Concurrent Electrical/Mechanical Design

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Presented by Wu Kai

March 2017

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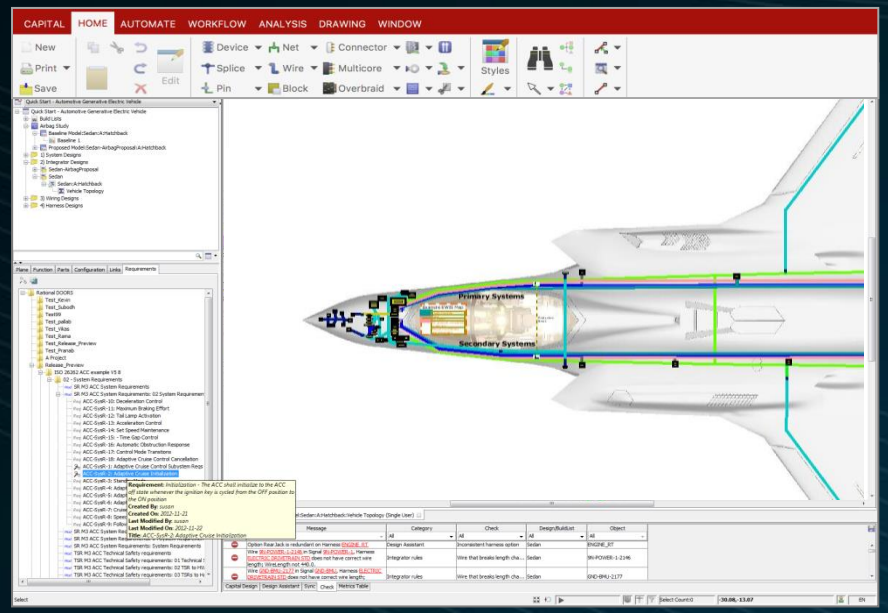
Agenda

- Introduction
- Electrical Domain Flow
- Electrical/Mechanical Collaboration
- Demonstration: Capital® – NX Integration
- PLM Integration
- Summary



Introduction
Rapidly Rising Electrical/Electronic Content

- Complex platforms are electronics intensive

- Electrical domain = power & signal distribution
- Highly complex electrical interconnect (example: wafer stepper)
  - 4,000 sensors & actuators
  - 100 data networks
  - 10,000 network & software signals
  - Many configurations

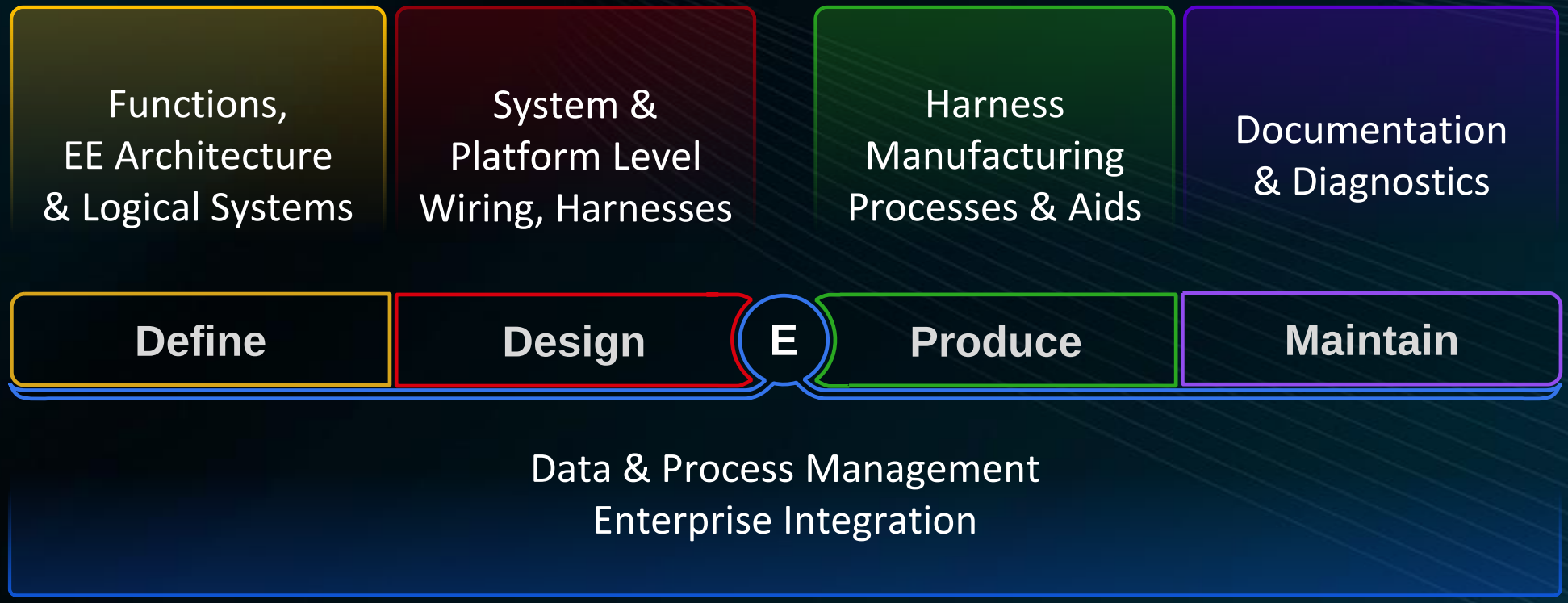
Commercial Reality
Powerful Tool Support Needed

