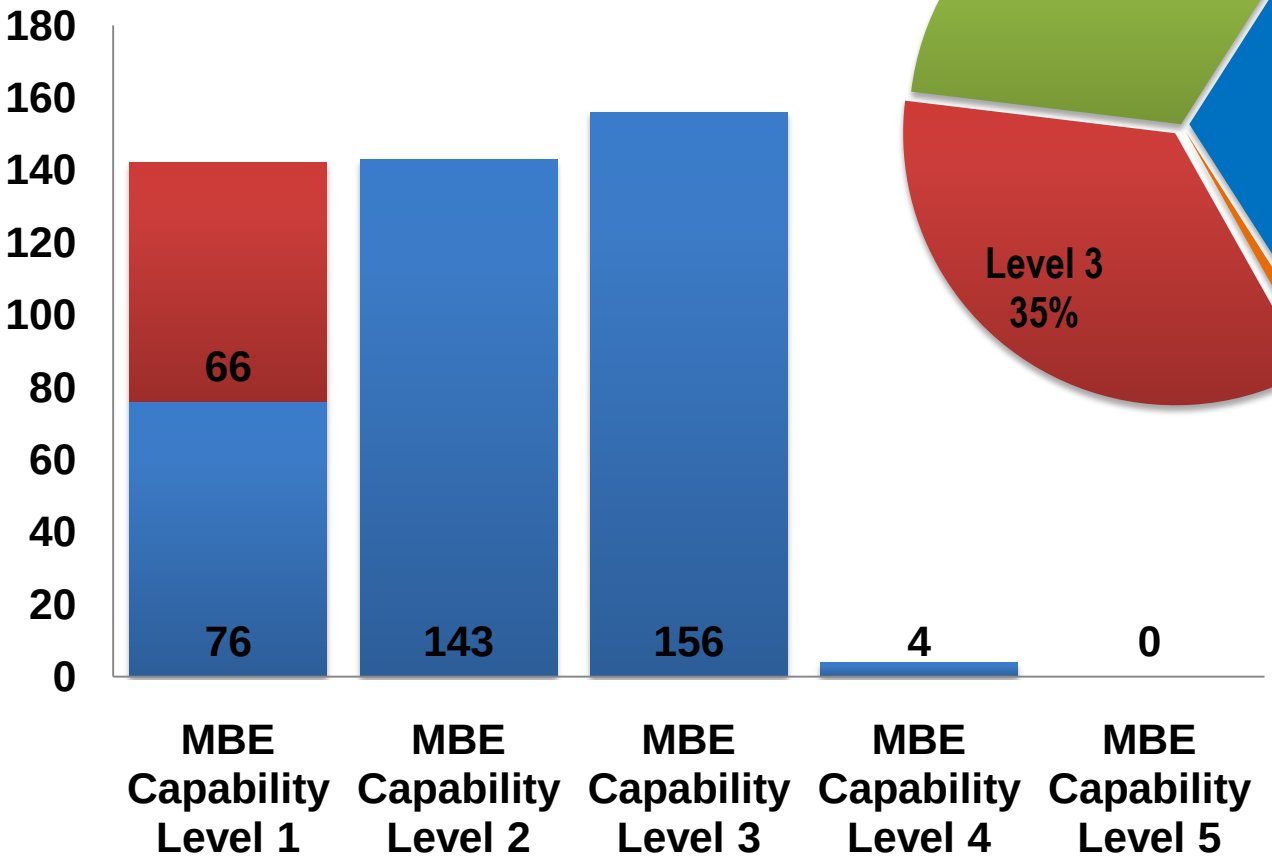
# MANTECH MTO CAPABILITIES METRIC

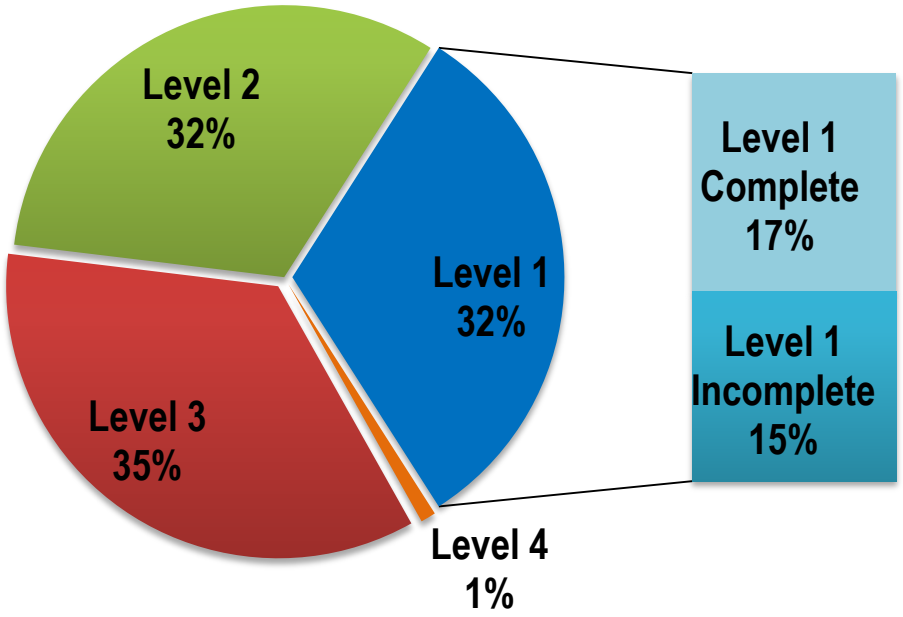
*The ManTech MTO MBE Capability Levels below will be the metrics used moving forward.*
*The metric on the previous slide is for interpretation of the 2009 Summer Assessment data only.*

| ManTech MTO MBE Capability Level | Notes |
|---|---|
| **Level 0: Model-centric drawings for design and manufacture, 2D drawing** | Correlates to Capability Level 1 on the 2009 scale<br>Operational basis is 2D drawings |
| **Level 1: Model-based manufacturing, 2D drawing and neutral CAD model** | Correlates to Capability Level 2 on the 2009 scale<br>Operational basis is 2D drawings, but have CAD capabilities, which implies 3D capabilities at some level |
| **Level 2: Native CAD based manufacturing, 2D drawing and native CAD model** | |
| **Level 3: Model-based definition, 3D annotated model and light weight viewable** | Correlates to Capability Level 3 on the 2009 scale<br>Operational basis is 3D models<br>Still likely to see use of 2D data in operations<br>Software systems assist in management and re-use of 3D model data across company operations |
| **Level 4: Model-based definition with data management, 3D annotated model and light weight viewable via PLM** | |
| **Level 5: Model-based definition with automated technical data package, digital product definition package and TDP** | Correlates to a Capability Level 4<br>Operational basis is 3D models<br>No 2D conversions<br>Extensive electronic integration of data across company operations, most of which are automated |
| **Level 6: MBD with automated TDP and on-demand enterprise access, digital product definition package and TDP via the web** | Correlates to a Capability Level 5<br>Operational basis is 3D models<br>Fully integrated company operations for asset visibility up and down the supply chain |

