

Schematic Integrations with UG/Wiring under Teamcenter Engineering

A lifecycle view of electrical design

Premium Partners:



Microsoft

Eclipse Aviation

- Less than \$1.4M purchase price
- Jet speeds, safety, comfort
- Operating costs significantly lower than current options
- 6 occupants
- Can operate out of over 10,000 U.S. airports
- Advanced all-glass cockpit
 - Certified for single-pilot flight
- First startup in 40 Years to fly a new passenger jet design
- 2200+ sold



Eclipse 500 Jet Performance



Takeoff Distance Sea level, ISA to 50 ft @ MGTOW	2,155 ft
Landing Distance Sea level, ISA @ 4,600-lb landing weight	2,040 ft
Rate of Climb - 2 engines	2,990 ft/min
Rate of Climb - 1 engine	888 ft/min
Time to Climb - 35,000 ft	19 min
Takeoff at 5,000 ft at 68°F (1,524 m at ISA +15)	3,350 ft
Single Engine Takeoff Climb at 5,000 ft at 68°F (1,524 m at ISA + 15)	293 ft/min
Single Engine Service Ceiling	25,000 ft
Cruise Speed	375 kt
V_{so}	67 kt
V_{mo}/M_{mo}	285 kt /0.64 Mn
Max. Altitude	41,000 ft
Range, 4 occupants NBAA IFR, 100 nm alternate, 200-lb Pilot, three 170-lb passengers	1,280 nm
Range, 4 occupants IFR 45-minute reserve	1,395 nm

Loaded with Standard Features for Safety and Comfort

- Twin turbofan engines
- Automotive-quality appointments
 - Leather upholstery
 - Semi-club and six-seat configurations
- Comprehensive avionics suite standard to maximize safety
- Dual-zone air conditioning and heating to assure pilot and passenger comfort
- Pressurized baggage access



