







Dale Hall, Director Manufacturing Engineering Laboratory



March 18, 2003

Economic

Studies





Manufacturing Interoperability

- The ability to seamlessly share <u>technical and</u> <u>business</u> information throughout an extended manufacturing enterprise (supply chain)
- Not just orders and payments
- Increasingly dependent on the internet and <u>electronic representations</u>
- The cost savings and economic advantages are great



E-Commerce increases demand for <u>manufacturing data</u> exchange

Automotive Interoperability Cost Study Results

- The economic cost due to lack of interoperability in the automotive supply chain is One Billion Dollars Per Year
- Two survey approaches used with OEMs, Large Suppliers, and Tooling manufacturers
- Result is considered to be a conservative estimate
- Fixing flaws in data exchanges is the primary cost driver



"as much as 50% of their time dealing with poor data files" v.

🔽 Menu Manage

INFORMATION WINDOW

The highlighted surface boundary contains a vertex which has caused the boundary to invert.

Recommended actions:

- Delete a portion of that geometry and recreate it.
- 2. If the surface was imported, manually repair the geometry by smoothing or straightening the edge through the Edit Boundary Functions.

Hit Space or Return to continue ('q' to quit, 'b' for previous page)



▼ INFO
Mass Props
Names
Measure
Feat Info
Feature List
Model Info
ParentChild
Layer Info
Regen Info
Geom Check
Srf Analysis
Crv Analysis
Part Diff
Audit Trail
Done/Return
▼ SHOW ERROR
Prev Item
Next Item
All Items
Feature Info
Item Info

Hide Item Done/Return

MANUFACTURING INTEROPERABILITY ECONOMIC STUDIES

What is the Solution?

- Point-to-point customized integration among the software systems supporting product and process development
 - Expensive to build & maintain
- Mandating specific vendor software systems among supply chain partners
 - Pushes interoperability problems lower in the supply chain it doesn't solve them
 - Using neutral standards
 - Standards for information technology are technical rules providing the foundation that enable interconnected systems to work across activities, organizations, and geographic locations.

Standards Enable Interoperability

STEP - <u>STandard for the</u> Exchange of <u>Product Model</u> Data - ISO 10303

The international standard which provides an unambiguous, computer-interpretable definition of the physical and functional characteristics of a product throughout its life cycle



3

MANUFACTURING INTEROPERABILITY ECONOMIC STUDIES



AMAGINE

a daily basis."

STEP in Production

- **Boeing Commercial** Aircraft
- **Boeing CSTAR**
- **Delphi** Automotive • **Systems**
- Lockheed Martin
- NASA

exchange available and allows us to exchange

- Lockheed Martin press release

Motorola "STEP is a fundamental part of our strategy; it is the great enabler that provides the highest quality data

AP 203: Configuration Controlled 3D Designs of Mechanical Parts and Assemblies PDES, Inc. Geometric Shapes





TEROPERABILITY ECONOMIC STUDIES

STEP Impact Study

"We estimate that STEP has the potential to save \$928 million per year by reducing interoperability problems in the automotive, aerospace, and shipbuilding industries."

percent (\$156 million) of the potential benefits of STEP quantified within the scope of this study are being realized." *Available online at



www.nist.gov/director/prog-ofc/report02-5.pdf

Estimated Savings by Industry Supply Chain Level

 Survey participants were asked to estimate how much they expect to save by adopting STEP standards currently in the development pipeline



3

MANUFACTURING INTEROPERABILITY ECONOMIC STUDIES

3

Beyond Product Data...

- Manufacturing plans
- Material specifications
- Process specifications
- Analysis data
- Cost data
- Supplier information
- Inventory management data

- Demand forecasts
- Production status
- Pricing information
- Warranty information
- Quality information
- Product genealogy
- Simulation data
- Supplier delivery data

Seamless integration of the manufacturing supply chain on the Internet "for the Fortune 100 to the company next door" Why does the Government need to be Involved with Interoperability Issues?

- Benefits to industry at large are non-appropriable by individual companies
- Small business interests
- International governments are investing significantly to displace our industrial strength

Yet the Sixth Framework program has targeted U.S. leadership in civilian science, technology and industry.

Starting this year, the EC will start selecting 50/50 cost-shared projects in

the areas of nanotechnology, advanced materials, new production processes and devices, aeronautics and space,

sustainable development, new energy

technologies, biotechnology, information technology and food

The only similar program in the United States is the

\$185 million Advanced Technology Program (ATP) run by

the National Institute of Standards and Technology. "ATP

resembles it most, but at a completely different order of

Europe Inaugurates Major Research Program Aimed At Boosting Competitiveness Of European Industry

The European Commission has issued its first call for proposals under its new four-year research program called the "Sixth Framework." The program, which will fund more than 17 billion euro of research between now and 2006, is not well known in the United States. The inaugural meeting in November in Europe attracted 8,500

attendees, turned awa 35 attende

www.ManufacturingNews.com

same num

3

Manufacturing Issues Are Reinvigorated At The National Academy Of Sciences Due To Concern About Loss Of U.S. Industrial Base

technology.

Enterprise Integration Act of 2002 (P.L. 107-277)

- Came into existence largely because of the attention created by the 1999 economic interoperability study.
 A key House staffer found the study impossible to ignore
- The Act authorizes NIST to work with major manufacturing industries on roadmaps, standards developments, and implementations for electronic enterprise integration
 - Aerospace, automotive, electronics, shipbuilding, construction, home building, furniture, textile, and apparel industries
 - Roadmaps, followed by standards development, piloting and testing
 - Emphasis on deployment
 - \$10M for FY03, \$15M for FY04, \$20M for FY05
- Will Congress appropriate the money?

Who are the Stakeholders?

- National Association of Manufacturers (NAM)
- Aerospace Industries Association (AIA)
- Automotive Industry Action Group (AIAG)
- Original Equipment Suppliers Association (OESA)
- Association for Enterprise Integration (AFEI)
- FIATECH
- Construction Industry Institute
- Associated General Contractors
- Building Owners and Managers Association
- International Alliance for Interoperability, NA
- National Association of Homebuilder's Research Foundation
- National Coalition for Advanced Manufacturing (NACFAM)
- Logistics Trade Association
- RosettaNet

3

- American Furniture Manufacturers Association
- National Association of Convenience Stores (NACS)
- Open Applications Group (OAG)
- Chemical Industries Data Exchange (CIDX)