# 2009 MBE CAPABILITIES ASSESSMENT

## *Results*



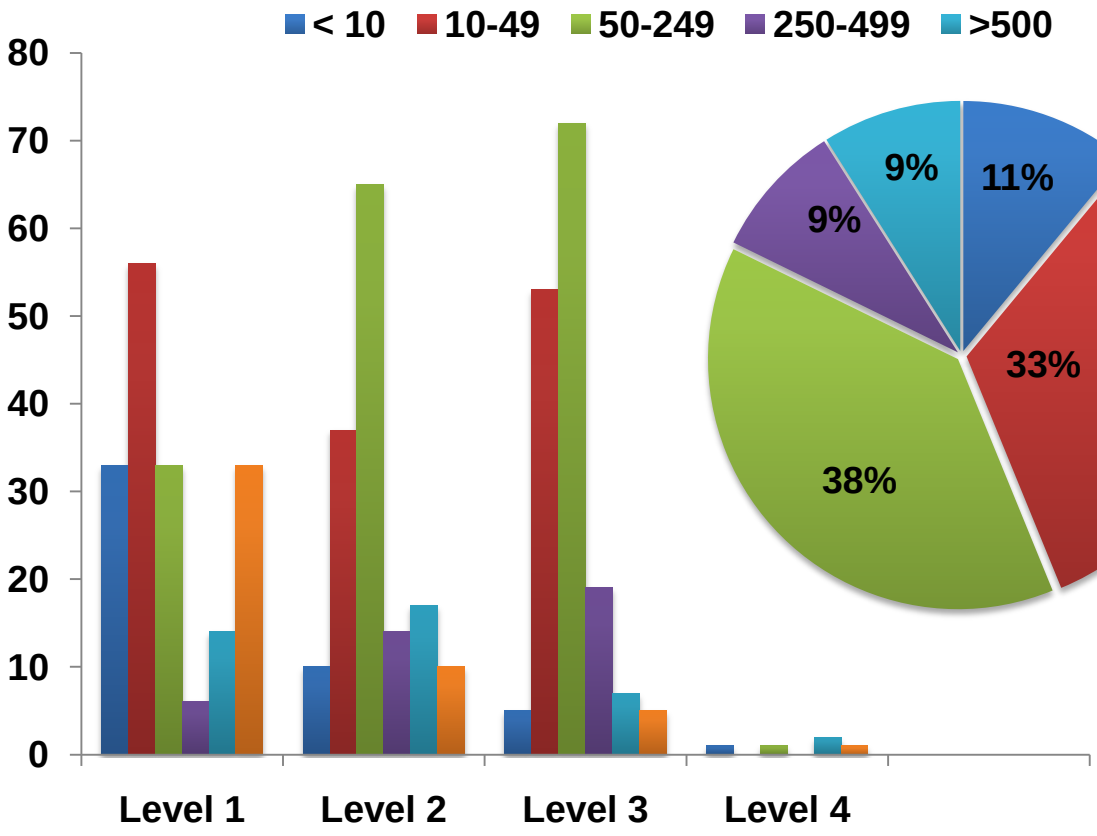




***NOTE: 66 Level 1 ratings were due to incomplete info in assessments***

# 2009 ASSESSMENT RESULTS

## *Supplier Demographics*

**Company Size**







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

**Participating Suppliers' Quality Certifications**

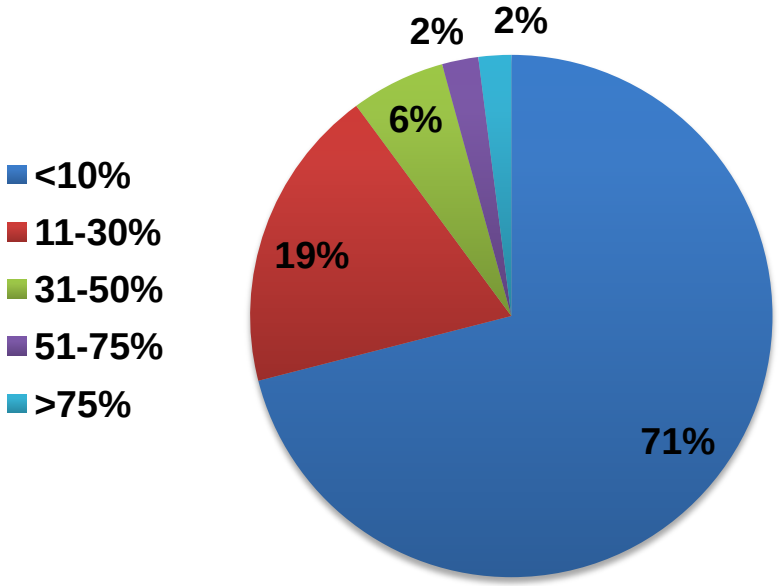
*Information was also gathered on the participating suppliers' set-aside categories and product lines*