The Eclipse Team



*500 people dedicated to Eclipse 500
development*

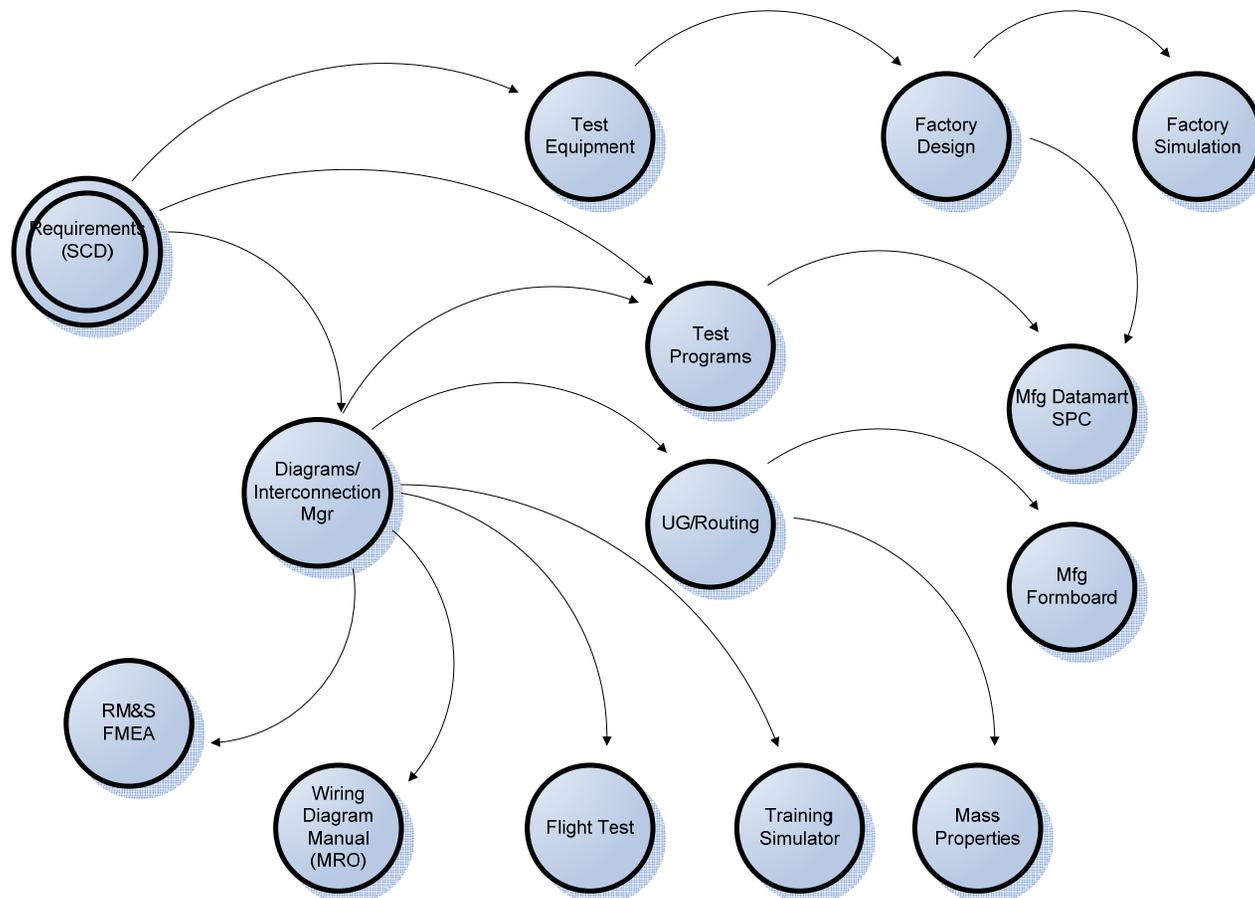
Abstract

- **Schematic Integrations with UG/Wiring under Teamcenter Engineering**
- The power of UG/Wiring comes with its integrations with logical definition in schematics. UG/Wiring stands at the center of the lifecycle in harness development between concept, and mechanical implementation, through formboard manufacturing, test and troubleshooting. This entire lifecycle is analyzed as use-cases for each of team member. A survey of schematics products is surveyed, including the major suppliers used with UG/Wiring. Database design is analyzed. A deep-dive into validation, release and change management in Teamcenter is detailed in synchronizing the many components of UG/ Routing technical data packages. A discussion follows into features which will be needed in future releases of UG/Wiring. Experience of Eclipse Aviation as well as several other companies is included.

Schematics Offerings

- UG/Schematics, an extension of UG/Drafting
- CIM-Team E3, and RDB driven graphics tool (aka HP ECAD)
- Mentor, file-base old 300# gorilla

