



NIST MBE Summit 2013

Model-Based Work Instructions

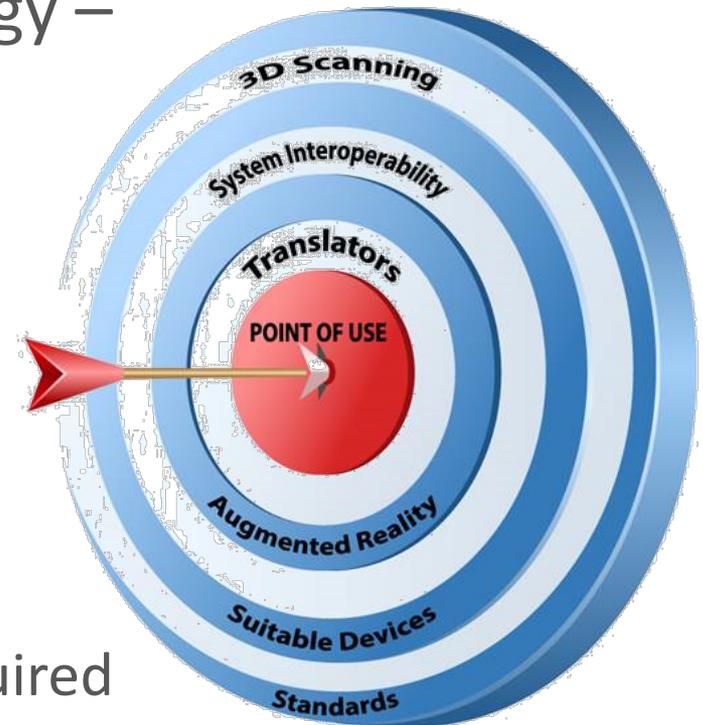
Digital Point of Use

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- Background
- Improved Work Instructions Workshop
 - What, why, who
 - Topic areas explored
- Current projects (a few examples)
- Next steps

- Navy ManTech Execution Strategy – Centers of Excellence
- Recognized potential savings (acquisition and life cycle) by improved delivery/use of work instructions
- Very broad topic
 - Lots of enabling technologies required to make digital instructions available at the “point of use”



- Lots of ongoing effort; across services and industries
- Little coordination of initiatives
- Significant opportunity for collaboration and leveraging
- A cross-functional workshop might be a good first step

- Navy ManTech sponsored event to:
 - Better understand the landscape
 - Identify areas for future R&D
- Objectives
 - Open a dialog between stakeholders to discuss common interests
 - Technology transfer event for existing solutions
 - Identify gaps between existing tech/industry needs

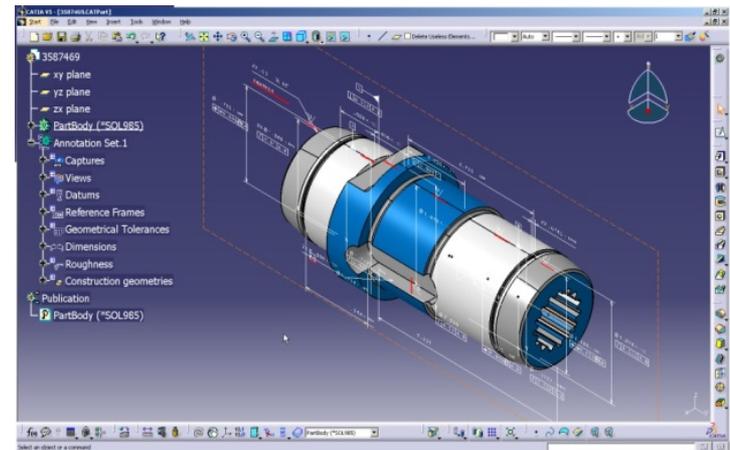


Participants



- 60 Attendees
 - 24 in-person, 36 via WebEx
 - 22 Government, 38 Industry/Academia
- Organizations represented
 - **Services & Agencies:** Army (ARDEC), Air Force (AFRL, ManTech), Navy (ManTech, NAVAIR, NAVFAC, NAVSEA, NSWC), USMC, NIST
 - **OEMs:** BAE, Boeing, John Deere, Lockheed Martin, Northrop Grumman
 - **Shipbuilders:** Austal USA, General Dynamics Electric Boat, HII Ingalls & Newport News, NASSCO
 - **Suppliers:** Anark, Direct Dimensions, ITI Transcendata, RECON Services
 - **Academia:** Penn State Applied Research Lab; Iowa State University (Virtual Reality Applications Center)