- Example factors
  - Cost containment
  - Time to market
  - Mass customization
  - Traceability & verification

- Technical complexity + commercial reality:
  electrical domain must be part of the “digital twin”

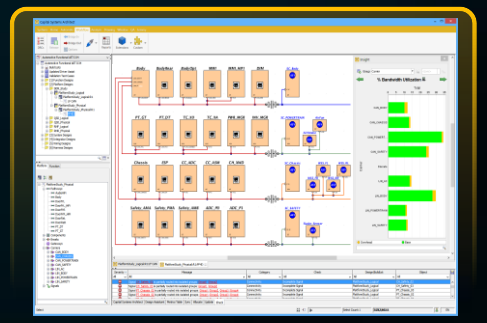
Electrical Domain Flow

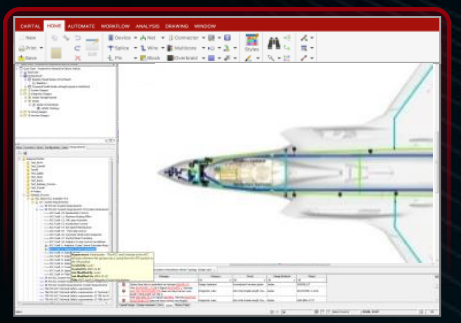
Extended Flow Supported By Capital Tool Suite

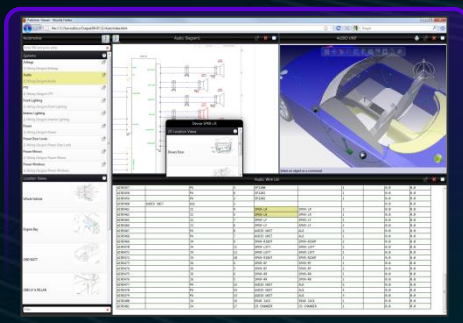


Electrical Domain Flow

Extended Flow Supported By Capital Tool Suite







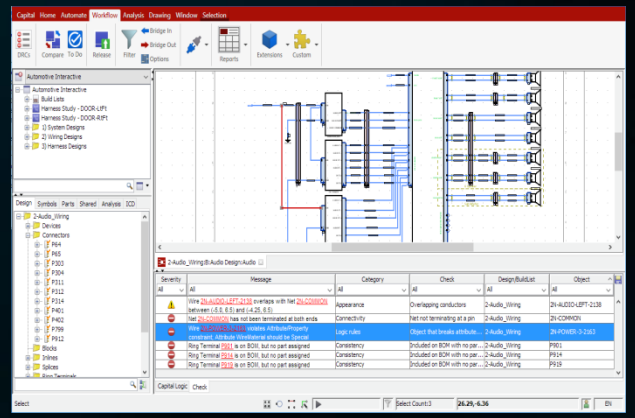
Define | **Design** | **E** | **Produce** | **Maintain**

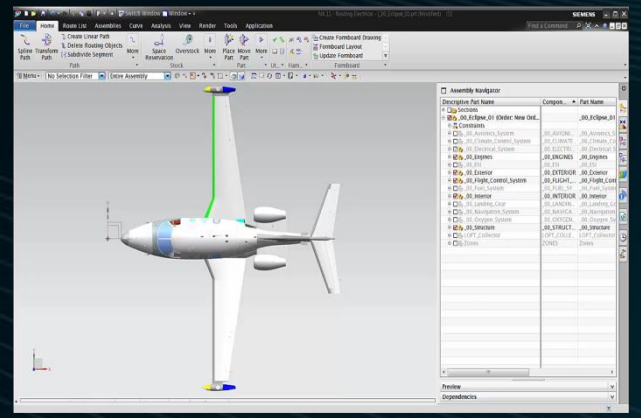
Data & Process Management
Enterprise Integration

Requirements	Product Plans	MES & ERP	PLM
Functional Models	MCAD	Manufacturing	Diagnostics
Workflow	Test Cases	Equipment	

