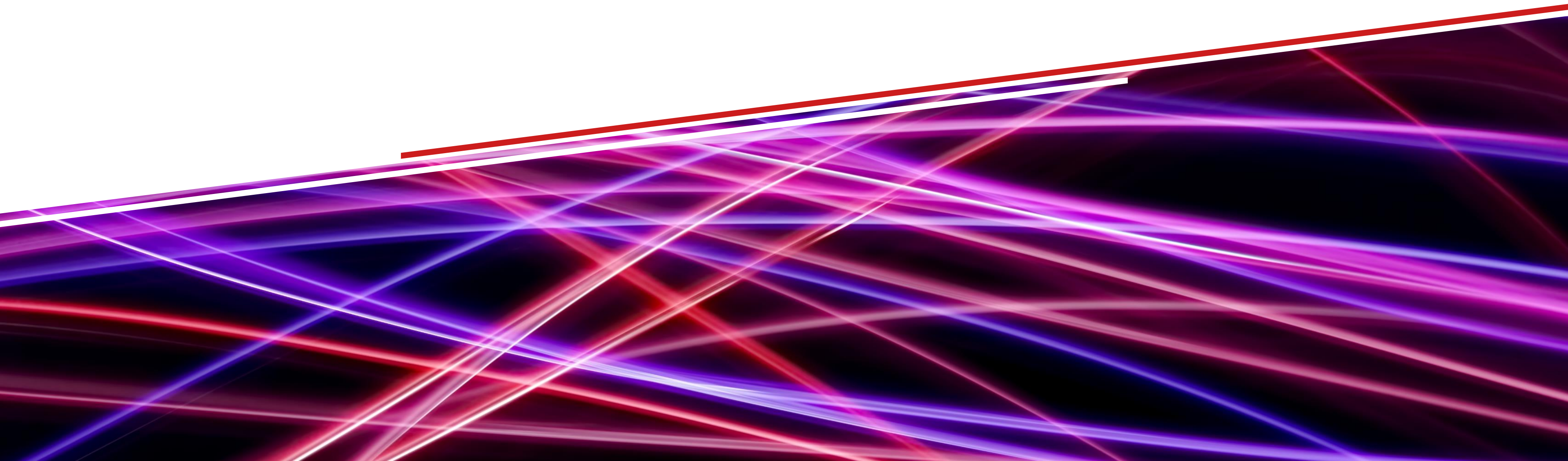


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# Mechatronic design with Aras Innovator