# 2009 ASSESSMENT RESULTS

## *Business Dynamics*

### % of Business to a Single OEM

*In this case BAE Systems*




### Company Business Model

| 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 the percentage of the participating suppliers' business that goes to defense vs. commercial customers*

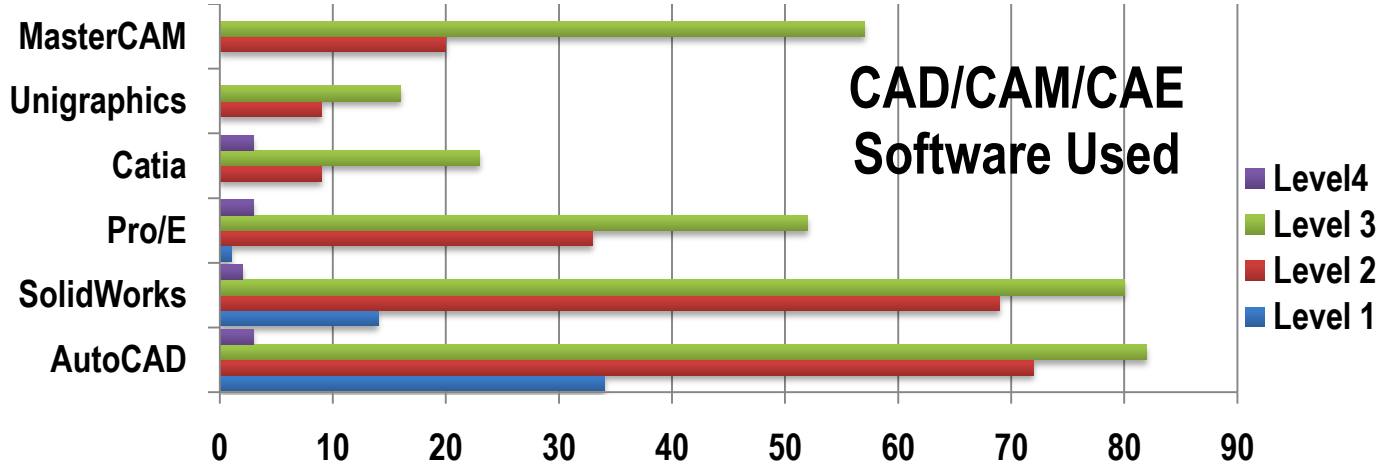
# 2009 ASSESSMENT RESULTS

## *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 ASSESSMENT RESULTS

## *Use of 3D Software & Models*

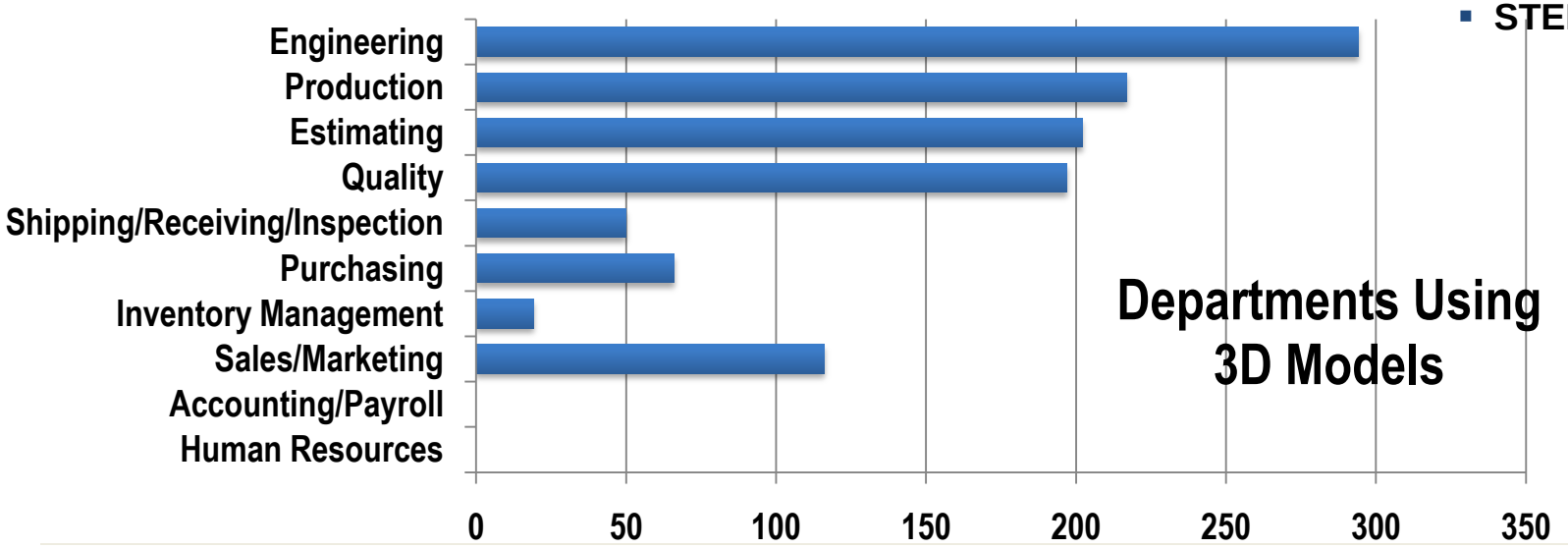



***Which of the following data formats can your company utilize?***

- **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
## *Impacts & Challenges*

- **MBE Impacts from a Supplier Perspective**
  ***Including Machined Parts, Assemblies, and COTS items***
  - **Lead Time Reduction**
  - **Cost Reduction**

- **Obstacles & Challenges**
  - **Cost and Investment:** ***Capital Investment, Time Investment, Personnel Training, Additional Staff/Expertise, Software and Equipment Upgrades***
  - **Customer/Supplier Commitment:** ***Customer Date, Supplier/Subcontractor Readiness***
  - **Cultural and Business Barriers:** ***Business Culture Transformation, Business Case***

# 2009 ASSESSMENT RESULTS
## *Observations & Conclusions*

- MBE Awareness is high among military ground vehicle suppliers
- Over 70% of participating suppliers do less than 10% of their overall business with a single OEM (in this case BAE Systems) – support from the DOD would significantly strengthen the business case for developing MBE capabilities
- *MBE Capabilities & MBE Readiness are not the same thing*
- Company culture will present major challenges for MBE implementation efforts
- It is possible, if not likely, that companies will pursue a "path of least resistance"
- Detailed technical and business requirements must be defined and communicated

# PHASE 2

- **MBE Website**

  *Developed by Catalyst Connection as a way to keep defense suppliers informed of MBE implementation efforts and development opportunities*

- **Supplier Pilot Projects**