Electrical/Mechanical Collaboration Is Mandatory

Example Needs

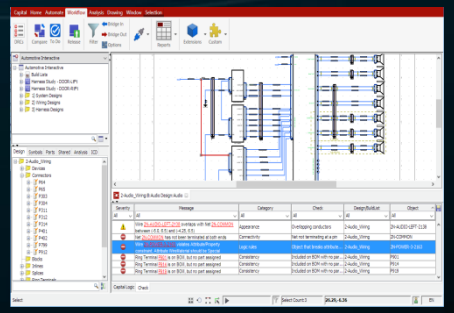


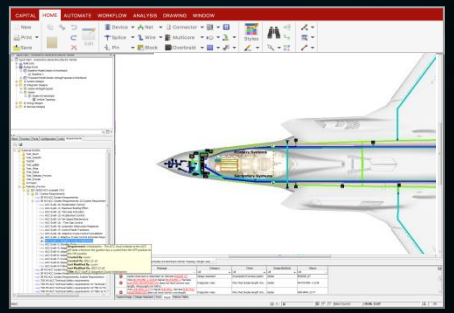


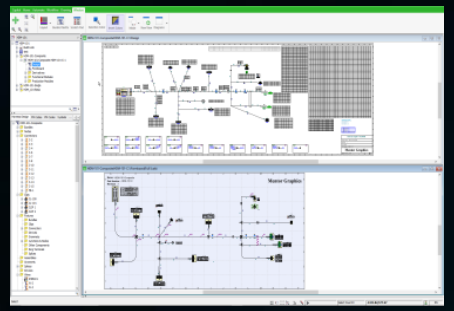
- Space reservation
- System integration
- Electrical simulation
- Signal separation
- Fixture placement
- Weight distribution
- Design for assembly
- Configuration & release management