Wiring Requirements Lifecycle



Integrated Parts Dictionary

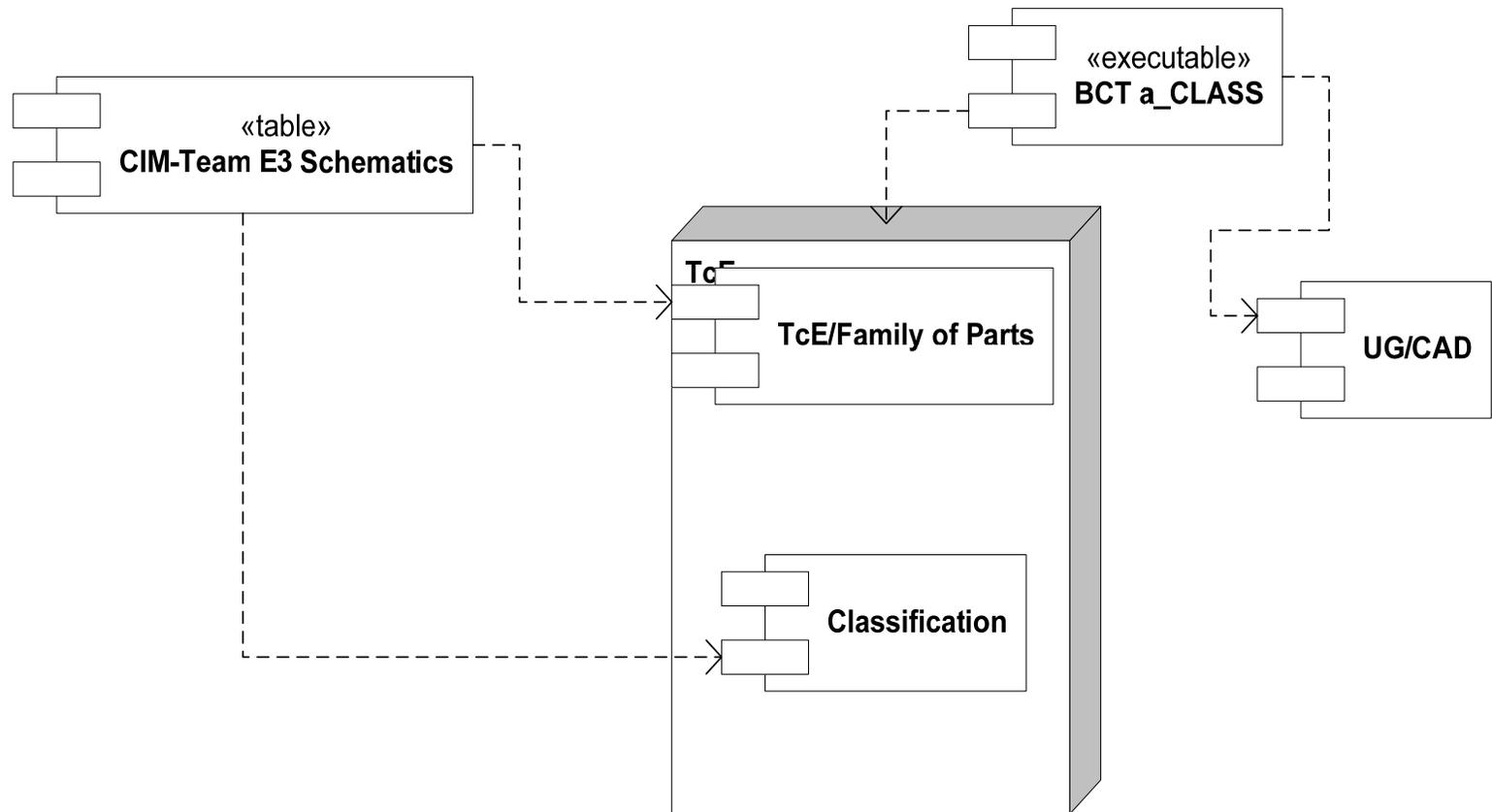
Seeing ALL part attributes

Premium Partners:

