



**EWIS-IF**

# Electrical Wiring Interconnection System Interoperability Forum

Lothar Klein, LKSoftWare GmbH, Managing Director

**20 October 2022**

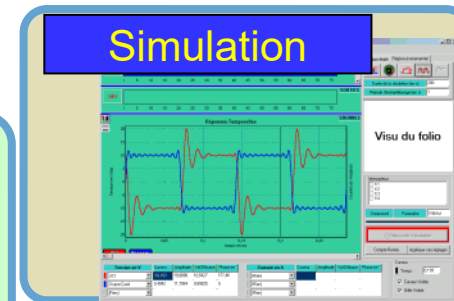
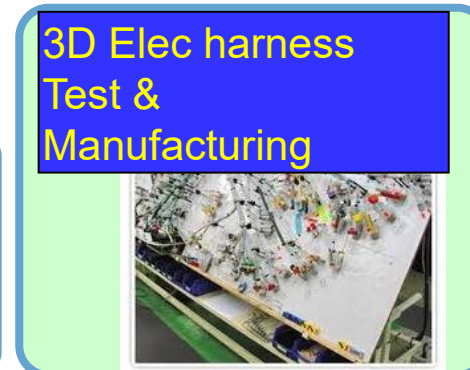
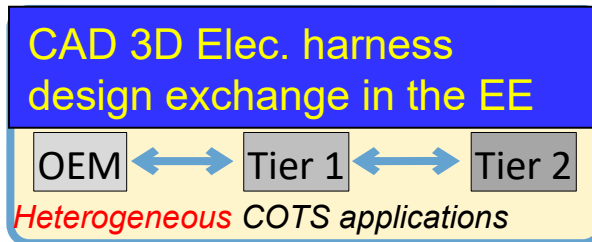
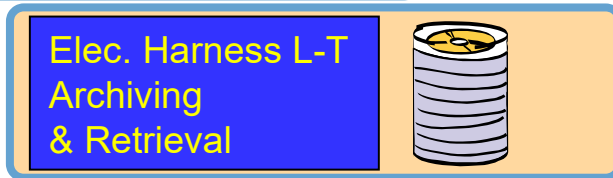
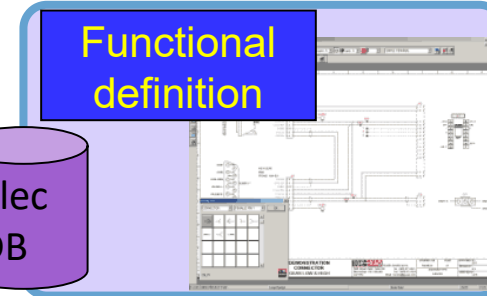
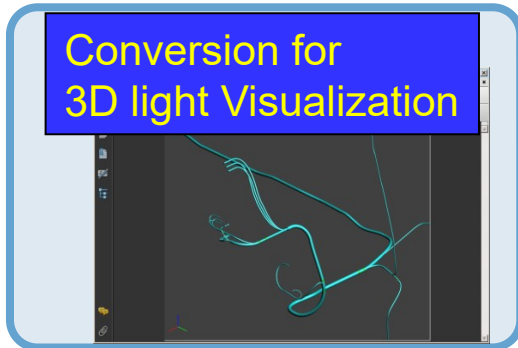
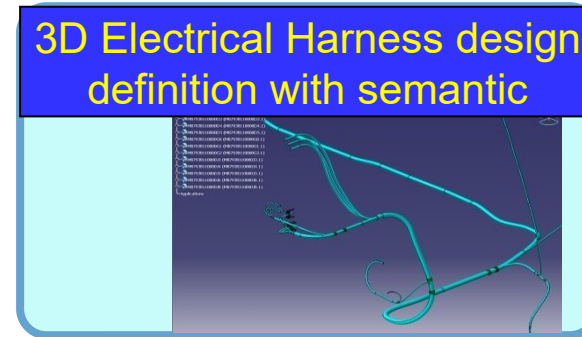
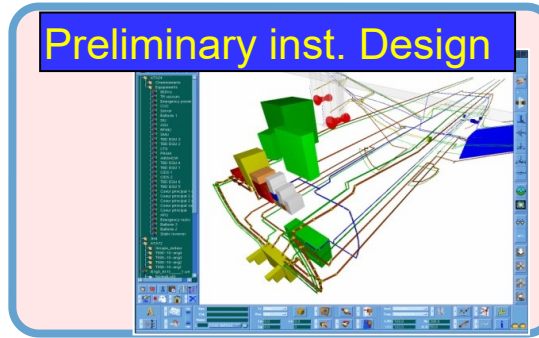
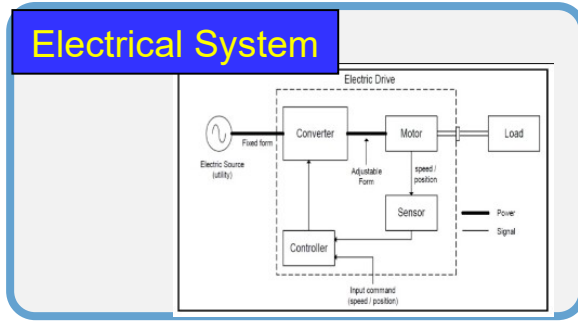
# Background & Timeline for the Electrical Wire Harness (EWH) extension

