

PTC® Live Global

CUST230 ECAD in an MCAD World

Kar Dehal and Chris Lyons
iRobot

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* All presentations are subject to change



iRobot Summary

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Robots!

- Home
- Defense and Security
- Telepresence



110 FirstLook®

Five-pound throwable robot that provides eyes and ears for quick situational awareness.



310 SUGV

Lightweight, backpack-portable and easy-to-deploy robot for mobile operations.



510 PackBot®

Quick-response, battle-tested robot for advanced manipulation, disruption, detection and investigation.



710

Counter-VBIED robot that lifts up to 300 pounds, reaches up to 11.5 feet high and easily deploys from an SUV or van.

- iRobot's corporate headquarters are located in Bedford, Mass. The company also has offices in California, the United Kingdom, China and Hong Kong.
- ~30 ECAD users across all sites
- ~ 60 MCAD users across all sites
- ~530 Employees Total

3

PLM:

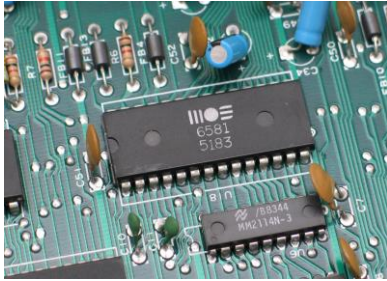
- PTC Windchill PDMLink 10.1 M030
- Partslink - classification of our electrical components
- Supplier Management - controls our AML/AVL lists
- SQL server - Intermediary between PTC Windchill and Altium component libraries

CAD:

- PTC Creo
- Solidworks
- Altium

4

ECAD and MCAD are different



Implementing it will be different

Training will be different

5

iRobot ECAD Data

Number	Name	Primary Content	Attachment
4440453	PCBA, MOTOR DRIVER, V1		
4440455_ECAD	ECAD, MOTOR DRIVER	4440440_ECAD.zip	4440455-A.emp 4440455-A.emn
4440453_PCBA	PCBA, MOTOR DRIVER, V1		4440453-A EASM, MOTOR DRIVER, V1 4440453-A SCH, MOTOR DRIVER, V1
4440455	PCB, MOTOR DRIVER		
4440455_ECAD	ECAD, MOTOR DRIVER	4440440_ECAD.zip	4440455-A.emp 4440455-A.emn
4440455_PCB	PCB, MOTOR DRIVER	4440441.zip	
4440455_FAB	PCB, MOTOR DRIVER		4440455-A FAB, MOTOR DRIVER