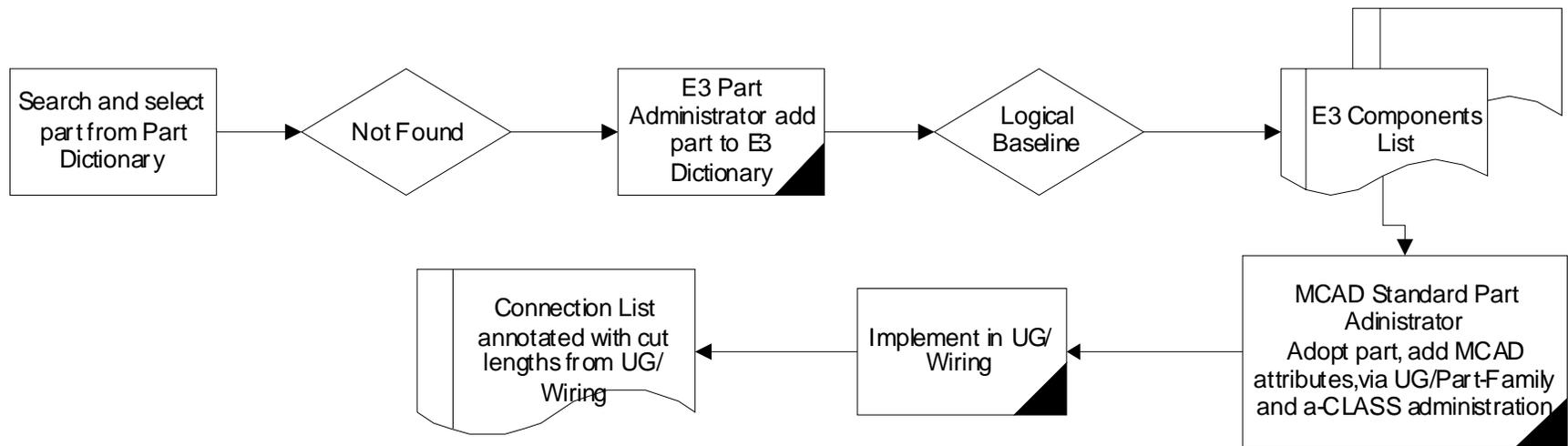


Microsoft

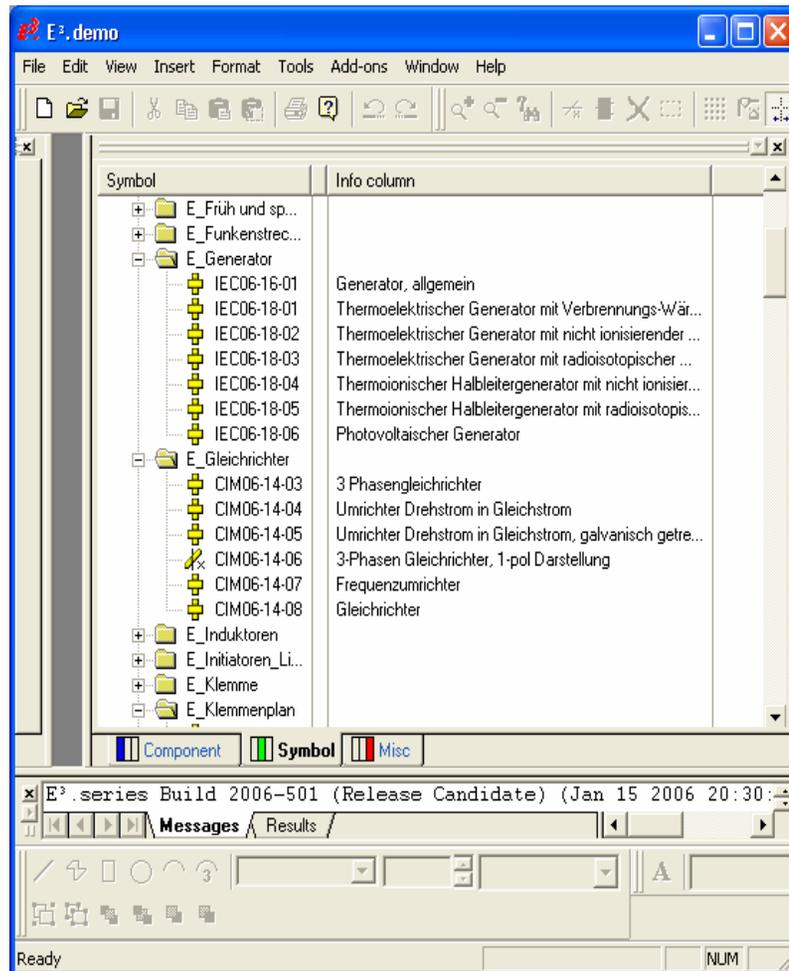
Parts Dictionary



Part Definition Lifecycle



CIM-Team E3 Part Dictionary



Classification

Classification - Teamcenter Engineering V9.1.2.8c

File Desktop Help

Cancel X Favorites

Classification (Meda, Ram (ram.med) - dba/DBA [EAC_ABQ])

Engineering

My Navigator

PSE

Classification

ICM Classification Root

- Resource Management
- Parts
 - COTS
 - Engineering
 - Bearings [495]**
 - as14101 [13]**
 - as14103 [8]
 - as27640 [28]
 - as27641 [36]
 - as27642 [21]
 - as27643 [24]
 - as27646 [18]
 - as27647 [9]
 - as27648 [11]
 - as81934_1 [9]
 - as81934_2 [29]
 - as81935 [23]
 - as81935_1 [40]
 - as81935_2 [60]
 - as81935_4 [40]
 - as81935_5 [60]
 - ms14102 [36]
 - ms14104 [14]
 - ms21151 [14]
 - ms21242 [2]
 - Blind Bolts [0]
 - Blind Rivets [0]
 - Bolts [4804]