Mark Caradonna



# Company-wide integrated Product Development

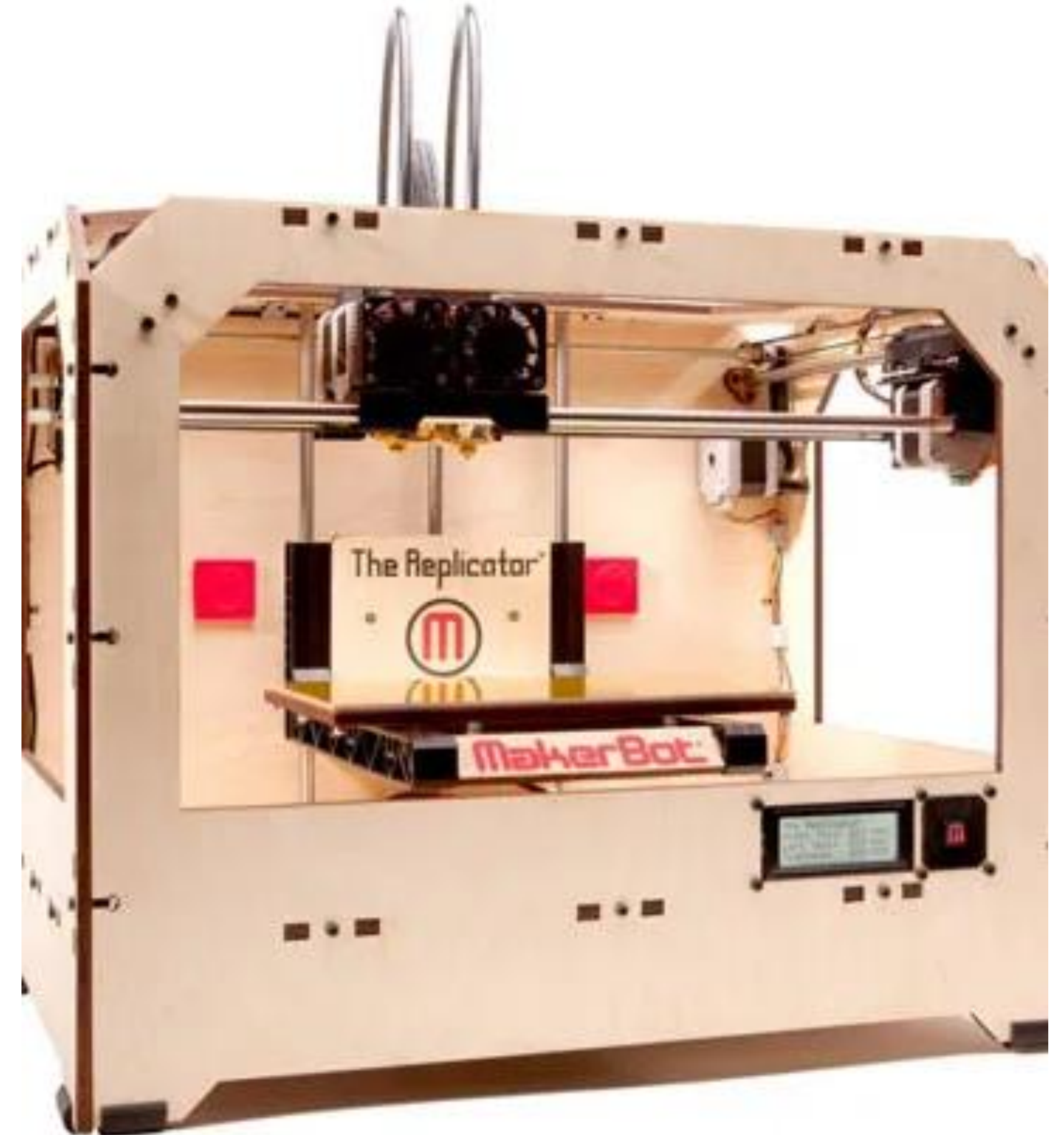
End-to-End Processes

Mechatronic Product Structures

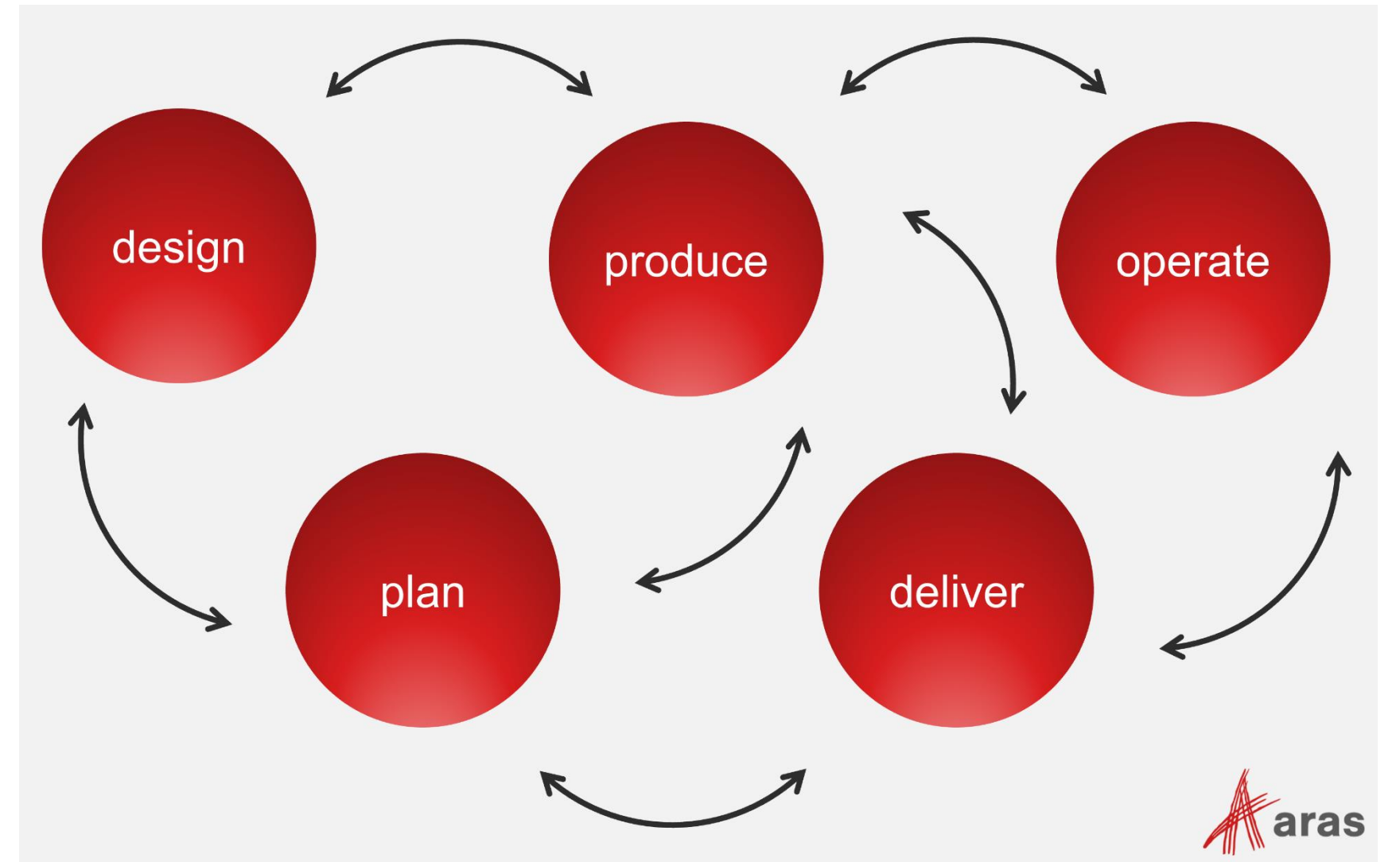
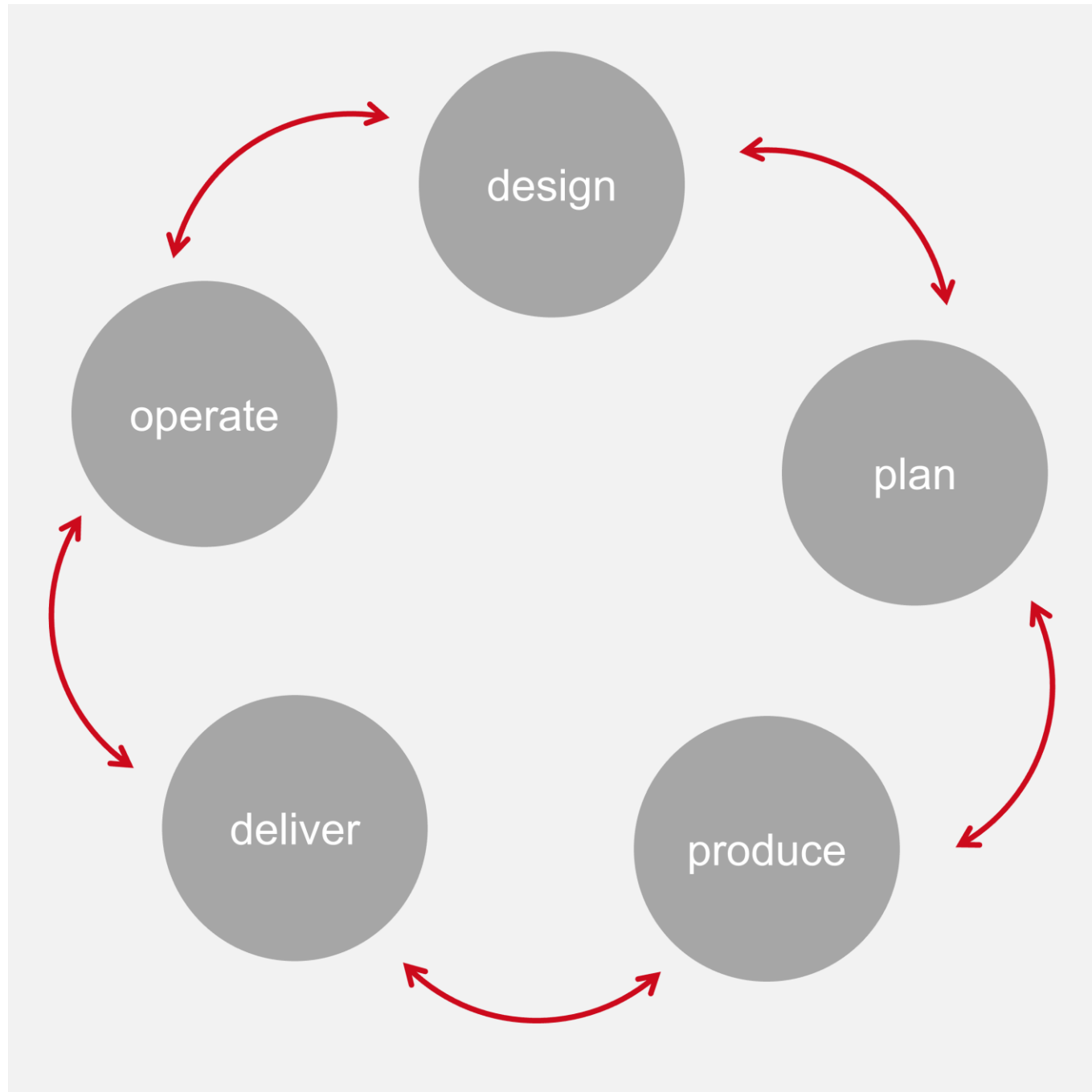
The Right Solution Backbone