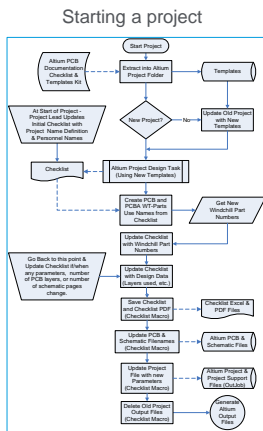
6

Before the ECAD WGM

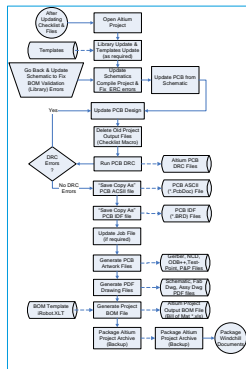
Original ECAD Workflow

Filled with many manual steps

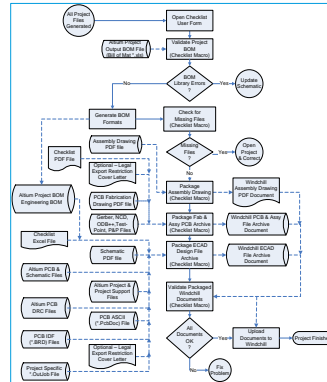
- 39 page procedure



Generating the Output Files



Package Files for Release in Windchill



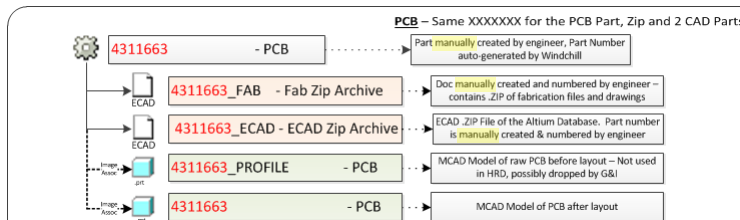
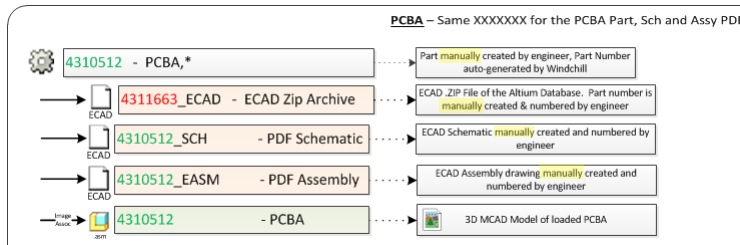
Naming and Association Inconsistencies

4328300 PCB, BUMPER, PHOENIX	
4328300_ECAD	Smart Bumper Project
4328300_FAB	Smart Bumper GBR
4334734 PCBA, BUMPER, PHOENIX	
4334734_EASM	SmartBumper_EASM
4334734_SCH	Smart Bumper SCH
4357152 PCB, MAIN, PHOENIX	
4357152_ECAD	Phoenix-Main-Board-Project (9-19-2012 1-32-15 PM)
4357152_FAB	Phoenix-Main-Board-GBR
4368776 PCBA, MAIN, PHOENIX	
4368776_EASM	Phoenix-Main-Board-EASM
4368776_SCH	Phoenix Main Board SCH
4351269 PCBA, CONNECTOR, EDGE CARD, PHOENIX	
4351269_EASM	Connector Carrier PCB ASM
4351269_SCH	Connector Carrier PCB SCH
4351270 PCB, CONNECTOR, EDGE CARD, PHOENIX	
4351270_ECAD	Connector Carrier PCB Project
4351270_FAB	Connector Carrier PCB GBR
4406097 PCB, BLIND MATE, PHOENIX	
4406097_ECAD	Blind-Mate-PCB (2-12-2013 6-19-01 PM)
4406097_FAB	Blind-Mate-PCB
4407738 PCBA, BLIND MATE, PHOENIX	
4407738_EASM	Wheel Motor EASM
4407738_SCH	Wheel Motor SCH

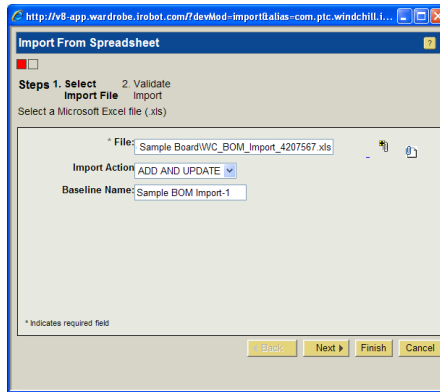
- Not all parts named or associated per our guideline
- Four Different Circuit Board Assemblies
- Named Four Different Ways

OLD ECAD Data Model

- All Manual Steps



- Manual import from spreadsheet
- Required 24 page procedure to export a BOM from Altium and import to PTC Windchill



11

Similar experience to the MCAD users



- Automatic upload of data and associations between objects
- Automatic BOM generation
- WGM integration with Altium

12

Implementation - Preparation

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Define your team of Windchill members and Electrical members