 - Bushings [3017]
 - Brackets [0]
 - Clamps [403]
 - Pins [1349]

Properties Table

Object ID ms14101-7 / - [as14101]

OD	00000.90620
ID	00000.43750
Width	000.437 in

as14101

ms14101-7-as14101

1 of 495 Clear Search

Ready 0

BCT a-CLASS

BCT aClass for NX Manager [administrator]

File Tools Help

Find Class Favorites autoClass autoSync Dictionary LOValues BCT Templates

Class Tree

- Engineering
 - Bearings
 - as14101
 - as14103
 - as27640
 - as27641
 - as27642
 - as27643
 - as27646
 - as27647
 - as27648
 - as81934_1

Attributes [4]

ID

OD

ID

Width in

Subclasses Node Documentation Instance Documentation

Instances

as14101 as14103 as27640 as27641 as27642

as27643 as27646 as27647 as27648 as81934_1

A

Release Methods

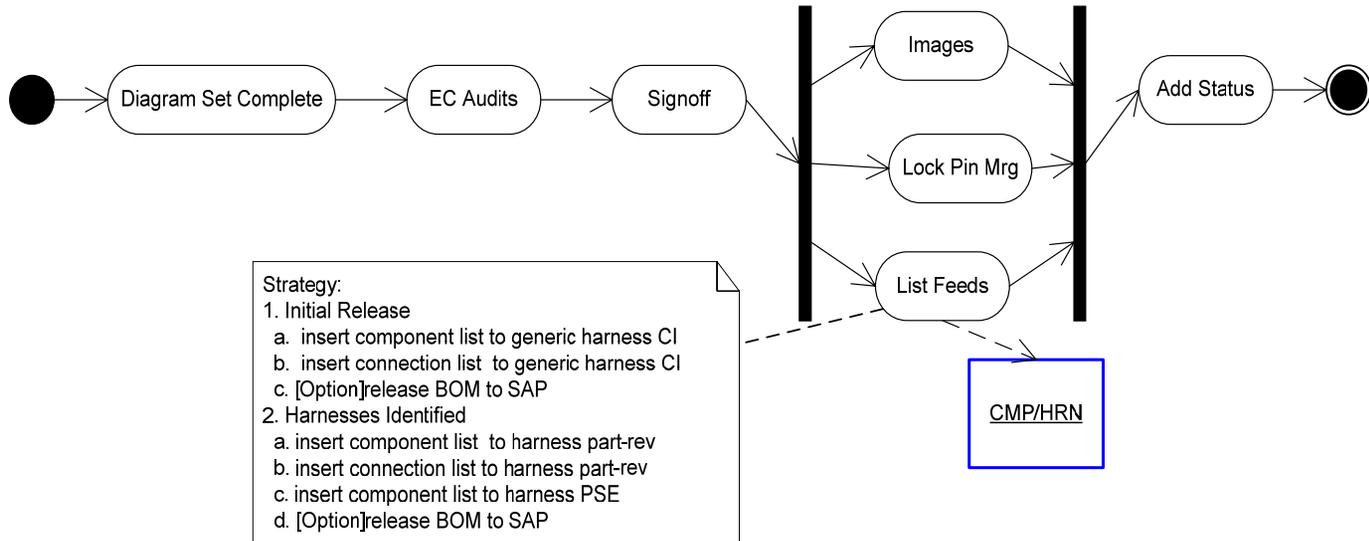
Using TcE Change Manager in the
Requirements → Schematics →
Harnesses → Fabrication → Test Lifecycle