Capital/NX Integration Technology

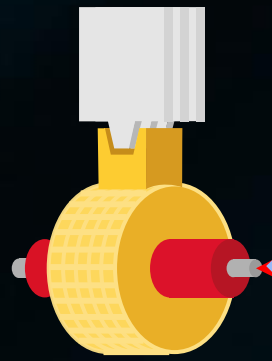
Exchange Process



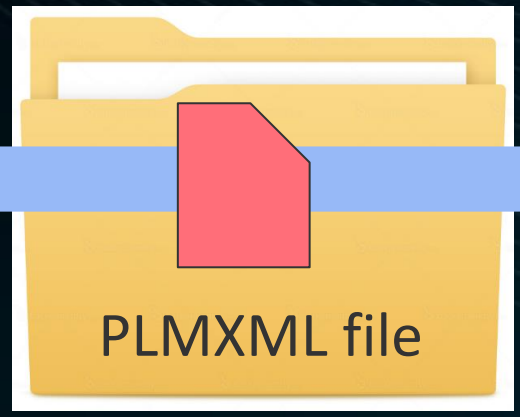


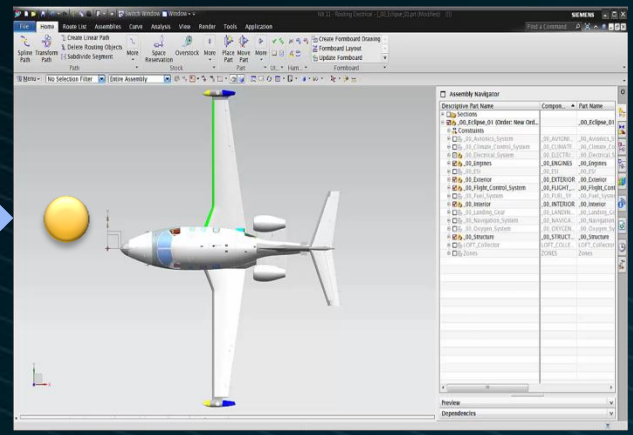


Adaptors



Integration Framework

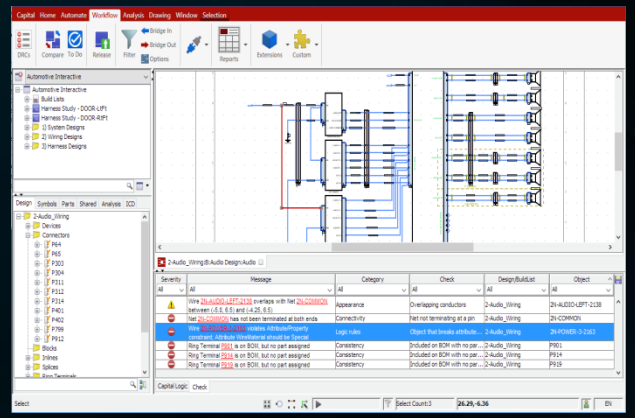


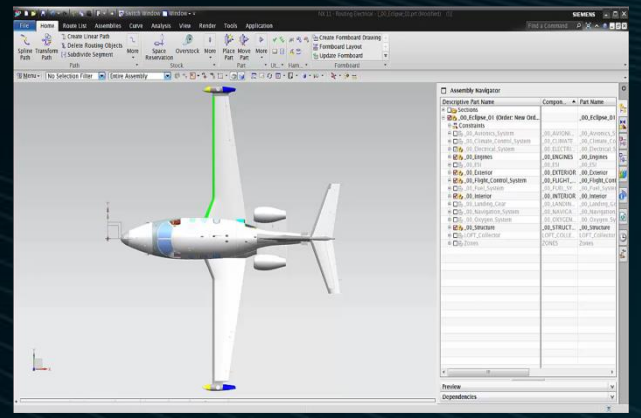