  *Three companies, supply chain vs. supply base, MEP will record the process and use it to develop a plan for scalable, customizable, assistance for individual suppliers.*

  *These pilots have been recently completed – our initial findings support our observations & conclusions from Phase 1; details in coming slides*

- **MBE Education & Training Summit Series**

  *This is the first in what we hope to be a series of MBE Education and Training Summits. Plan are in the works to develop an additional ten events held regionally across the country.*

# 2010 MBE SUPPLIER PILOTS

## *The Process*

- BAE Systems identified production parts with contracts in process / to be worked with supplier companies
  - 3 Projects, 4 Companies participating in pilots – located in TX, PA, MI
    *(One project involved a sub-contractor, in addition to BAE Systems contractor)*
  - Simple, prismatic parts / weldments
  - Focus on process & models, not products

- BAE Systems sent relevant part design info to supplier for each pilot in new MBE-based, 3D model file format
  - *as described earlier today by Roy Whittenburg*

- Supplier company use 3D model files as basis for production

# 2010 MBE SUPPLIER PILOTS

## *The Process*

- NIST MEP team (w/rep from local MEP Centers) went onsite to each company, interviewed personnel, documented all company touch points for 3D model data, according to:

  - Data Receipt and Engineering Functions
  - Data Consumption – Manufacturing Executable Functions
  - Data Consumption – Business Functions
  - Data Transmission Functions
  - Observations

# 2010 MBE SUPPLIER PILOTS

## *NIST MEP Findings*

- MBE / 3D TDPs are not yet perfect
  - Can still be missing important info
  - User confidence in models not high – NEED model validation
    - *strongly supports DOD MBE Model Validation/Certification work*
- 3D Models 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
- Significant uncertainty about what's next
  - Companies excited, want to learn more about future of MBE and opportunities
  - Definite interest in potential of **MBE Supplier Capabilities Certification**

# MBE SUPPLIER CAPABILITIES CERTIFICATION

*A Logical, 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.