Premium Partners:

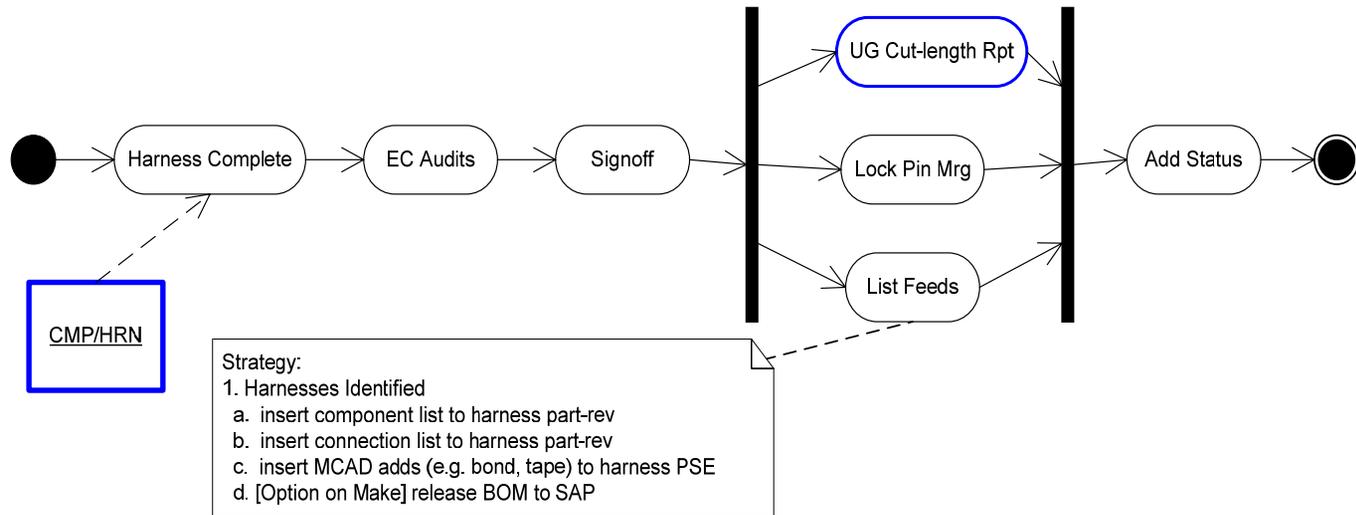


Microsoft

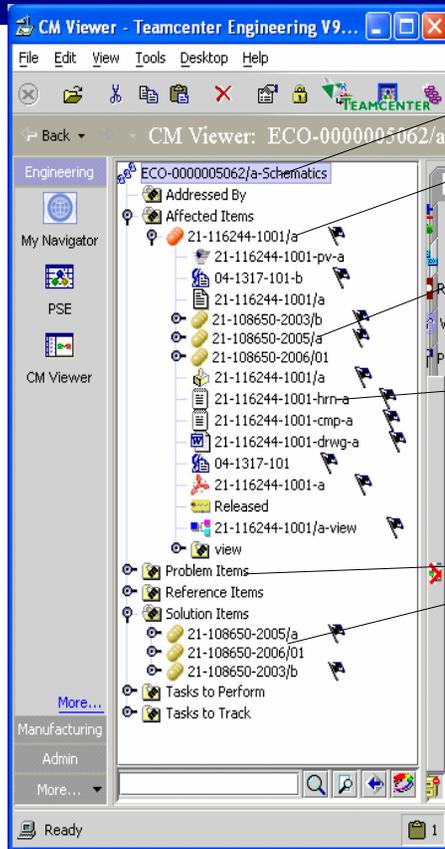
Requirements Baseline, Schematics



Implementing Harnesses from



Teamcenter Harness Datamodel



ECO change revision object

The harness being released

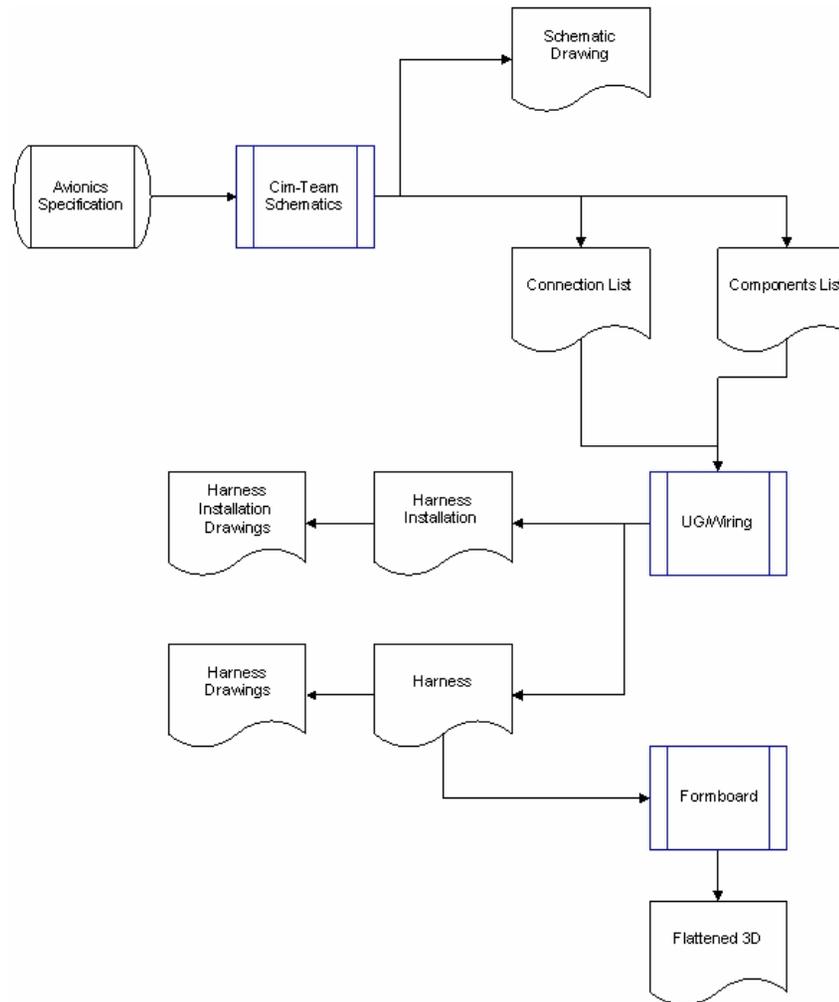
Schematics are referenced as *Requirements* they will not get status as children of the harness

.hrnconnection and cmp component lists are datasets of the harness assembly

Schematics are parent here they will get status as children of the harness

Relationships Required for Release of Harnesses

File Lifecycle



Component List

Microsoft Excel - 24-117703-1003.cmp

File Edit View Insert Format Tools Data Window Help

J8

Name Box	B	C	D	E
1	! PROPRIETARY INFORMATION			
2	! All information and technical data disclosed herein are the property of			
3	! Eclipse Aviation and are not to be duplicated or disclosed to others for			
4	! any purpose without written consent of Eclipse Aviation Albuquerque NM			
5	! Harness List version 70			
6	Status:	Released		
7	Part Number	24-117703-1003	Revision:	C
8	Description:	Harness, Left Happy		
9	Date Created:	3/31/2006	6:54:06 AM	
10	Diagrams used:	24-117502-2004_01		
11	Created by:	lee.whitton		
12	Harness Number:	24-117703-1003		
13	N/A	RefDes	PartNumber	AlternatePN
14		24A11-A-1	MS25036-108	
15		24A11-D-1	MS25036-108	
16		24A11-E-1	MS25036-110	
17		24A11GS01SH-A	MS25036-108	
18		24A11GS01SH-B	MS25036-112	
19		24A11GS01SH-C	MS25036-112	
20		24A11P01	MS3475W8-98S	
21		24A11P01BS	33A1001RMD802C	
22		24A13-X1-1	MS25036-103	
23		24A15-X1-1	MS25036-103	
24		24A15-X2-1	MS25036-103	
25		24A17P01E01	M81824/1-1	D-436-36
26		24K05-A1-1	MS25036-150	
27		24K05-A2-1	MS25036-150	
28		24K05P01	ETV06RF-9-98SN	D38999-26MA98SN
29		24K05P01BS	S4784S09L12	
30		24K07P01E01	M81824/1-2	D-436-37
31		24K07P01E02	M81824/1-2	D-436-37
32		91GS511SH-A	MS25036-103	
33		91GS611DC-A	MS25036-103	
34		91GS611DC-B	MS25036-103	
35		91GS653SH-A	MS25036-103	
36		91GS653SH-B	MS25036-108	
37		91GS653SH-A	MS25036-103	
38		91P09	ETV06RF-15-19PN	D38999-26MD19PN
39		24A11-E-1_1	MS25036-110	
40		24K05-A2-1_1	MS25036-150	
41		24A13-X2-1	MS25036-103	
42		24A17P01	MS3476L24-31S	
43		24A17P01BS	S4785S24L12	
44		24K07P01	ETV06RF-9-35SA	D38999-26MA35SA
45		91GS511SH-B	MS25036-112	
46				
47				
48				
49				
50				
51				