Main driver: International LOTAR consortium on Long Term Archiving and Retrieval of aerospace manufactures

- 2013: Document “Essential Information for Electrical Harnesses”
- 2014-09: Kick-Off meeting for the standard development
- 2015: Analysis of related data models that contributed to AP242 ed2:
  - EDIF: Electronic Design Interchange Format, first edition 1985
  - STEP AP210: Electronic assembly, interconnect and packaging design (Printed Circuit Boards). Problem: complexity
  - STEP AP212: Electrotechnical design and installation  
Problem: ed1 from 2001 got never fixed
  - VEC: Vehicle Electric Container  
Problem: not integrated into STEP
- since 2019: “STEP AP 242 Electrical Harness XML Tutorial & Recommended Practices” together with example XML files
- 2019-09: Start of EWIS-IF test round 01E .... today test round 05E

# STEP AP242 ed2 for Electrical Harness interoperability

## Overview & target



# Major problems to address during the development:

- EWH have typically rigid components such as connectors, but their harness segments are flexible. A specific 3D geometry comes only into place only an EWH is installed (vehicle, aircraft, ...)
  - flexible parts had so far not be addressed by STEP
- M-CAD <=> E-CAD:
  - M-CAD only know about the major components (connectors). Through the 3D model the length of the harness segments and the needed fixture units are determined
  - E-CAD knows about all connectivity details, connectors details, etc. but can't determine length of harness segments and needed fixture units
  - major OEMs have their own specific solution for the synchronization of their M- and E-CAD systems.
- Decision was to use AP242-EWH primarily on the level of the new Domain Model (SysML, derived from the Express Business Model of edition 1) using XML:
  - the new model and derived XML schema had initially not the same maturity as the traditional p21/MIM approach
  - nevertheless the p21/MIM (Modular Integrated Model) approach is also available for EWH
  - need for External Element Reference for 3D geometric elements (e.g. XML => p21 for centre-curves for harness segments and AxisPlacement for connectors)

**- Synthetic Test Models -**

**EWH\_Assembly1:**

Electrical Harness assembly structure & BoM

Electrical parts (cable, wire, connector, lug...)