The Right Next Steps

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# Path to End-to-End Processes



# Single Source of Truth

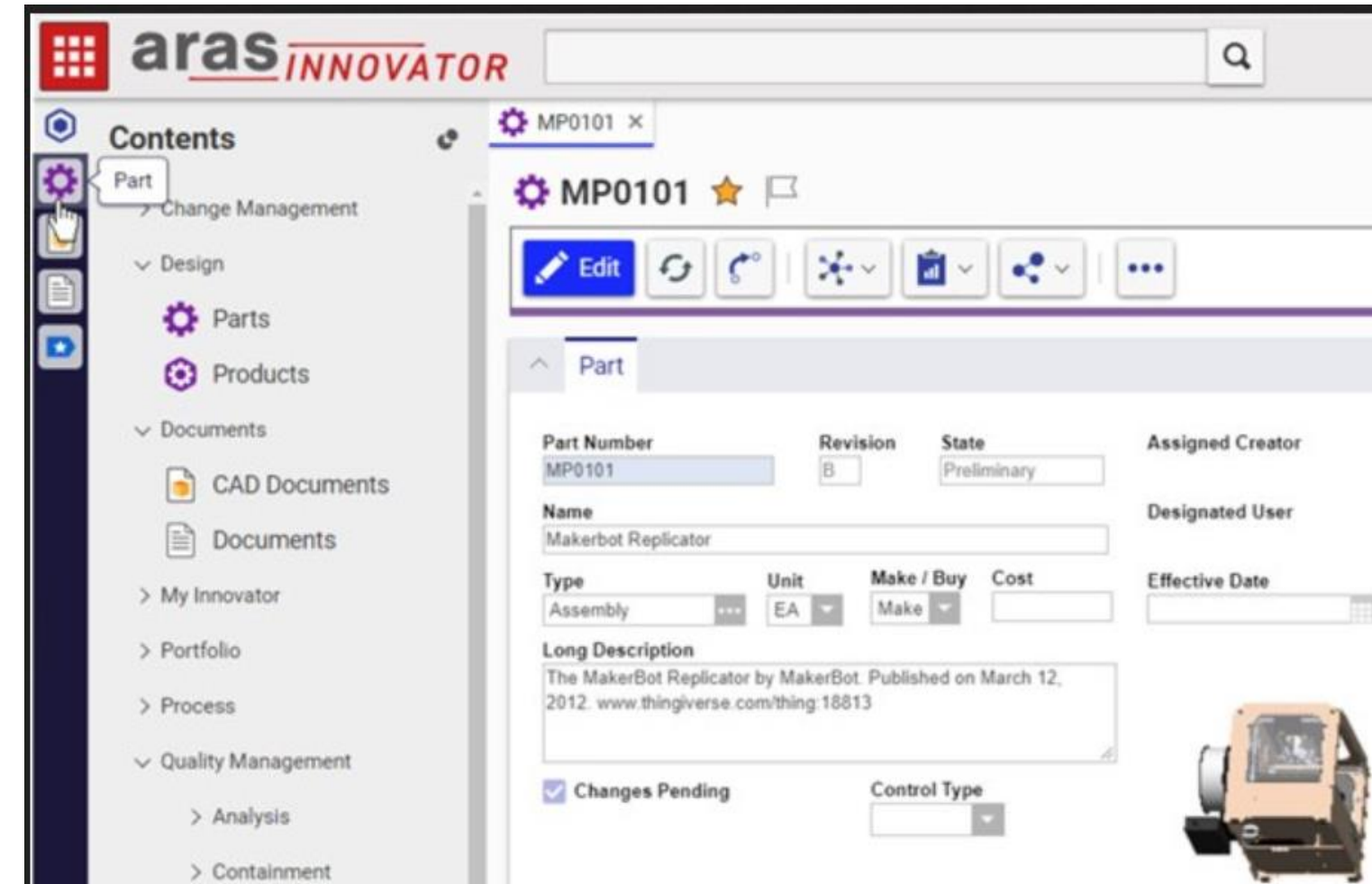
RQM

MCAD

DOCs

ECAD

Software



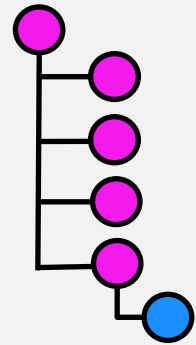
Mechatronic product structures require all engineering data in PLM

→ XPLM direct integrations of authoring tools enable data upload and further processes

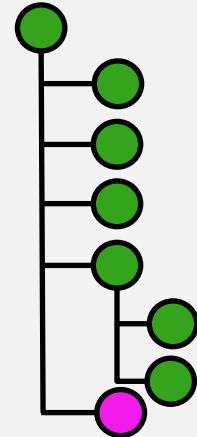
# Mechatronic Product Structures in Aras

