A Business Case for Long-Term Archiving & Retrieval of the Model-Based Enterprise’s Data

Dr. W. David Williams
PDES, Inc
Board of Directors
Model-Based Sustainment Champion
I. Global Drivers of Manufacturing Transformation

II. PDES’s Model-Based Enterprise Vision and Necessity for LOTAR strategies, standards and tools

III. LOTAR International Roadmap and Status
Part I

Global Drivers of Manufacturing Transformation
Manufacturing as I View It

- Product Concept
- Product Engineering
- Process Engineering
- Line/Plant Design and Realization
- Supply Chain Management
- Product Fabrication & Distribution
- Product Lifecycle Support & Service
- Other Regulatory Factors, Contractual and/or Competitive Factors
Drivers of Transformation

For many of us the market is demanding more from us and the world is changing

- Respond more quickly to opportunities
- Skills set management
- Intellectual property and knowledge
- Introduction of new technology
- Creation of new processes
- Dynamic Supply chains
A Brief Glimpse into the corner of the world in which I live and work… the US and Western Europe
**US and Western Europe**

**Gross Domestic Production (2009)**

- **USA**: $14.1 Trillion (1.62%)
- **EU**: $14.4 Trillion (1.18%)

**Population (2010 est.)**

- **USA**: 307 M
- **EU**: 492 M

**“Per Capita GDP”**

- $45.9K/person – USA
- $29.3K/person – EU

Source: US Central Intelligence Agency
Social Demographic

“Per Worker GDP”
$91.4K/worker – USA
$64.0K/worker – EU

Source: US Central Intelligence Agency
US Science & Engineering Degrees

Figure 2-10
S&amp;E bachelor's degrees, by field: 1983–2002

Degrees (thousands)

NOTES: Physical sciences include earth, atmospheric, and ocean sciences. Data not available for 1999.

A Trend of Concern?

**Figure 2-20**
Foreign share of U.S. S&E degrees, by degree and field: 2002 or 2003

- Doctoral
- Master’s
- Bachelor’s
- Associate’s

NOTES: Doctoral degree data are for 2003; other data are for 2002. Foreign includes temporary residents only. Natural sciences include physical, biological, agricultural, computer, earth, atmospheric, and ocean sciences and mathematics.


**Science and Engineering Indicators 2006**

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**Figure 2-18**
U.S. S&E doctoral degrees, by sex, race/ethnicity, and citizenship: 1975-2003

Degrees (thousands)

- U.S. citizen white male
- Foreign
- U.S. citizen white female
- U.S. citizen minority

NOTES: Foreign includes permanent and temporary residents. Minority includes Asian/Pacific Islander, black, Hispanic, and American Indian/Alaska Native. Degree recipients with unknown citizenship omitted.


**Science and Engineering Indicators 2006**
Manufacturing is a highly competitive industry
Manufacturing is a highly regulated industry
Workforce dynamics & world economics are not favorable
Many manufacturer’s turn to technology for solution

Creating a Model-Based Enterprise is many manufacturers’ approach of choice

LOTAR is essential to this choice!
Part II

PDES, Inc. & LOTAR International
“A Partnership for Progress”
PDES, Inc. Model-Based Enterprise

- Digital Enterprise
- Model Based Enterprise
- Systems Engineering
- MBe
- MBs
- Engineering Analysis
- System Life Cycle Support
- Digital Manufacturing
- LOTAR
- Product Lifecycle Management
- Integration & Data Exchange Testing
- Information Standards: AP203, AP209, AP210
- Infrastructure & Maintenance: AP233, AP239, AP242
Facets of Interoperability

Interoperability of Like Domain and Cross Domain CAD/CAE

Integration of Gaming Technologies To Leverage Advanced Visualization in Developmental Decision Making

Implementation of DFx Rules Engines

Network Centric Manufacturing (NCM) Demo With DSN Innovations

Long Term Archiving And Retrieval of Information
“... for Gulfstream, LOTAR is not a ‘nice-to-have’, it is an essential must-have.”
Part III

LOTAR International Roadmap & Status
LOTAR International Mission Statement

“It is the mission of LOTAR International to globalize a standards-based archival and retrieval mechanism for digital product and technical information through the ongoing harmonization and standardization efforts of Aerospace and Defense organizational affiliations.”
Standards-based Approach for the Digital Enterprise

- MBengineering
- MBmanufacturing
- MBproduct life cycle
- MBsustainment

ISO Standards for information models
- PLM information
  - STEP AP 209, AP 242*, AP 238, AP 239, AP 233,
  - *convergence of AP203/AP214
- 3D light Visualization:
  - JT, PRC, U3D...
- LOTAR Standards
  - EN/NAS 9300-xx

Managed Digital Model Based Definition throughout the Enterprise

2007 → 2015 +
LOTAR International Way of Working

**People**
- Team and Sub-projects in place
- Telecons/Meetings/Off-sites
- LOTAR Consortium Formed
- MOU/Charter
- Process Steering Council established
- Bi-annual review

**Process**
- Model Based 3D vs 2D Paper
- Neutral format for data retention (STEP) Polyline Presentation + U3D, JT, PRC
- STEP Verification and Validation
- Improve project management
- Expand technical involvement in project support
- Solicit new membership

**Technology**
- Ineffective and inefficient tools
- Limited use of technologies
- Technology maturation limited
- Improve communication of Model Based Environment
- Improve pilot activity with solution providers
- Reduce verification and validation cycle time

**High-performing culture**
- Focus on functional excellence and project metrics
- Growth opportunities within and outside Aerospace Industry

- Leaner & more efficient processes
- Semantic Representation of PMI Data
- Integrated verification and validation process
- Complete end to end LOTAR process with Visualization support

- Single source of data retention
- Seamless Design reuse
- Verification and Validation built in
## LOTAR International Three-Year Milestone Plan

### Table of Milestones

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### Diagram

The diagram visualizes the timeline and milestones across the three years, with key events and phases indicated for each quarter.
LOTAR International Homepage

Long Term Archiving and Retrieval - LOTAR

Activities

The objective of LOTAR International is to develop standards for long-term archiving (LTA) of digital data, such as 3D CAD and PDM data. These standards will define auditable archiving and retrieval processes. Use of the standard series by other branches of industry such as the automotive or shipbuilding industry is possible. The results are harmonized with e.g. the Recommendation 4956 for long-term archiving of the German Association of the Automotive Industry (VDA) and are based on the ISO 14721, Open Archival Information System (OAIS) Reference Model. The documents for the standard are published as the EN9300 series and, in cooperation with the AIA, also as the National Aerospace Standard (NAS).

LOTAR International is a project being conducted by leading OEMs and suppliers in the aerospace and defense industry under the joint auspices of ASD-STAN, AIA, PDES Inc. and the ProSTEP iM Association.
In Summary

DRIVERS
- The market is demanding more from us
- National and Global demands are changing

ACTION
- Create the Model-Based Enterprise
  ➔ LOTAR is essential to the Model-Based Enterprise

INVITATION
- Get involved in precompetitive alliances