- Simplified (Intuitive) Work Instructions
- Point of Use Work Instructions & 3D Work Instructions
- Shifting from 2-D to 3-D Instructions
- Employing Augmented Reality Technologies in Work Instructions



What We Learned

- *Improved Work Instructions* – definition varies
- Wide maturity gap in the MBE world
- Maturity levels may be needed
- Business case
- Integration and compatibility are big challenges
- Frequent software releases are disruptive



Efforts Revealed

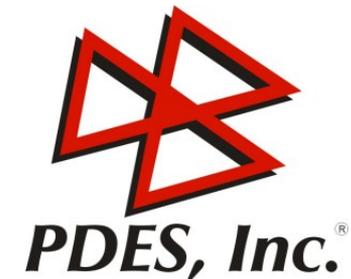
- Navy ManTech - 20+ ideas from three shipyards
 - Digital Storyboarding
 - Workflow Tracking
 - Data & Configuration Management
- Air Force ManTech – Digital Work Instructions User Requirements Study and Analysis of Alternatives
- Lockheed Martin
 - “Digital Tapestry”
 - Human Augmentation for assembly
- NAVAIR - 3D instructions for depot-level repair of aircraft



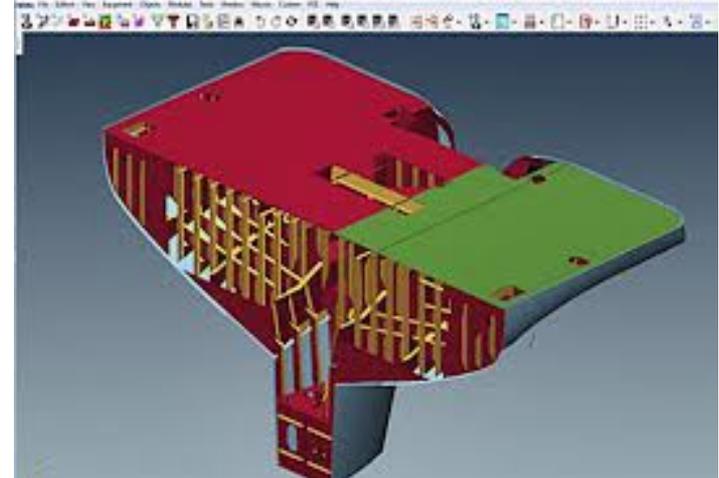
High Level: Hardware integration into IT architecture, file format interoperability, reducing file size without losing content

Some Specific Challenges:

- Digital Stream
 - Process Modifications
 - Process Mapping, Documentation, & Modifications
 - Enterprise Digital Data & Configuration Management
 - Instant Change Awareness
 - Real Time Metrics & Status
 - Commonality and Standardization



- Data Enterprise
 - Data Management Systems
 - Data Architecture
 - IT Infrastructure
 - Prevent Obsolescence
 - Ship Data Conversion
- One-Touch Tracking – Materials & Other Resources and Processes
- Point of Use (POU) Delivery
 - Digital Work Package
 - Tailored, Specific Applications



Next Steps

- Connect and leverage
- Shipyards are developing strategies
 - Understand requirements/needs pretty well . . .
Need tools & solutions
- Similar efforts across Services and Agencies
 - Get (and stay) familiar with what others are doing
 - Coordinate who tackles which challenges
 - Leverage others' work; don't reinvent the wheel,
make it better