Learn and discover together



Give them time to be successful

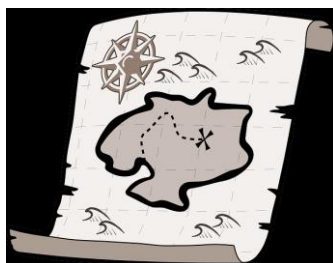
13

Implementation - Training

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Know your users

Coordinate with project managers



Create and evaluate guides

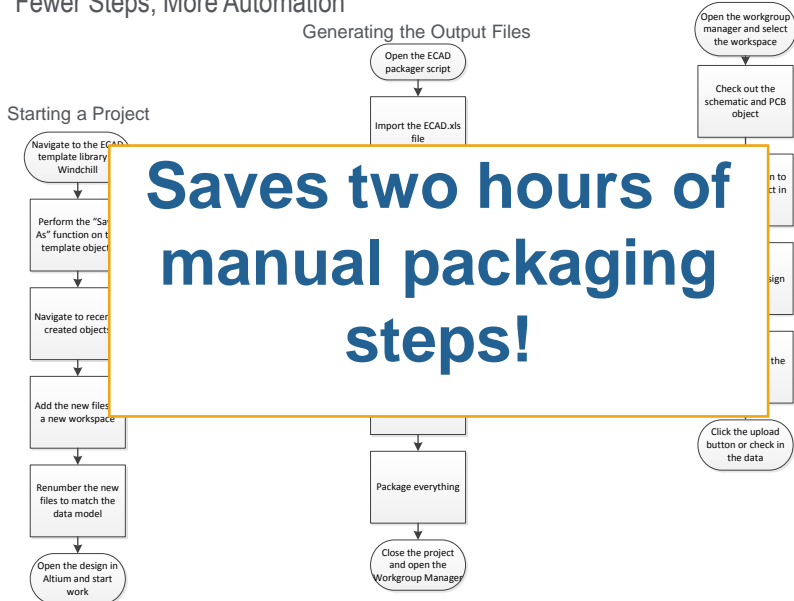
Plan hands on training

14

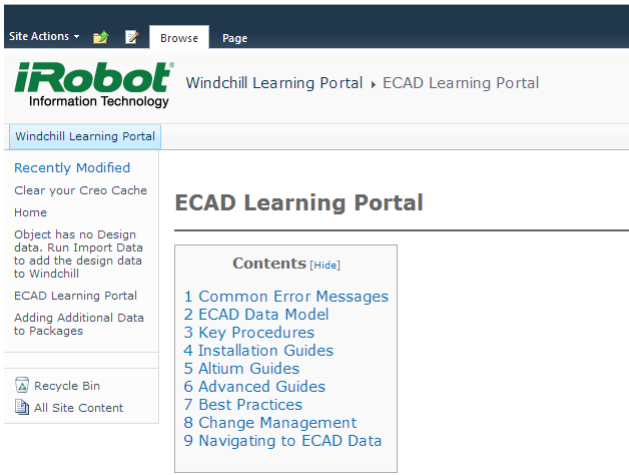
After WGM

Fewer Steps, More Automation

Package Files for Release in PTC Windchill



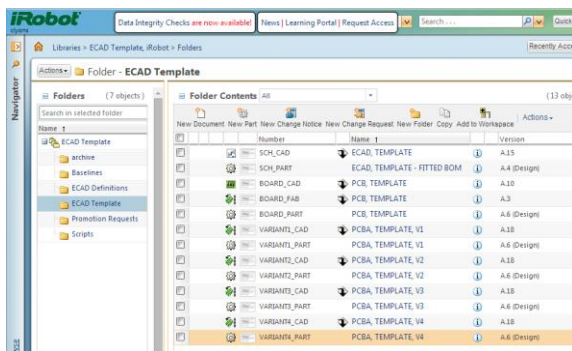
Utilized Internal SharePoint Site



- Created guides for common tasks.
- Allows users to learn on their own
- Provides a common location for ECAD information

17

Common Template for all Users



- Ensures all design start the same way
- Allows for easy maintenance and updates
- Improves capability to onboard new engineers

18

Automation Forces Common Naming and Numbering

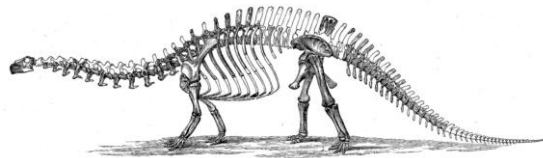
4434866	PCB, LOGGER, SD, ELPASO
4434866	PCB, LOGGER, SD, ELPASO
4434866_ECAD	ECAD, LOGGER, SD, ELPASO
4434866_FAB	PCB, LOGGER, SD, ELPASO
4434866_PCB	PCB, LOGGER, SD, ELPASO
4434867	PCBA, LOGGER, SD, ELPASO
4434867	PCBA, LOGGER, SD, ELPASO
4434867_PCBA	PCBA, LOGGER, SD, ELPASO, V1