Allows richer integration experience, eg cross highlighting

Principle: Best In Class Tools Seamlessly Integrated

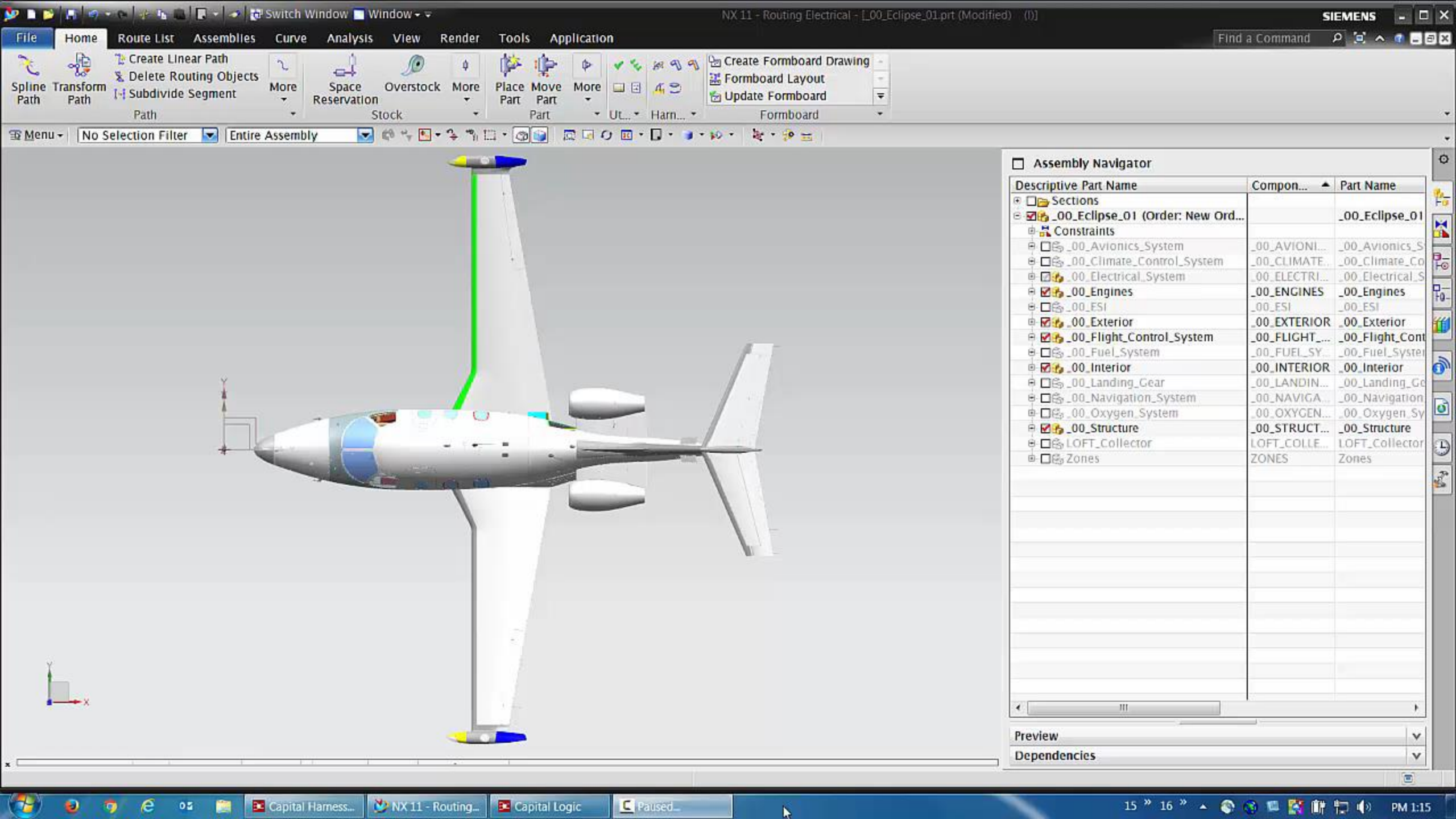
Capital Masters Electrical Data, NX Masters Mechanical Data





- Concurrent electrical/mechanical design is needed to compress development cycles