## E-BOM

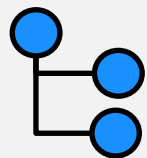
ECAD



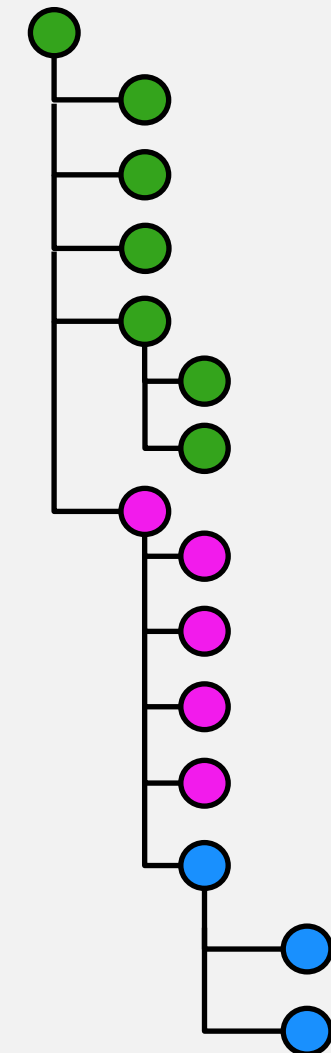
MCAD



Firmware

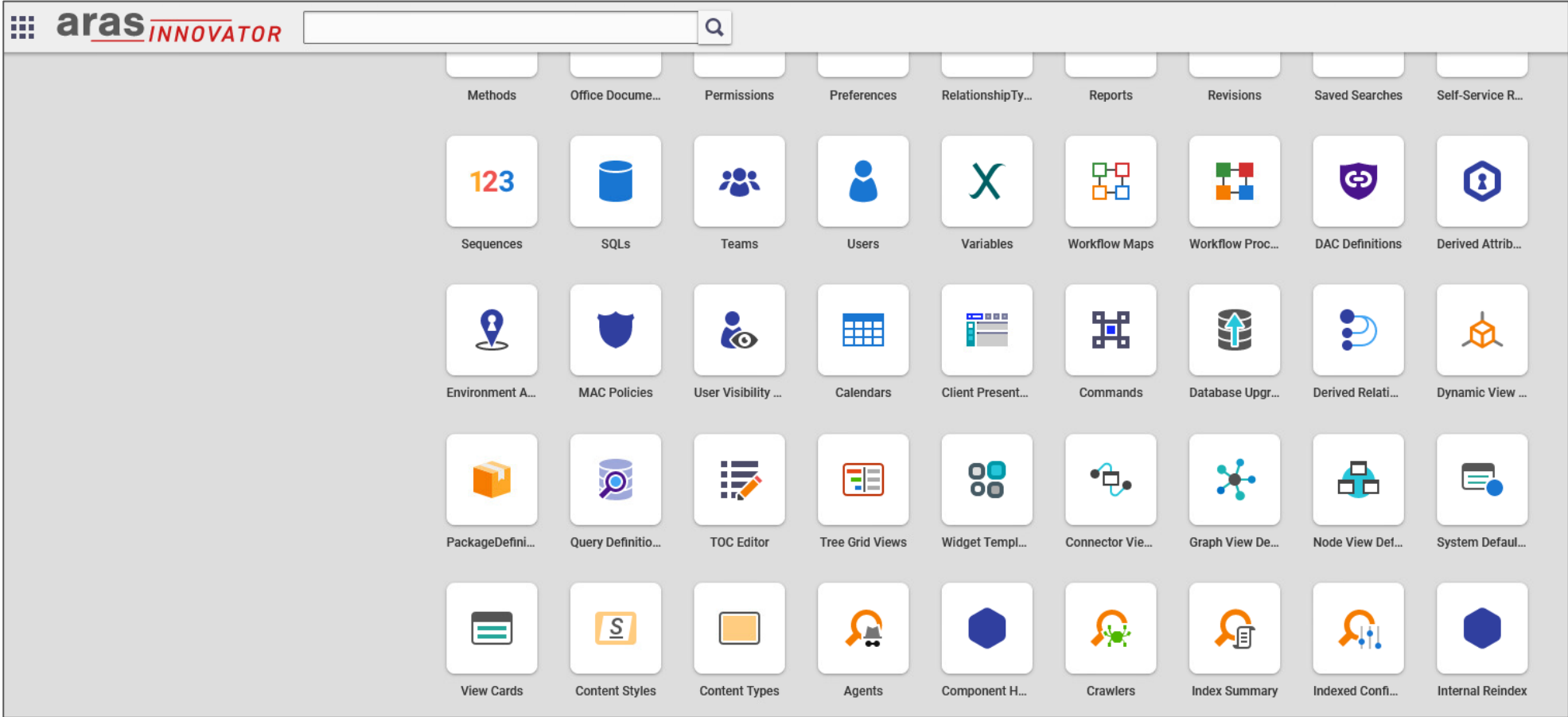


## Consolidated E-BOM



# Collaboration at its Best

RQM  
MCAD  
DOCs  
ECAD  
Software



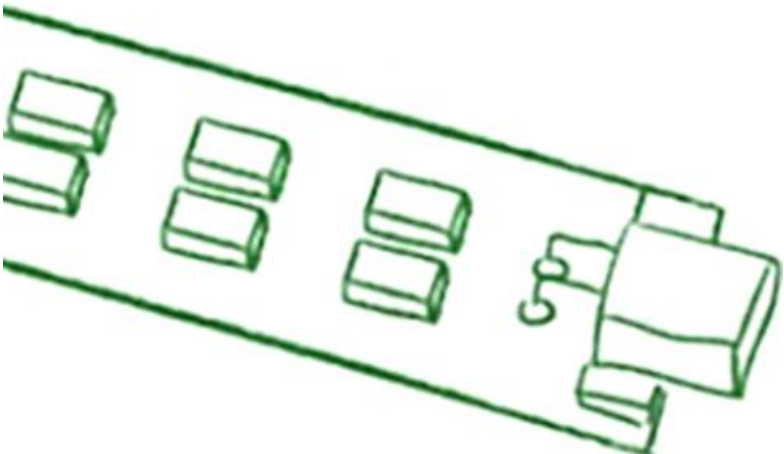
Sales  
Purchasing  
R & D  
Production  
Service  
Others

