

The Integration Conundrum

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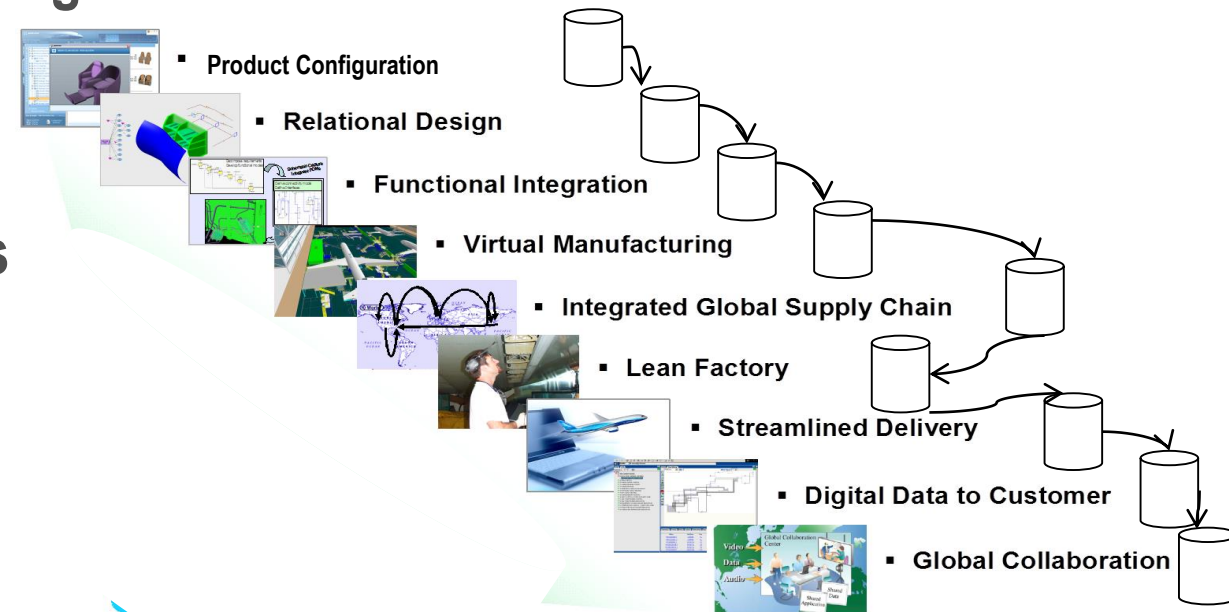
**David J Kasik, Senior Technical Fellow Emeritus, The Boeing
Company**

Introduction

- **Retired Boeing Senior Technical Fellow**
- **What does aerospace have to do with:**
 - Oceans and agriculture?
 - Big data?
 - Visualization?
- **Examine risks with data, visualization, and analytics**