- Advanced functionality is required for concurrent design (examples)
  - Automatic object linking
  - Dynamic cross highlighting
  - Design change detection
  - Design change policies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Render
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Transform Path
Create Linear Path
Delete Routing Objects
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Space Reservation
Overstock
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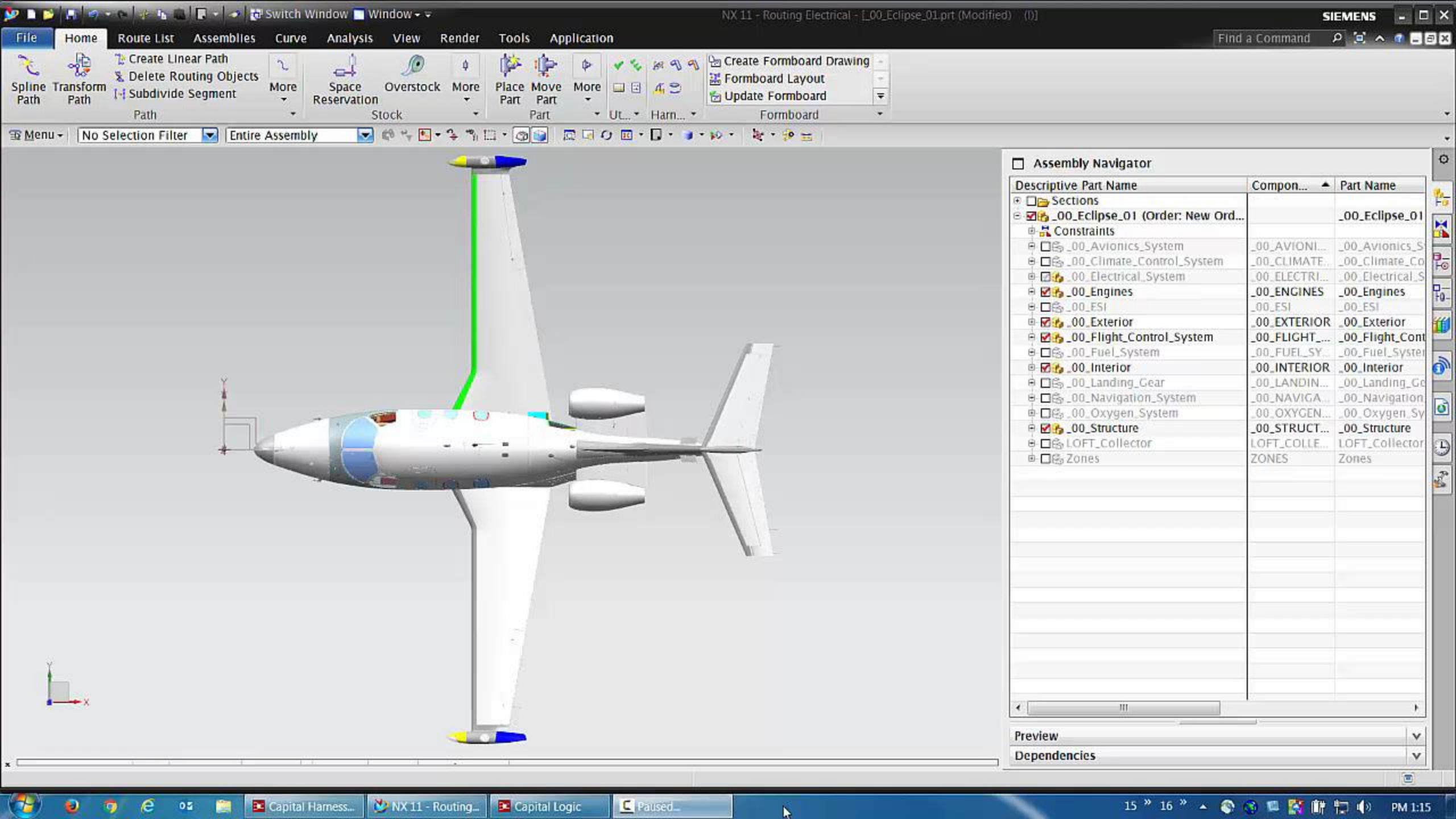
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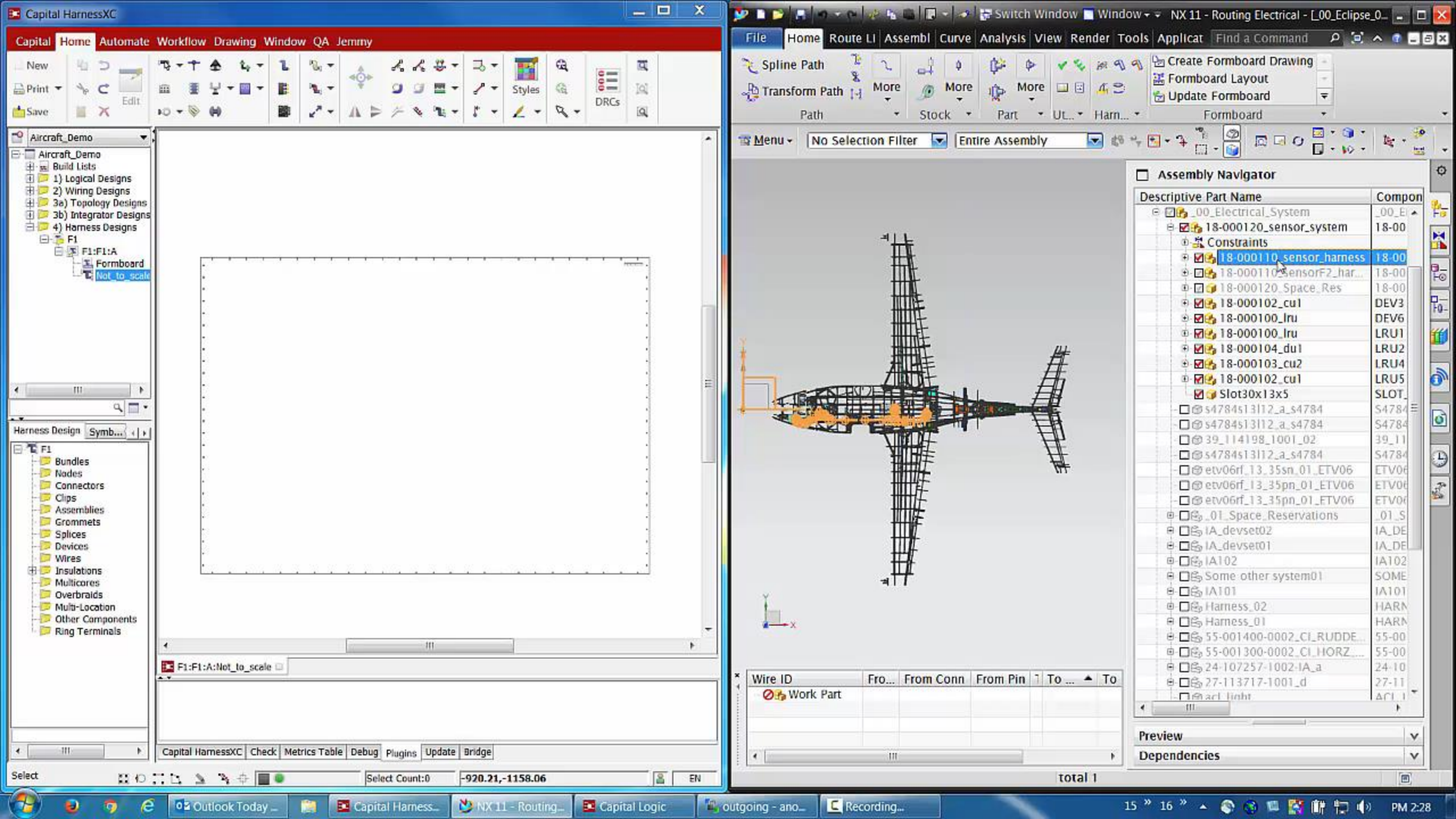