# Design-to-Operate - Use Case

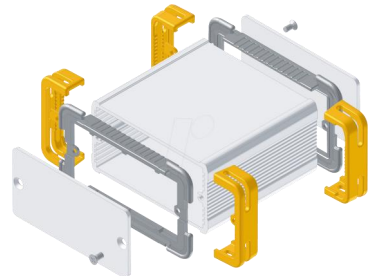
# Design-to-Operate (D2O) - Use Case

## Assembly 1: Extender PCB

- Cables
- Connector
- PCB
- ....
- Firmware



## Assembly 2: Housing



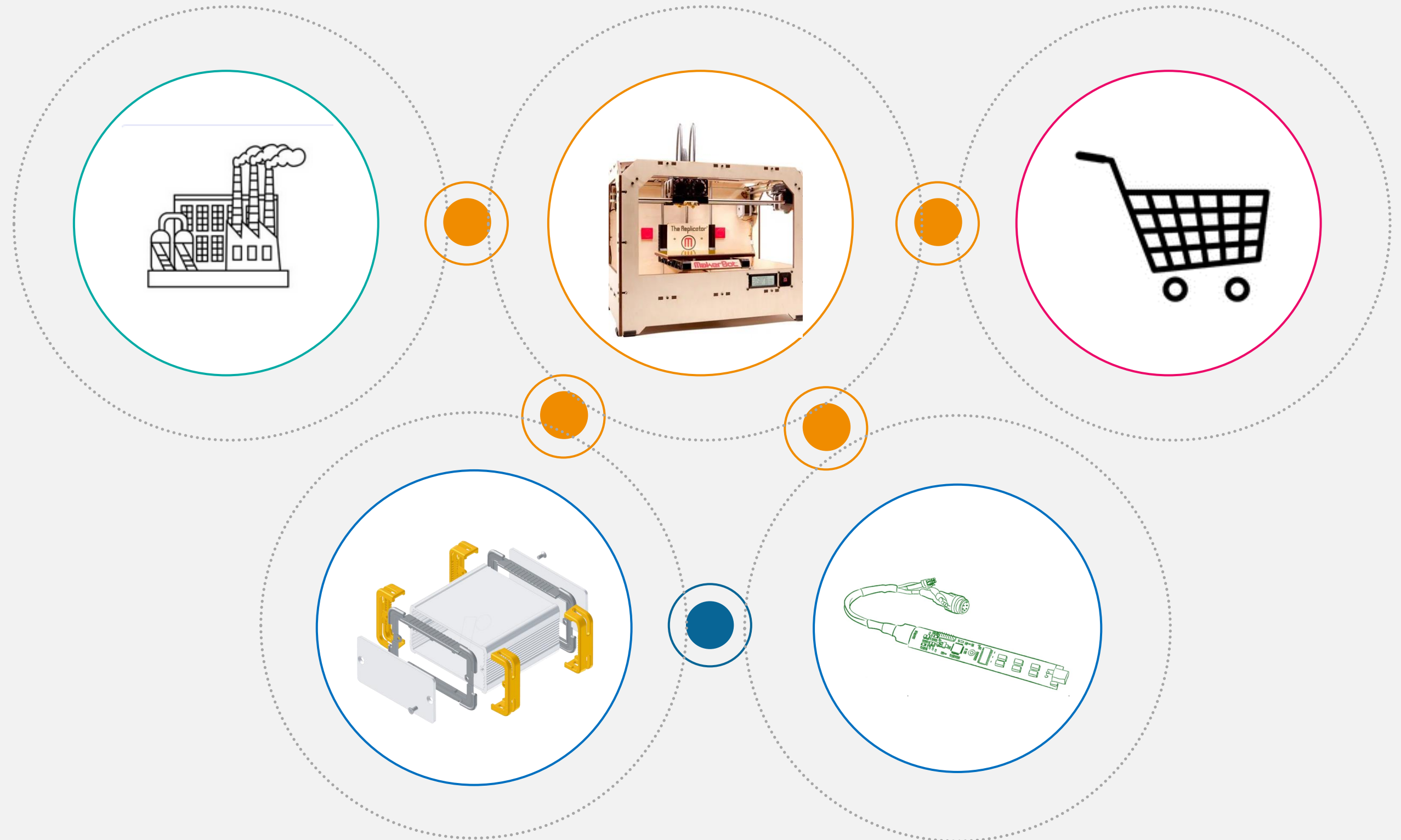
## Assembly 3: 3D Printer





# Interdisciplinary Product Development (NPID)

A single  
part change  
effects  
many  
people

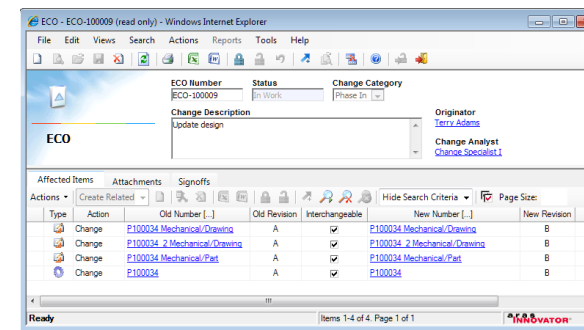
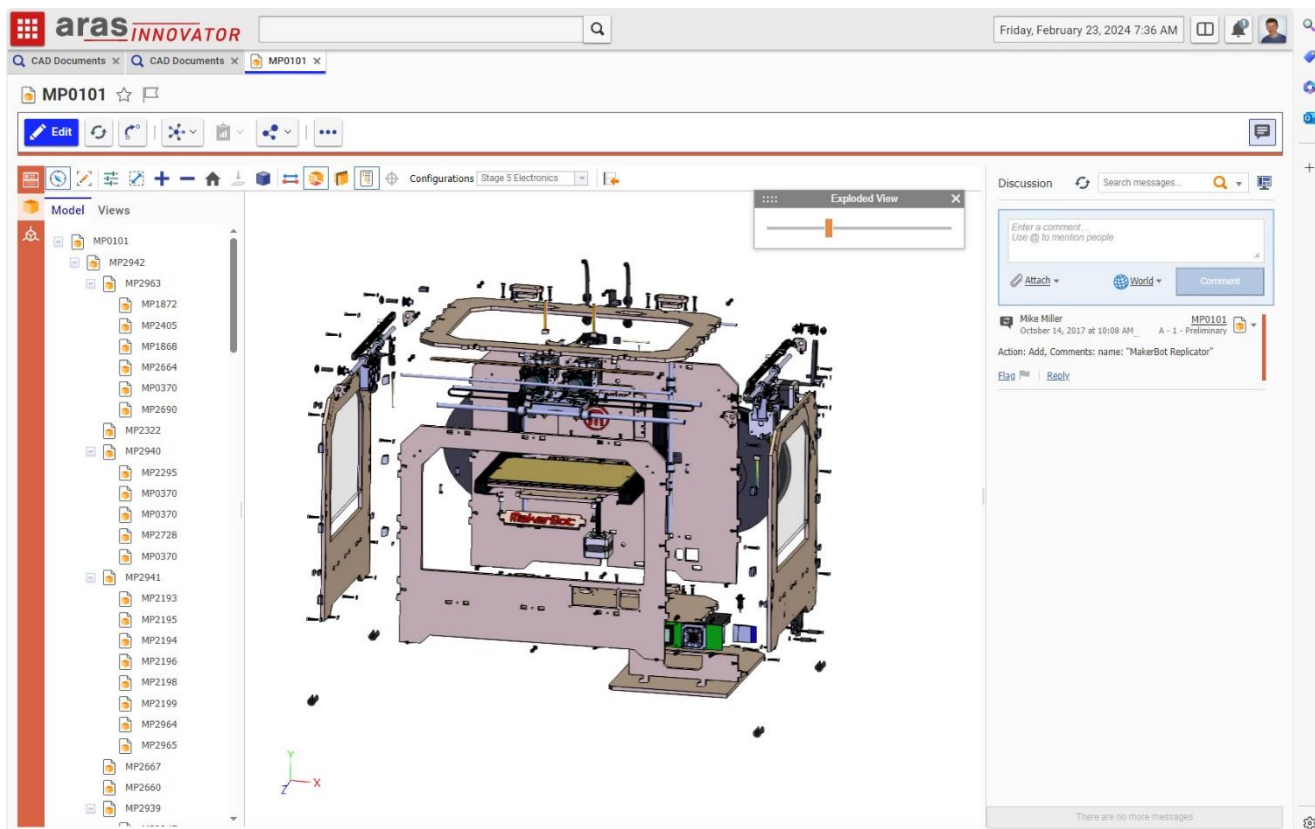


