Equipment and Systems Engineering
- Electrical DOMAIN -
CUMULATIVE OVERVIEW
Content

- Electrical Domain Cumulative Assessment
- Electrical Domain introduction
  - Customer pains
- Electrical Domain contribution to the PLM Fundamentals
  - Process Centric
  - Collaborative Workspace
  - Product Process Resource
  - Knowledge
  - CATIA Application Architecture
Electrical Domain
Cumulative Assessment
CATIA Electrical V5R14: Cumulative Assessment

- Powerful CATIA V5 electrical harness design solutions
  - Highly productive 3D harness design driven by logical specifications
  - Seamless process for harness design and documentation
  - V5 Electrical process integration with ENOVIA VPM Navigator
  - Harness design data migration from V4 to V5 is provided

- Dedicated CATIA P1 electrical product offering for F&A customers
  - Introduced in V5R13: CATIA - Electrical Design & Documentation 1 (EC1)
CATIA V5R14 Electrical Portfolio

**Electrical Schematics**

- CATIA - Electrical 3D Design and Documentation 1 (EC1)
- CATIA - Electrical Library 2 (ELB)
- CATIA - Electrical Wire Routing 2 (EWR)
- CATIA - Electrical Harness Installation 2 (EHI)
- CATIA - Electrical Harness Flattening 2 (EHF)

**P2 Platform**

- **Electrical Wire Routing** generates and manages the electrical wires within the DMU according to the functional or wiring specifications
- **Electrical Harness Flattening** achieves flattening of Electrical Harnesses for extensive drafting production (i.e. manufacturing documentation)
- **Electrical Harness Installation** provides powerful tools to route physical harnesses in 3D DMU context
- **Electrical Library** creates and manages catalogs containing electrical components, and assists their placement

**Functional/Logical Design**

**Physical Design**

**Manufacturing**

**P1 Platform**

- **Electrical Schematics**
- **Electrical 3D Design and Documentation**

> Dedicated to Automotive & Aerospace

> Dedicated to F&A and Consumer Goods
Electrical Domain
Introduction
Customer Pains

Design and manufacture electrical systems that are compliant with requirements in order to improve manufactured product quality
- Specifications driven 3D harness design
- Accurate and complete electrical DMU to get rid of physical mockup
- Harness design documentation for manufacturing

Reduce time to market and product development cost
- Reduce cost and risk of introducing errors associated to manual and repetitive tasks
- Transparent data exchanges between the design and manufacturing phases
- Automate design tasks with integration of company expertise in the system
- Avoid duplicated data with design reuse

Easily deploy new tools and best practices
- Have a complete suite of CATIA products integrated throughout the whole Systems and electro-mechanical product creation process
- Guarantee company investments in reusing V4 data
Domain Definition

- Electro-Mechanical design process is fully covered with CATIA V5 integrated products
  - Population of catalogues with electrical components
  - 3D harness routing in the Digital mock-up
  - Integration of logical wiring systems data in the 3D harness
  - Generative Harness documentation for Manufacturing

- Electronics dedicated product for definition of 3D assembly of electronic Circuit Board
  - Bi-directional interface (with IDF standard) between Electronic CAD data and CATIA Version 5 Circuit Board Design

- Single product life cycle management for electrical and mechanical data.
  - ENOVIA manages Electrical and mechanical data together
Electrical Domain Contribution to the PLM Fundamentals
PLM Fundamentals

- **Process Centric**
  - Industry specific business process optimization

- **Collaborative Workspace**
  - Pervasive 3d based communication & collaboration

- **PPR**
  - Unique Product, Process and Resource description and integration model

- **Knowledge**
  - Capturing sharing and re-applying corporate knowledge

- **CAA V5**
  - Openness and extension through component based architecture and community
Electrical Systems Development

Requirements

Functional Design
- Function Flow, Functional Data Flow
- Function Decomposition
- System’s Connectivity Authoring

Logical Design
- System Decomposition & Allocation
- Interactive Wiring diagram
- 2.5D topology
- Generative diagrams
- Harness documentation

Physical Design
- Space Reservation
- 3D harness installation
- Manufacturing documentation

Manufacturing
- Manufacturing & Assembly process
- Manufacturing Formboard

ENOVIA/ LCA & SMARTEAM
V5 Engineering hub

ENOVIA/IPD
V5 Process & Resource hub
CATIA PLM V5R14 Assessment

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Manufacturing
- Manufacturing Hub
- Manufacturing & Assembly process
- Manufacturing documentation
- Manufacturing Formboard

NEW

ENOVIA & SMARTEAM V5 Engineering hub

V5R14
Collaborative Workspace: Electrical Domain

- Interface provided with CAA partners applications enable collaboration between electrical system designer and Electro-Mechanical designer
- Relational design between 3D electrical system and mechanical structure environment enables collaboration between mechanical designer and 3D electrical system designer
  - Enables automatic update of the 3D harness geometry when mechanical environment is modified

V5 Electrical tools enable collaboration between harness design and manufacturing team
- Generative electrical harness is integrated in 3D design harness
- Assembly simulation of the wire harness installation and maintenance activities.

Integration of harness design and documentation process in VPM Navigator enables collaboration between all electrical designers community.
- V5 process from 3D harness routing to harness documentation integrated in VPM Navigator
- Logical specifications & Catalog of components are shared between all designers
PPR definition of Electrical Systems

Objects in electrical systems:
Functions, Signals, Equipments, Connectors, Wires, Splices...

Harness manufacture process plan
Harness assembly Process planning & simulation

Tools to build the harness (formboard table ...) Operator
Operator to assemble harness in the product
Knowledge : Electrical Domain

Build reusable 3D harness templates with Product Knowledge Template product
- Define “intelligent” harness that will be reuse in several contexts.
- Include in the harness template knowledge parameters that will be used to automatically adapt the harness when the context changed.

Customizable Expert Checks can be defined to verify consistency of electrical systems to company rules
- Check incompatible wires do not share the same route for more than a given length.
- Check all bundle segments, connectors and wires are properly connected in the harness.
- Improve harness reliability with rules related to electro mechanical integration (rules involving wiring data in the DMU)…

Wire routing product (EWR) enables to plug a knowledge ware rule within the routing algorithm in order to make sure generated wire harness is compliant with company rules
- This rule can drive the wire integration in 3D to get a wire route compliant with company rule.
- Program will propose another routing solution (if any exists) if the shortest path route is not compliant with integration rule.
Electrical Domain Ecosystem

ELECTRICAL SYSTEM FUNCTIONAL DEFINITION

ELECTRICAL LIBRARY

SYSTEM SPACE RESERVATION

ELECTRICAL HARNESS INSTALLATION

ELECTRICAL WIRE ROUTING

ELECTRICAL HARNESS FLATTENING

Harness design & manufacturing

ELECTRICAL 3D DESIGN & DOCUMENTATION

Simulation

Electrical

System “Schematics”

Generative Wiring diagram

Simulation

2.5D topology

3D electrical catalog content

Available in R14

Not yet available

Partner’s AP

DS’s AP
Thank you