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Capital Home Automate Workflow Drawing Window QA Jemmy
New
Print
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Edit
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Aircraft_Demo
Aircraft_Demo
Build Lists
1) Logical Designs
2) Wiring Designs
3a) Topology Designs
3b) Integrator Designs
4) Harness Designs
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IA_devset01
IA102
Some other system01
IA101
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Harness_01
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Capital Harness...
NX 11 - Routing...
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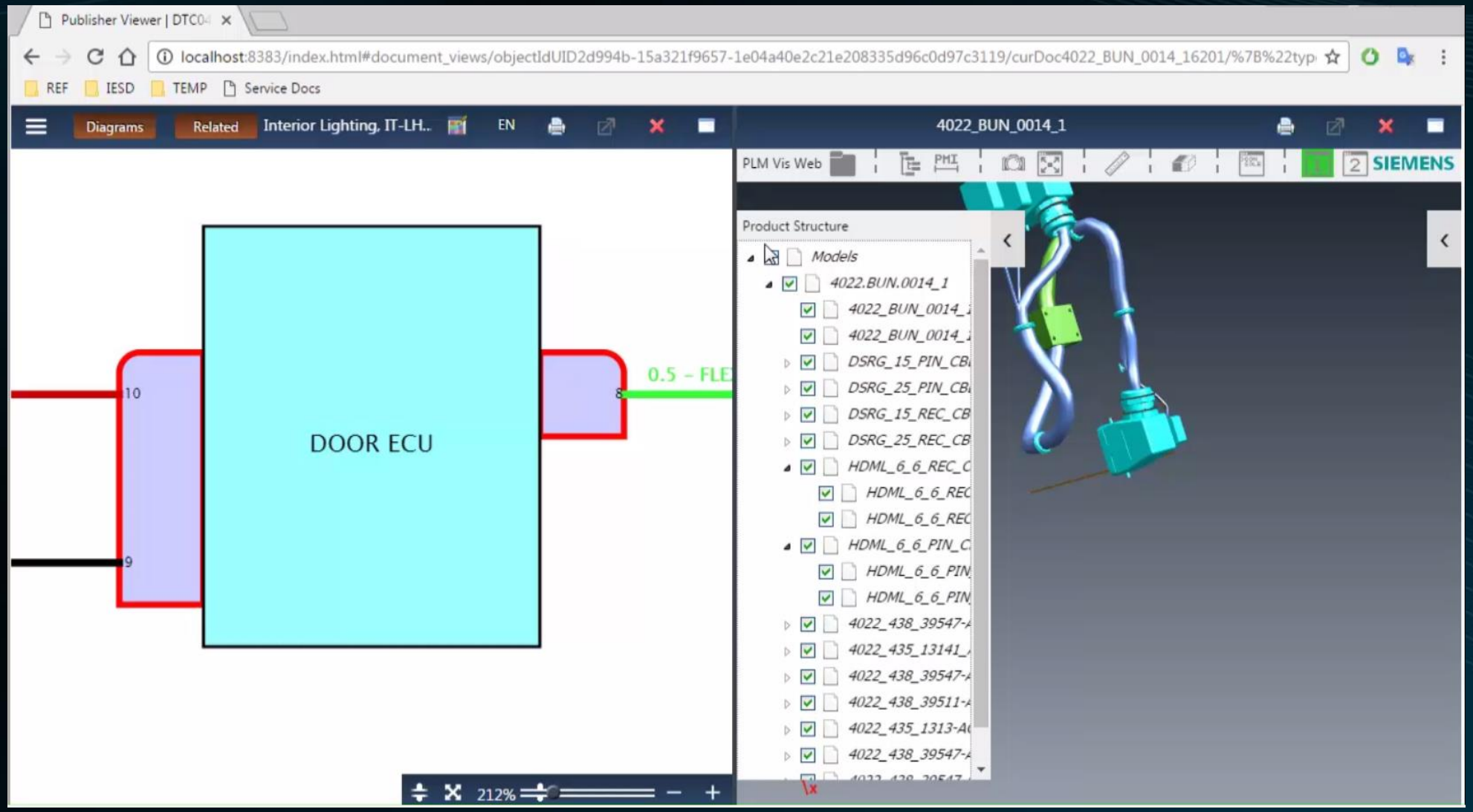
PM 2:28