# Aras Innovator – Enabling a Digital Thread

Visual Collaboration to discuss change

Initiate workflow driven change process

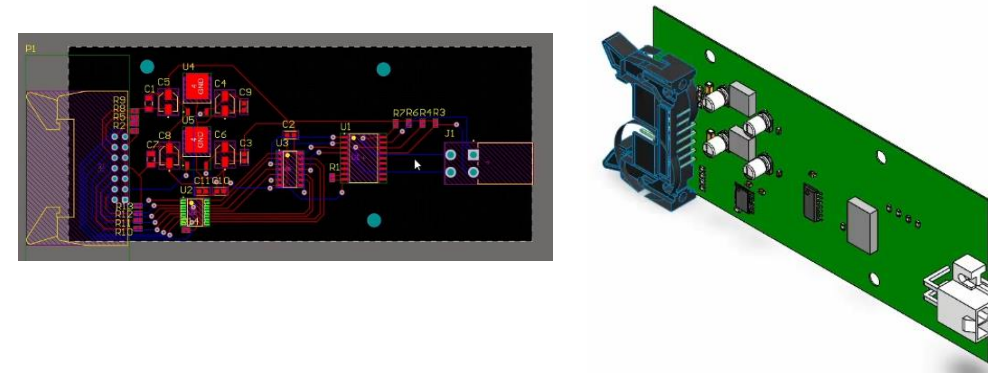
BOM redlines shown changes made



The screenshot shows the BOM table in Aras Innovator. The table has columns for Part Number, Rev., Name, Type, State, Cost, Chan., and Indexed On. A red line is drawn across the row for part CA-4221, indicating a change.

Part Number	Rev.	Name	Type	State	Cost	Chan.	Indexed On
100001-001	A	022224KR1 PCB		Preliminary			
BB-9090	B	Non-Threaded 63mm Bottom Br...	Component	Released			
BB-9091	A	Threaded 63mm Bottom Bracket	Component	Released			
BB-9092	A	Non-Threaded 73mm Bottom Br...	Component	Released			
BB-9093	A	Threaded 73mm Bottom Bracket	Component	Released			
BC-BELL	A	Bell		Released			
BC-BELL-2	D	Bell 2		Released			
BL-3757	A	SLX Hydraulic Disc Brake Lever	Assembly	Released			
BL-R550	A	BL-R550 Brake Lever	Assembly	Released			
BLT0001	A	4mm Steel Allen Bolt	Component	Released			
BR-4069	B	SLX Hydraulic Disc Brake	Assembly	Released			
BR-6319	C	BR-CX50 Cantilever Brakes	Assembly	Released			
CA-2923	A	175mm Carbon Fiber Hollow Cra...	Component	Preliminary			
CA-3191	A	170mm Aluminum Alloy Turbine ...	Component	Preliminary			
CA-4221	A	170mm Carbon Fiber Hollow Cra...	Component	Preliminary			
CA-4221	A	170mm Carbon Fiber Hollow Cra...	Component	Preliminary			
CB-4581	A	Steel Spider Bolts	Component	Preliminary			
CN-6732	A	11-Speed nickel-plated steel chain	Component	Preliminary			
CN-6733	A	10-Speed nickel-plated steel chain	Component	Preliminary			
CN-6734	A	9-Speed nickel-plated steel chain	Component	Preliminary			
CN-6735	A	6/7/8-Speed nickel-plated steel c...	Component	Preliminary			

Engineers make changes and upload them



# ECO form, Workflow, & Impact Matrix

ECO-00001014

Edit | Refresh | Undo | Share | Print | More

ECO

Number: ECO-00001014 | Title: Change location of SD Card slot to avoid interference with bolt

Change Reason: Move location of slot for SD Card to go through | Change Description: [Empty]

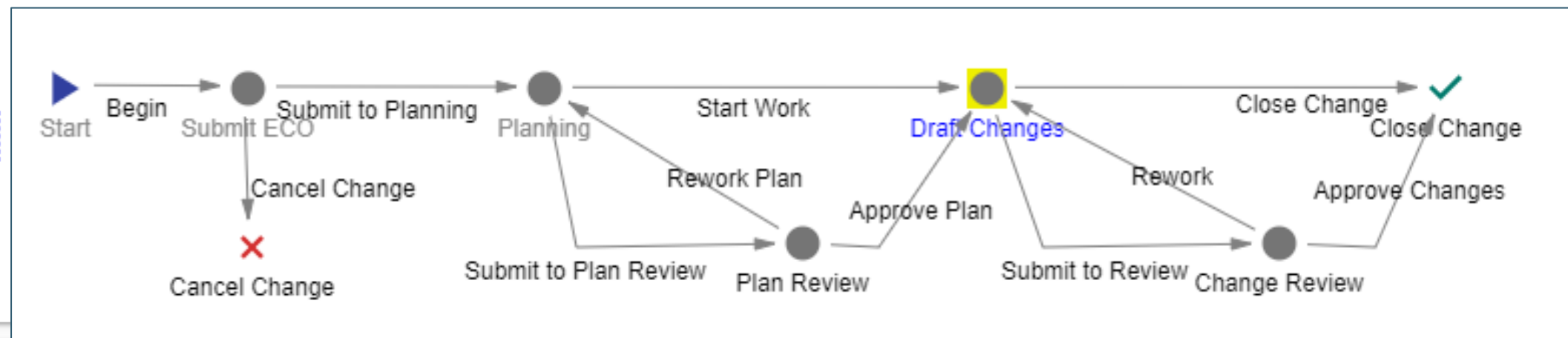
Change Coordinator: Mike Miller | Team: Product Team

Release Date: [Calendar] | Effective Date: [Calendar]