Ready

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Connection List with UG Cut-lengths

Microsoft Excel - 39-118750-1001-tce.hrm:2

File Edit View Insert Format Tools Data Window TcEng Help

Type a question for help

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E6

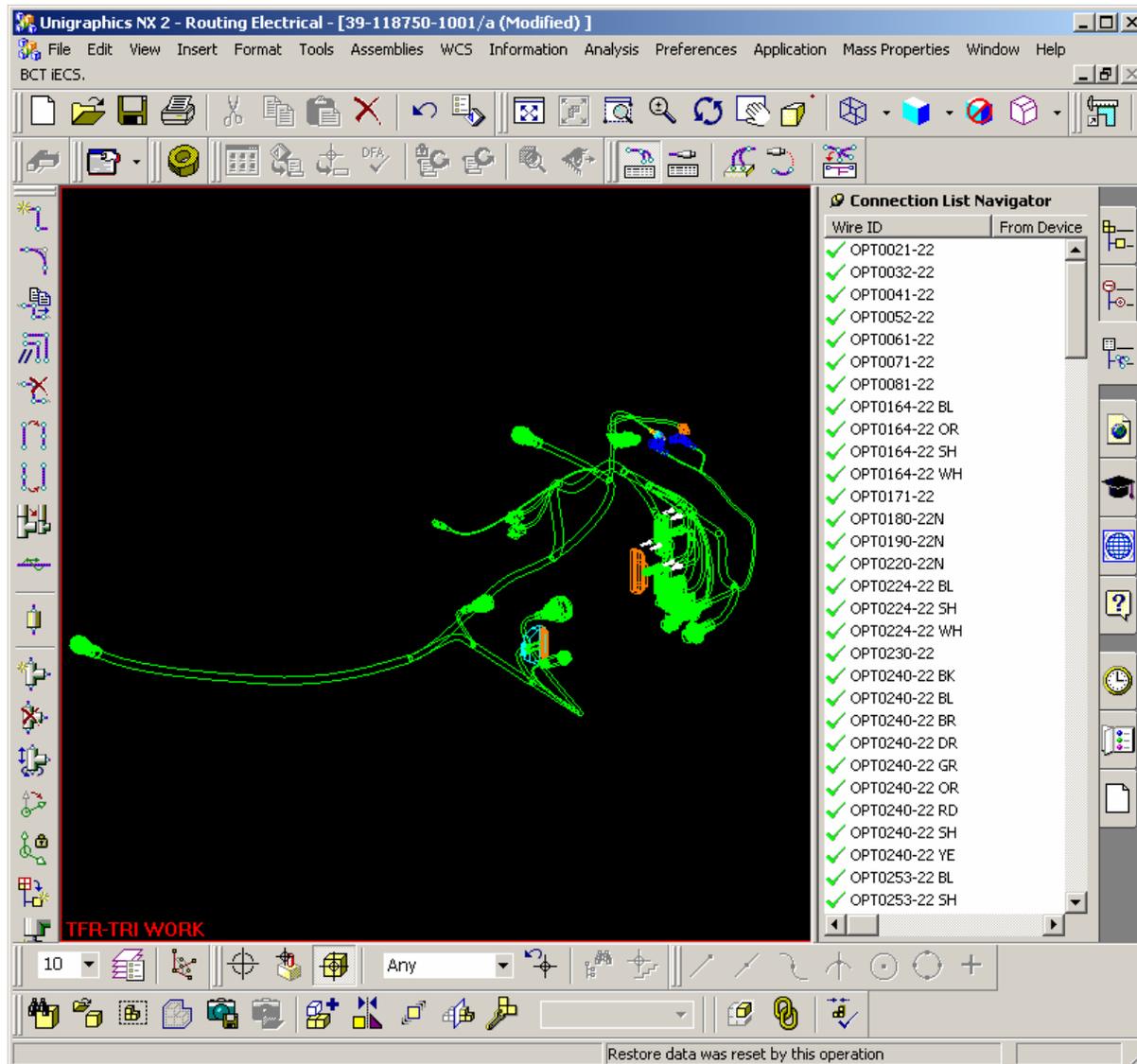
1	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	! PROPRIETARY INFORMATION													
2	! All information and technical data disclosed herein are the property of													
3	! Eclipse Aviation and are not to be duplicated or disclosed to others for													
4	! any purpose without written consent of Eclipse Aviation Albuquerque NM													
5	! Harness List version 68													
6	! Date Created:	2/15/2006	9:29:47 AM											
7	! Diagrams used:	39-109612-2006_01												
8	! Created by:	jeannette.norton												
9	! Passed Audit!:	2												
10	! CableName	wirArticleNo	WireName	DeviceFrom	PinFrom	DeviceTo	PinTo	Guage	WireColor	Length	Harness	WireType	Marking	Description
11	OPT0424	REF ONLY	OPT0424-22 SH	34A20GSD1SH-A	1	91P12BS	S2		White/Black	47.5474	39-118750-1001		OPT0424-22	
12	OPT0433	REF ONLY	OPT0433-22 SH	34A20GSD1SH-A	2	34A20J01E07	1		White/Black	4.05264	39-118750-1001		OPT0433-22	
13	OPT0363	REF ONLY	OPT0363-22 SH	34A20GSD1SH-A	3	34A20J01E04	1		White/Black	3.93528	39-118750-1001		OPT0363-22	
14	OPT0682	M22759/43-22-9	OPT0682-22	34A20J01E01	1	34A20J01	49		White	1.77134	39-118750-1001		OPT0682-22	
15	OPT0681	M22759/43-22-9	OPT0681-22	34A20J01E01	1	34A20J01	51		White	1.77134	39-118750-1001		OPT0681-22	
16	OPT0680	M22759/43-22-9	OPT0680-22	34A20J01E01	1	34A20J01	65		White	1.77134	39-118750-1001		OPT0680-22	
17	OPT0362	M27500-22SD2T23	OPT0362-22 WH	34A20J01E02	1	91P11	18		White	63.0657	39-118750-1001		OPT0362-22	
18	OPT0363	M27500-22SD2T23	OPT0363-22 WH	34A20J01E02	1	34A20J01	3		White	1.73136	39-118750-1001		OPT0363-22	
19	OPT0362	M27500-22SD2T23	OPT0362-22 BL	34A20J01E03	1	91P11	19		Blue	63.0587	39-118750-1001		OPT0362-22	
20	OPT0364	M27500-22SD2T23	OPT0364-22 BL	34A20J01E03	1	34A25J01E02	1		Blue	23.0828	39-118750-1001		OPT0364-22	
21	OPT0363	M27500-22SD2T23	OPT0363-22 BL	34A20J01E03	1	34A20J01	4		Blue	1.72441	39-118750-1001		OPT0363-22	
22	OPT0364	REF ONLY	OPT0364-22 SH	34A20J01E04	1	34A25J01E03	1		White/Black	23.0842	39-118750-1001		OPT0364-22	
23	OPT0432	M27500-22SD2T23	OPT0432-22 WH	34A20J01E05	1	91P12	6		White	45.0545	39-118750-1001		OPT0432-22	
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25	OPT0432	M27500-22SD2T23	OPT0432-22 BL	34A20J01E06	1	91P12	7		Blue	45.0226	39-118750-1001		OPT0432-22	
26	OPT0433	M27500-22SD2T23	OPT0433-22 BL	34A20J01E06	1	34A20J01	22		Blue	1.72417	39-118750-1001		OPT0433-22	
27	OPT0434	REF ONLY	OPT0434-22 SH	34A20J01E07	1	34A26J01E03	1		White/Black	18.5906	39-118750-1001		OPT0434-22	
28	OPT0330	M22759/43-22-9	OPT0330-22	34A22P01	4	34A22P01	5		White	1	39-118750-1001		OPT0330-22	
29	OPT1375	REF ONLY	OPT1375-22 SH	34A22P01BS	S3	91CP02P03TC-1	1		White/Black	100.436	39-118750-1001		OPT1375-22	
30	OPT0644	M22759/43-22-9	OPT0644-22	34A23J02E01	1	91P12	33		White	52.3293	39-118750-1001		OPT0644-22	
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33	OPT0364	M27500-22SD2T23	OPT0364-22 WH	34A25J01E01	1	34A20J01E02	1		White	23.1281	39-118750-1001		OPT0364-22	