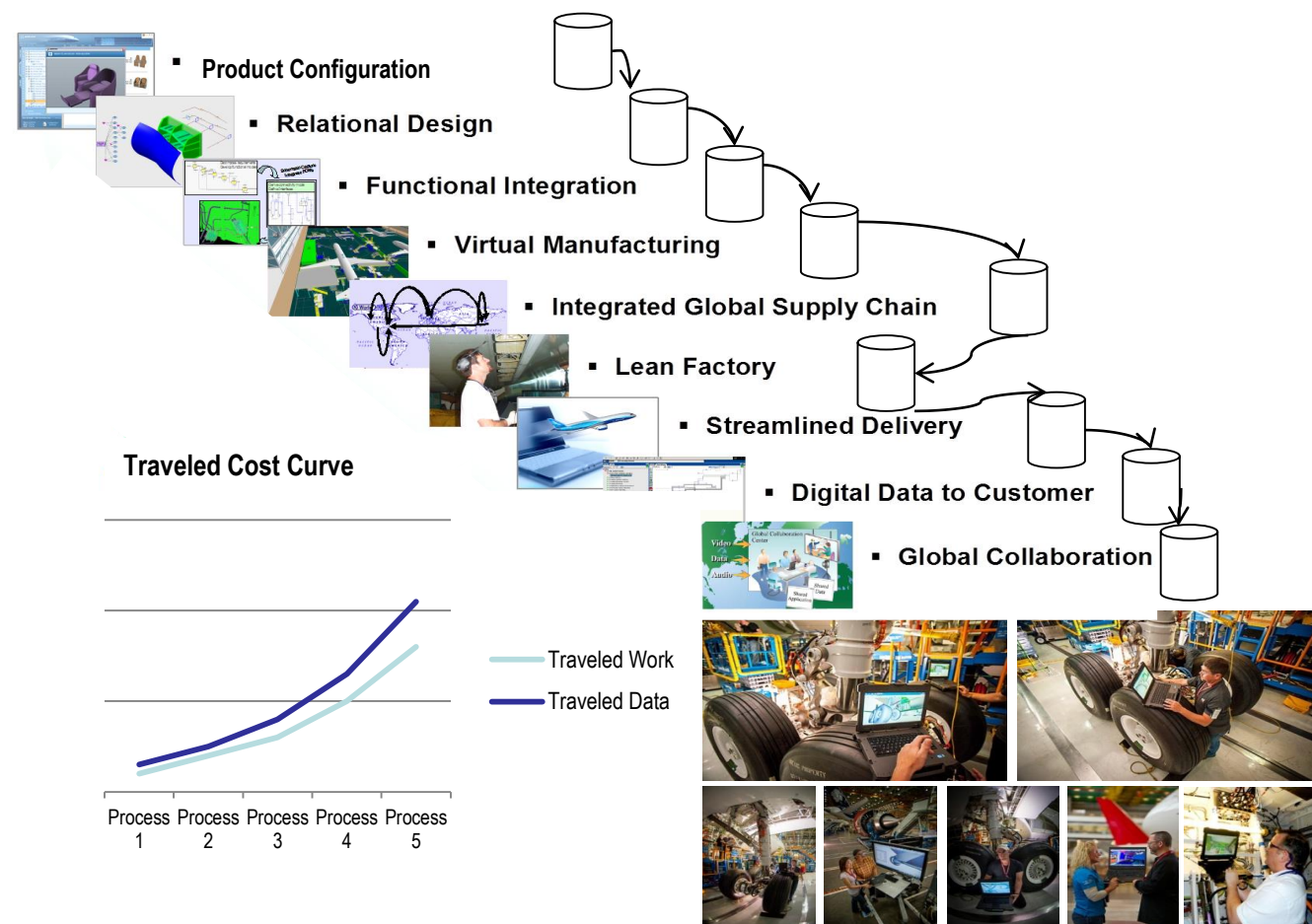
Aspects of Integration

- **Working across a business's digital thread**
 - Storing data in one place doesn't mean integration
 - Provide internal and external access
 - Consistent terminology
 - Data accuracy, including units and values
 - Dealing with supplier and customer data
- **Aging data**
 - Handling legacy data and systems
 - Data accessibility over decades and centuries



Challenges

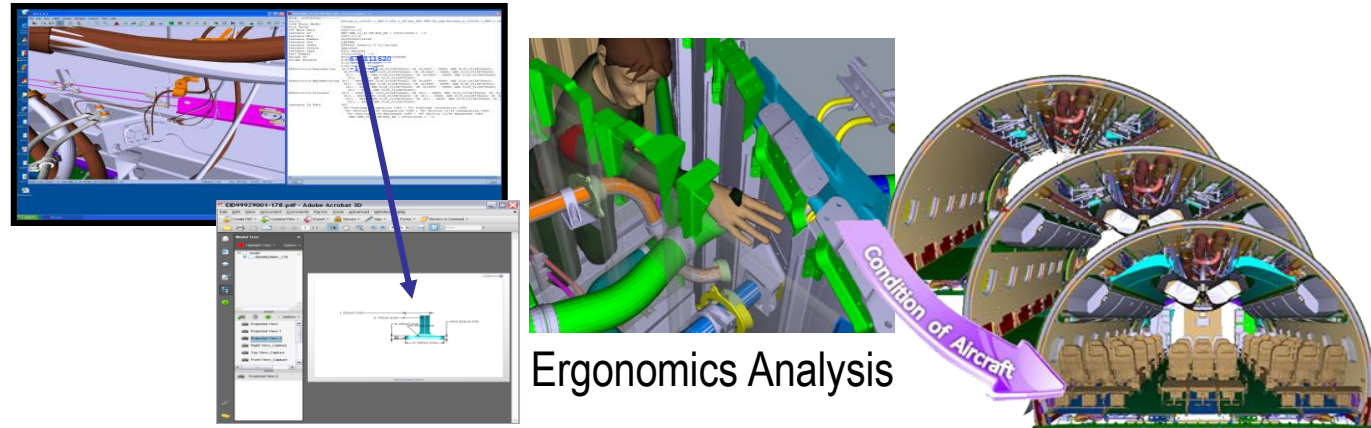
- **Crossing the digital thread**
 - **Data access**
 - Data owners tend to limit access
 - Computer and legal barriers
 - **Terminology and values**
 - Need translation and reconciliation
 - **Data accuracy**
 - Algorithms want clean data
- **Dealing with time**
 - Upgrades
 - Across decades



Cost to fix either traveled data or to fix traveled work increases exponentially

Mitigation

- **Visualization**
 - Mask actual integration
 - Use 3D model as key
- **Analytics**
 - Evolving tools and techniques
 - Involve experts with analysts
 - Data wrangling
- **Standard syntax**
 - Verify and validate data throughout
 - Develop for inevitable semantic errors



Field Operations

Safety

Smart Factory

Provide the Illusion of Integration

Summary

- **Analytics and data are like love and marriage**
 - You can't have one without the other
- **Top risks**
 - **Visualization: Communicate analytics results accurately**
 - **Data: remove data rework**
 - Requires a culture change to make data a corporate product/asset
 - **Analytics: People responsible for decisions, not algorithms**