Priority:  1 - High  2 - Normal  3 - Low

EDR Status: COMPLETE

In Work

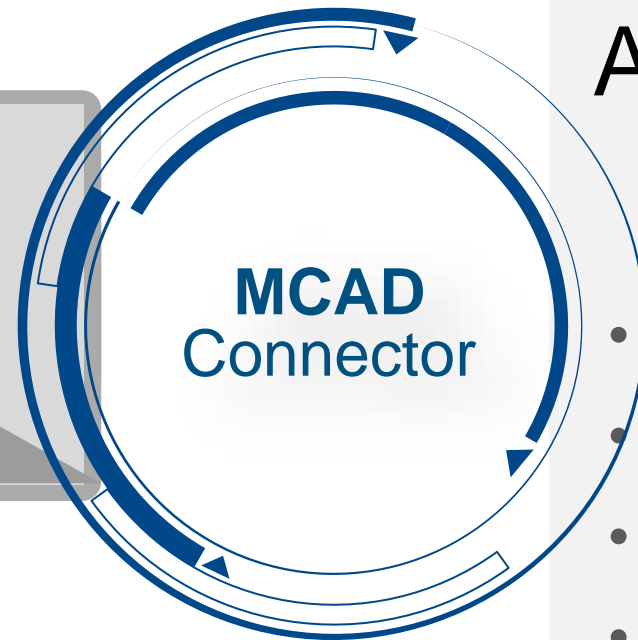
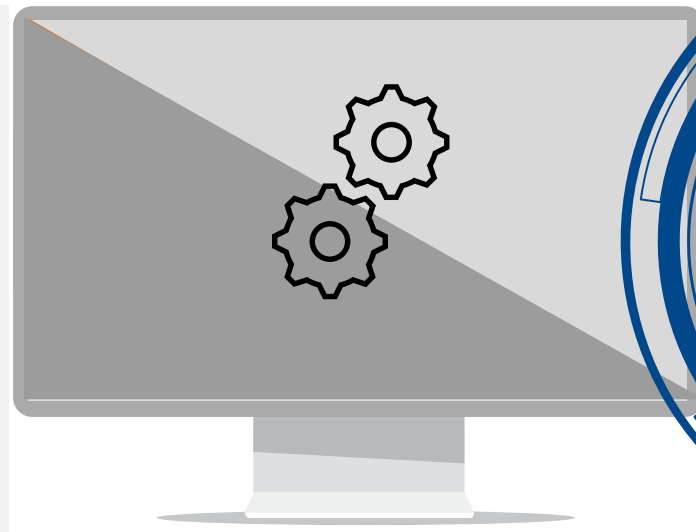


Impact Matrix | Attachments | EDRs | SignOffs

Item Number	Name	Revision	State	Sequence	Quantity	Unit	Item Action	EDR Grouping
MP2942	Body	A	In Change			EA	Revise	MP2942
MP2667	Spacer Black 5-16 in length .14in I...	B	Released	5	1	EA		
MP2322	RGB LED Strip Common Anode	C	Released	10	1	EA		
MP2660	Spacer Black 1-2 in length .14in ID ...	B	Released	15	2	EA		
MP2939	Body Fan Assembly	A	Released	20	1	EA		
MP2940	Body Hardware	A	Released	25	1	EA		
MP2941	Body Panels	A	In Change	30	1	EA	Revise	MP2941
MP2194	Thing-O-Matic 2 Front Panel	B	Released	5	1	EA		
MP2196	Thing-O-Matic 2 Back Panel	A	Released	10	1	EA		
MP2199	Thing-O-Matic 2 Right Panel	A	Released	15	1	EA	None	
MP2199	Thing-O-Matic 2 Right Panel	A	Released	10				
MP2193	Thing-O-Matic 2 Top Panel	C	Released	20	1	EA		