39-118750-1001-tce

Draw AutoShapes

Ready CAPS NUM

UG/Wiring



Weights Calculation

Weights of harnesses are calculated from the UG/Wiring connection cut length report and the component lists. The report shall be generated on-demand for Weights or at release, and shall be stored as a dataset of the harness part revision.

Lessons

Using application integrations for harnesses

Premium Partners:



Microsoft

What UG/Wiring needs to work with database-driven schematics

- UG/Wiring → Teamcenter Engineering
 - Open hrn, cmp from TcE
 - Audit
- Teamcenter
 - No geometry attribute
- BCT and TcClassification to be recognized by UG/Wiring (just like UG/Advanced-Modeling)

Suggested Best Practices

- Definition of routing objects in file
 - Break down of characteristics and attributes
 - components interaction with NX routing parasolids
- Layering and refset convention
- Association of .hrn and .cmp
 - Importation and assigning
 - Importance of using proper components
 - Auto-routing
- NX standard routing functionality
 - Best practices for proper harness build and formboard creation
 - Interaction with BCT a-CLASS
 - PDM revision and variant rules
- Quality check
 - Pin Manager audit
 - BOM audit
 - NX pin to pin connectivity
- Wire weight program
- Formboard
 - Eclipse format
 - Flattening audit
- Problem reporting and defect tracking
- Run flattening as check
- Run formboard as check

Thanks, and good regulating

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