4432632	PCB, WALL DOCK, BARCELONA
4432632	PCB, WALL DOCK, BARCELONA
4432632_ECAD	ECAD, WALL DOCK, BARCELONA
4432632_FAB	PCB, WALL DOCK, BARCELONA
4432632_PCB	PCB, WALL DOCK, BARCELONA
4432630	PCBA, WALL DOCK, BARCELONA
4432630	PCBA, WALL DOCK, BARCELONA
4432630_PCBA	PCBA, WALL DOCK, BARCELONA

4420455	PCB, DEBUG, ELPASO
4420455	PCB, DEBUG, ELPASO
4420455_ECAD	ECAD, DEBUG, ELPASO
4420455_FAB	PCB, DEBUG, ELPASO
4420455_PCB	PCB, DEBUG, ELPASO
4420456	PCBA, DEBUG, ELPASO
4420456	PCBA, DEBUG, ELPASO
4420456_PCBA	PCBA, DEBUG, ELPASO

- Easier for users to follow the same process
- Data is consistent

Before discovery, agree to an ECAD data model



Think like an end user

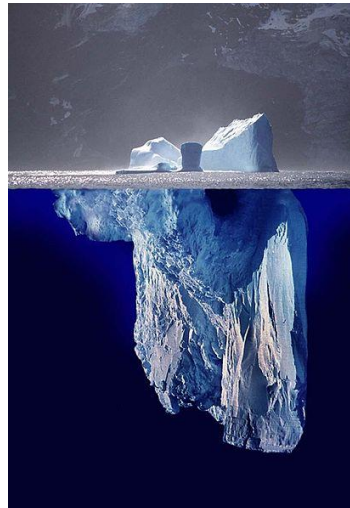
Complex Simple Too Simple



- Can't train in a vacuum
- Have projects ready to go
- You care about how it works
- They care about what it does for them

21

- Issues and frustration are reduced when users have an accurate mental model of how PTC Windchill works
- MCAD WGM mirrors the cad tool, the ECAD WGM does not
- Difficulty in managing variants

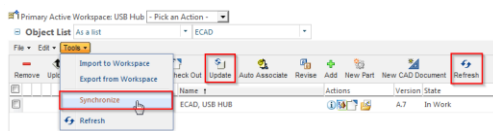


22

Current Issues

23

Captured User Issues



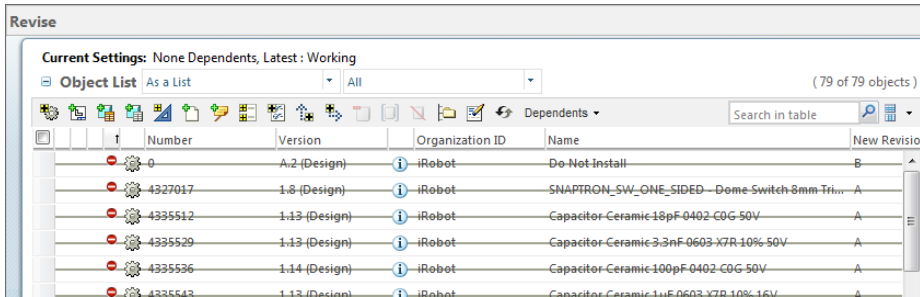
- Not clear to users the difference between refresh, synchronize, and update.

- The associations of the different objects are not well understood. Users don't understand what model items are.

	Number	Association Type	Name ↑	Revision
	4448157_ECAD		ECAD, MOTOR DRIVER	A
	4448156		ECAD, MOTOR DRIVER - FITTED BOM	A
	SCH_PART	Owner	ECAD, TEMPLATE	A
	4448157		PCB, MOTOR DRIVER	A
	SCH_PART	Contributing Content	ECAD, TEMPLATE	A
	4448157_FAB	Content	PCB, MOTOR DRIVER	A
	4448157_PCB	Content	PCB, MOTOR DRIVER	A
	4448153		PCBA, MOTOR DRIVER, V1	A
	4448153_PCBA	Content	PCBA, MOTOR DRIVER, V1	A
	VARIANT1_PART	Owner	PCBA, TEMPLATE, V1	A

24

- The revise collection adds all WT parts in a BOM and is a confusing window.



25

Electrical designs are different than mechanical designs.

Understanding these differences will ensure a successful implementation of the ECAD WGM

26

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