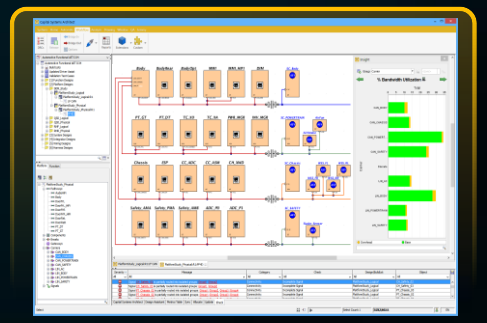
Not Just Design: 3D Context To Aid Troubleshooting

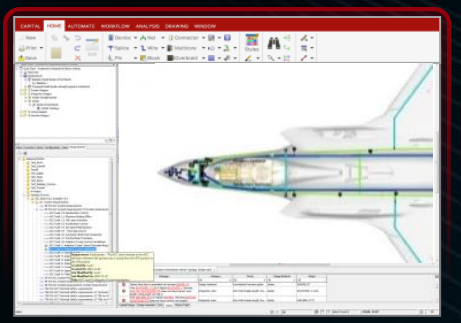
Embedded JT Viewer In Service Technician Environment

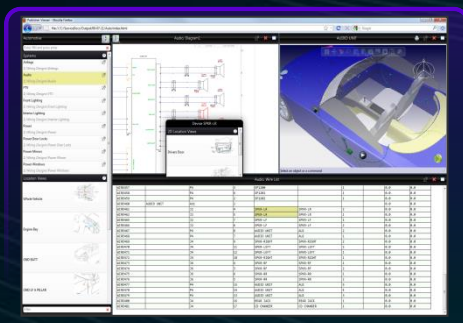


Electrical Domain Flow

Extended Flow Supported By Capital Tool Suite







Define | **Design** | **E** | **Produce** | **Maintain**

Data & Process Management
Enterprise Integration

Requirements
Functional Models
Workflow

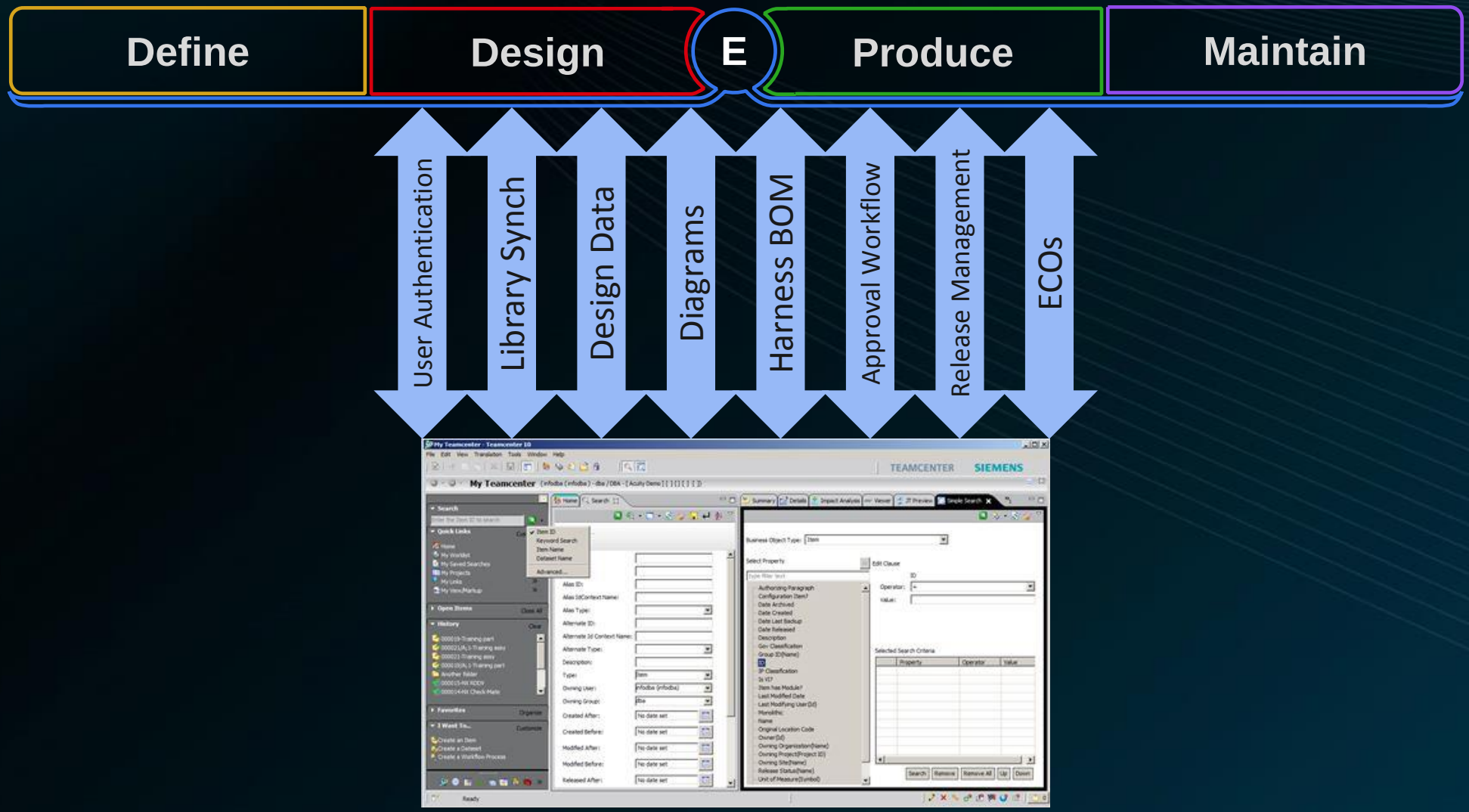
Product Plans
MCAD
Test Cases

MES & ERP
Manufacturing
Equipment

PLM
Diagnostics

Capital/Teamcenter Integration: Example Use Cases

Flexible Integration Architecture Supports Multiple Scenarios



Customer Example: Daimler Trucks

Mentor Graphics Products Solutions Training & Services Company Blogs SUPPORT

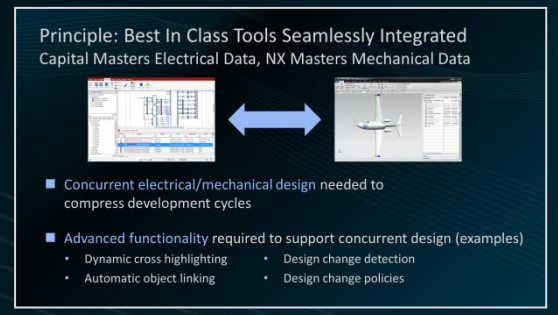
"To develop such an advanced truck requires not only powerful design automation, but also robust design data management. Capital was the natural tool choice because it is so strong in these areas, and is designed to be used by large, multi-site organizations"

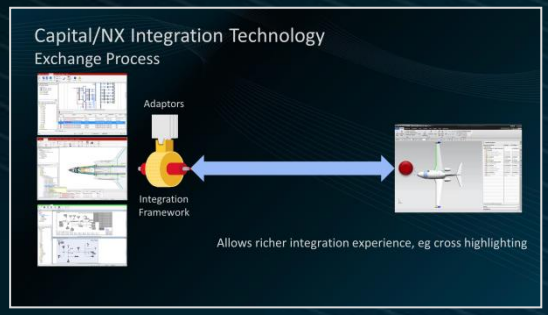
Wolfgang Appel
Senior Manager, Mechatronic Engineering

www.mentor.com/products/electrical-design-software/news/mentor-daimler-capital

Summary

- Development of complex equipment today involves electrical/mechanical collaboration
- Concurrent electrical/mechanical design requires advanced functionality
- Capital & NX are best in class tools, seamlessly integrated
- Major customers are benefiting from the technology





www.mentor.com/electrical