# MBE CAPABILITIES METRIC

## *The Basis for Potential Supplier Certification*

| ManTech MTO MBE Capability Level | Notes |
|---|---|
| **0:** Model-centric drawings for design and manufacture, 2D drawing | ▪ Operational basis is 2D drawings |
| **1:** Model-based manufacturing, 2D drawing and neutral CAD model | ▪ Operational basis is 2D drawings, but have CAD capabilities, which implies 3D capabilities at some level |
| **2:** Native CAD based manufacturing, 2D drawing and native CAD model | |
| **3:** Model-based definition, 3D annotated model and light weight viewable | ▪ Operational basis is 3D models<br>▪ Still likely to see use of 2D data in operations<br>▪ Software systems assist in management and re-use of 3D model data across company operations |
| **4:** Model-based definition with data management, 3D annotated model and light weight viewable via PLM | |
| **5:** Model-based definition with automated technical data package, digital product definition package and TDP | ▪ Operational basis is 3D models<br>▪ No 2D conversions<br>▪ Extensive electronic integration of data across company operations, most of which are automated |
| **6:** MBD with automated TDP and on-demand enterprise access, digital product definition package and TDP via the web | ▪ Operational basis is 3D models<br>▪ Fully integrated company operations for asset visibility up and down the supply chain |

# MBE Supplier Capabilities Certification Program

## *Implementation Possibilities*

**If MBE Certification is pursued, different options would be possible:**

1. Capability Certification for military purposes via Mil-Std (Mil-Std 31000, e.g.)
2. Capability Certification for commercial purposes via voluntary, consensus-based commercial standard (ASME or ISO, e.g.)
3. Hybrid – combining both

# 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

# POTENTIAL BUSINESS MODEL FOR MBE SUPPLIER CAPABILITY CERTIFICATION

- Self sustaining in the long term
  - Operate on fee-for-certification / fee-for-service basis
  - Fee amounts TBD
- Potential for short / finite term incentives to be made available to kick-start MBE Supplier Certification process once/if decision is made to implement Certification
  - Sources / amounts TBD
  - To potentially apply to both MBE Certification, Certification Assistance
  - Timing TBD – dependent upon adoption of standards, approaches pursued
- MEP System is available and positioned to assist companies interested in MBE Certification
  - MEP Centers already serve similar role regarding Lean , Quality Certifications

# 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.
- 59 centers with ~ 400 field locations
  - System wide, Non-Federal staff is ~ 1,600
  - Contract with over 3,000 third party service providers

MEP • MANUFACTURING EXTENSION PARTNERSHIP

- 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 *

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

# SUMMARY AND NEXT STEPS


- MBE is the future of DOD supply chain ops
- The work conducted to date relating to MBE Supplier Assessment and Development indicates that the DOD supply base is ready to implement MBE at a basic level
  - *The DOD supply base is engaged and interested in next steps*
- Significant work is occurring and progress is being made to develop the technical infrastructure for MBE

MBE Model Based Enterprise

# SUMMARY AND NEXT STEPS






- Development of an MBE Supplier Certification Program represents a potential path to broad MBE implementation throughout supply base.
  - *DOD considering implications, approach*

- MEP is natural resource to be leveraged to assist supplier MBE implementation, including potential Supplier MBE Capabilities Certification
  - *national coverage – interact with tens of thousands of U.S. manufacturers each year*
  - *significant participation in Supply Base Assessment, MBE pilots*
  - *already serve similar functions for Lean, Quality certification programs*


- ***The new MBE Website will contain all relevant info, resources, updates, announcements that suppliers will need to implement MBE.***