Electrical part occurrences  
Harness assembly

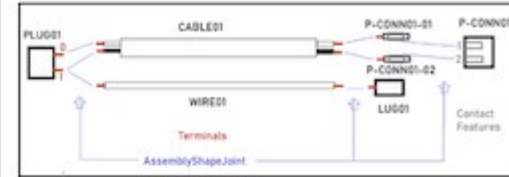
**EWH\_Connectivity1 :**

basic connectivity between a simple connector, a terminal lug, a wire and a cable



**EWH\_Connectivity2 :**

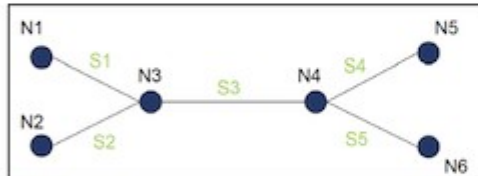
detailed connectivity (contact level)



Part Number	Quantity	Description	Image
PLUG01	1	Plug Connector	
CABLE01	1	Cable	
WIRE01	1	Wire	
P-CONN01-01	1	Terminal Connector	
P-CONN01-02	1	Terminal Connector	
LUG01	1	Terminal Lug	

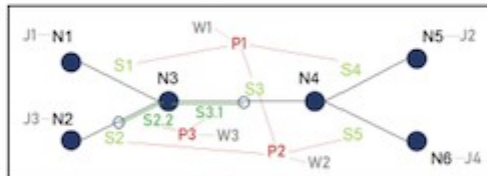
**EWH\_Topology1 :**

Simple case



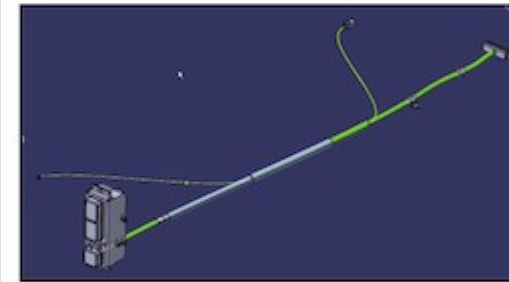
**EWH\_Topology2 :**

More complex case to support protection or supports



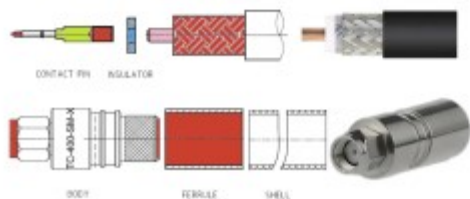
**EWH\_Topology3 :**

Topology with a 3D representation



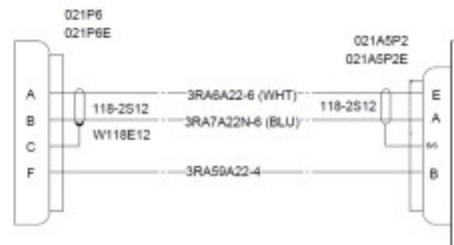
**EWH\_Connectivity3:**

Coaxial connectors and cables



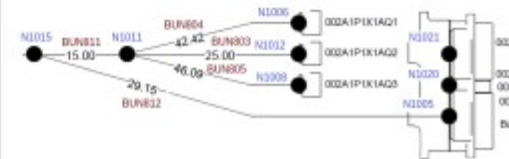
**EWH\_Connectivity4:**

Shielded cable, shield sleeve, electrified backshell



**EWH\_Connectivity5:**

Modular connectors, EN4644 / EPX B2 with quadrx contacts



# Achievements of AP242 EWH

- implemented capability covered is not limited to EWH:
  - support of generic connectivity
  - effectively replacing AP212 Electrotechnical design and installation (2001)
  - covers optical fibres
  - covers as well piping and ventilation (HVAC)
- VEC capability covered:
  - there already exist prototype converters from KBL and VEC to AP242
- result of test cases and early implementations
  - data model extension for EWH for AP242 edition 2 (2020) is working
  - identified issues that got fixed for AP242 third edition (2022? - technical corrigendum)
  - minor improvements planned for AP242 fourth edition
- goals for 2023
  - get more vendors and users on board
  - first commercial releases and public production models

# Links

- <https://lotar-international.org/>
- [https://www.mbx-if.org/ewis/ewis\\_introduction.php](https://www.mbx-if.org/ewis/ewis_introduction.php)
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Thank you for your Attention

**20 October 2022**