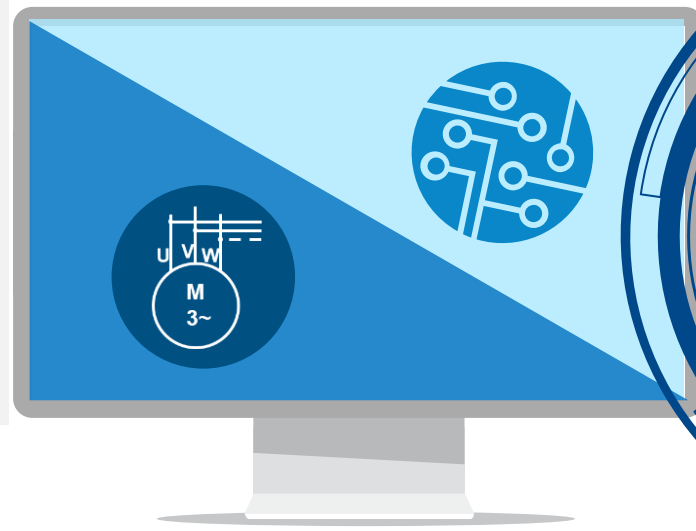
# CAD Integrations in Aras Innovator

Engineering Tools



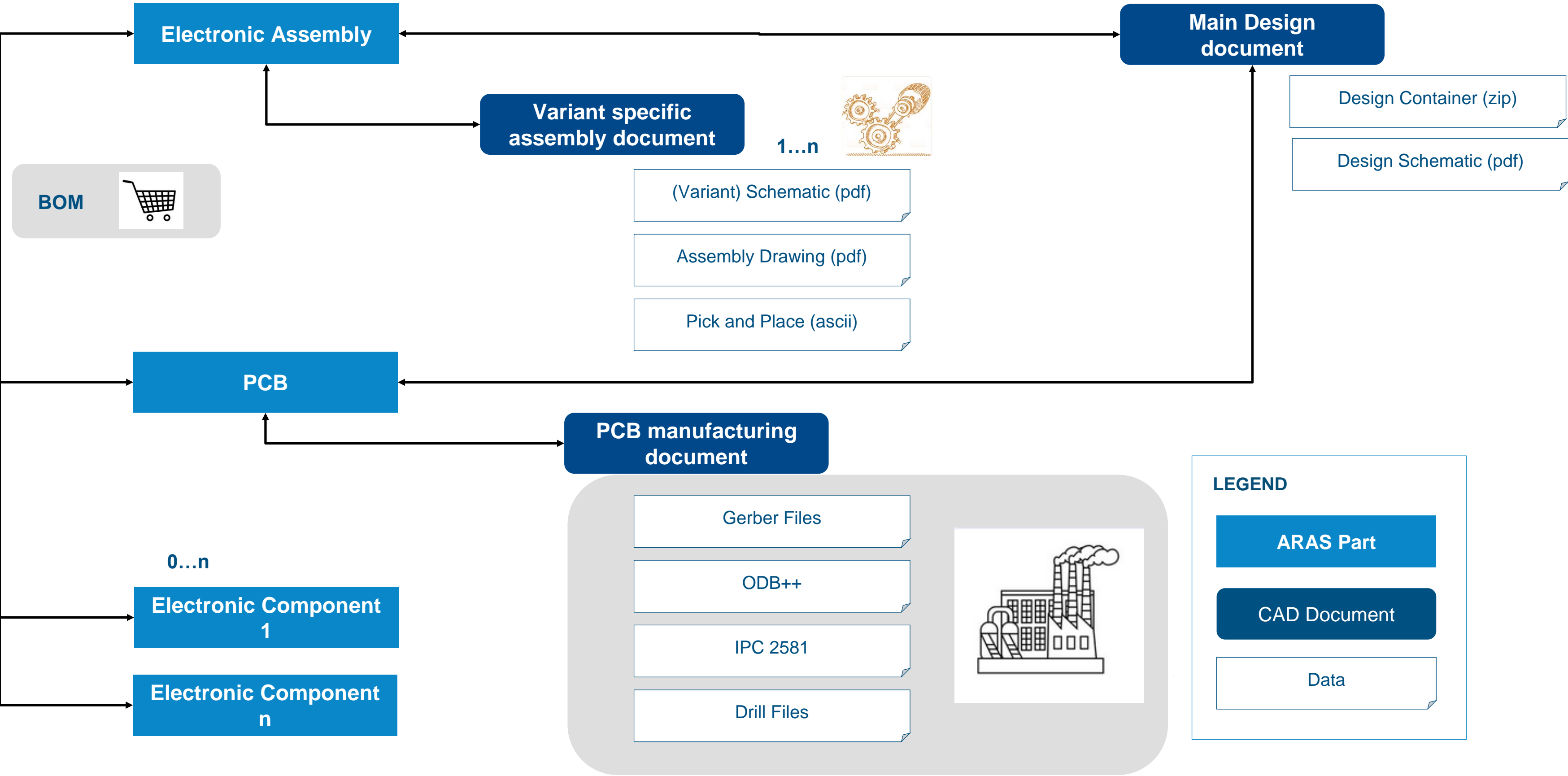
## Automated Engineering

- Create new project
- Save to PLM
- Easy check-in/check-out
- Open, access and work on projects
- Automated creation of
  - Data model
  - EBOM in PLM
  - Viewables and neutral files
- Bidirectional BOM comparison
- Library synchronization




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# Possible EDA Data Model



# Demo Process

## Demo part1 – Purchase

 Innovator

Purchase department sets electronic connector state to end of life

## Demo part 2 - ECAD

 Altium Designer

- ECAD designer opens project file from ARAS Innovator
- Indication of invalid component when saving
- Design change in Altium
- Safe ECAD design with parts list synchronization

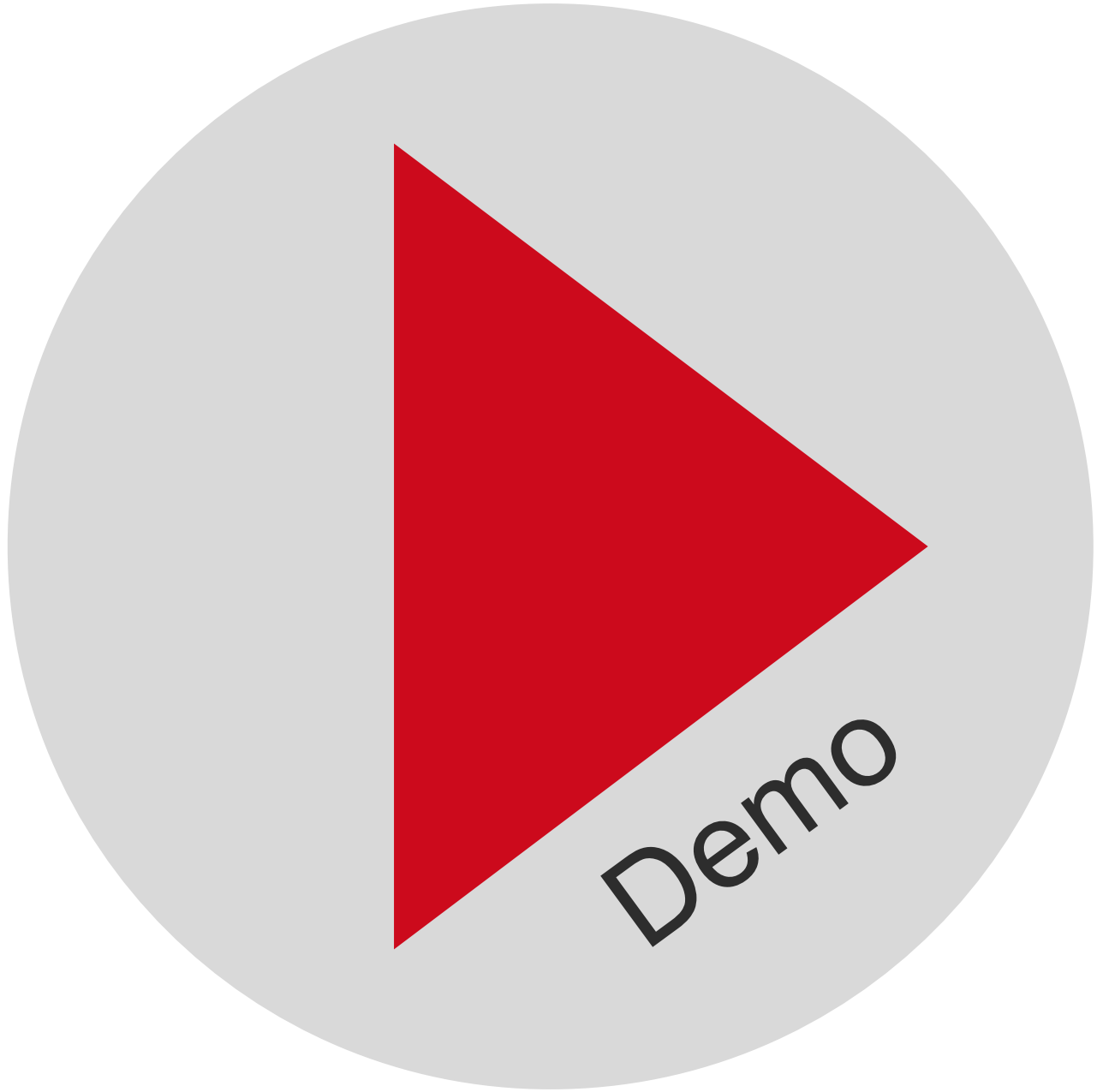
 Innovator

- ECAD designer checks data in Aras Innovator
- ECAD designer informs MCAD designer about changes over discussion panel

## Demo part 3 – MCAD

 SWX

- MCAD Loads Model into SWX.
- MCAD loads new Model to SWX and replace old Version with new one

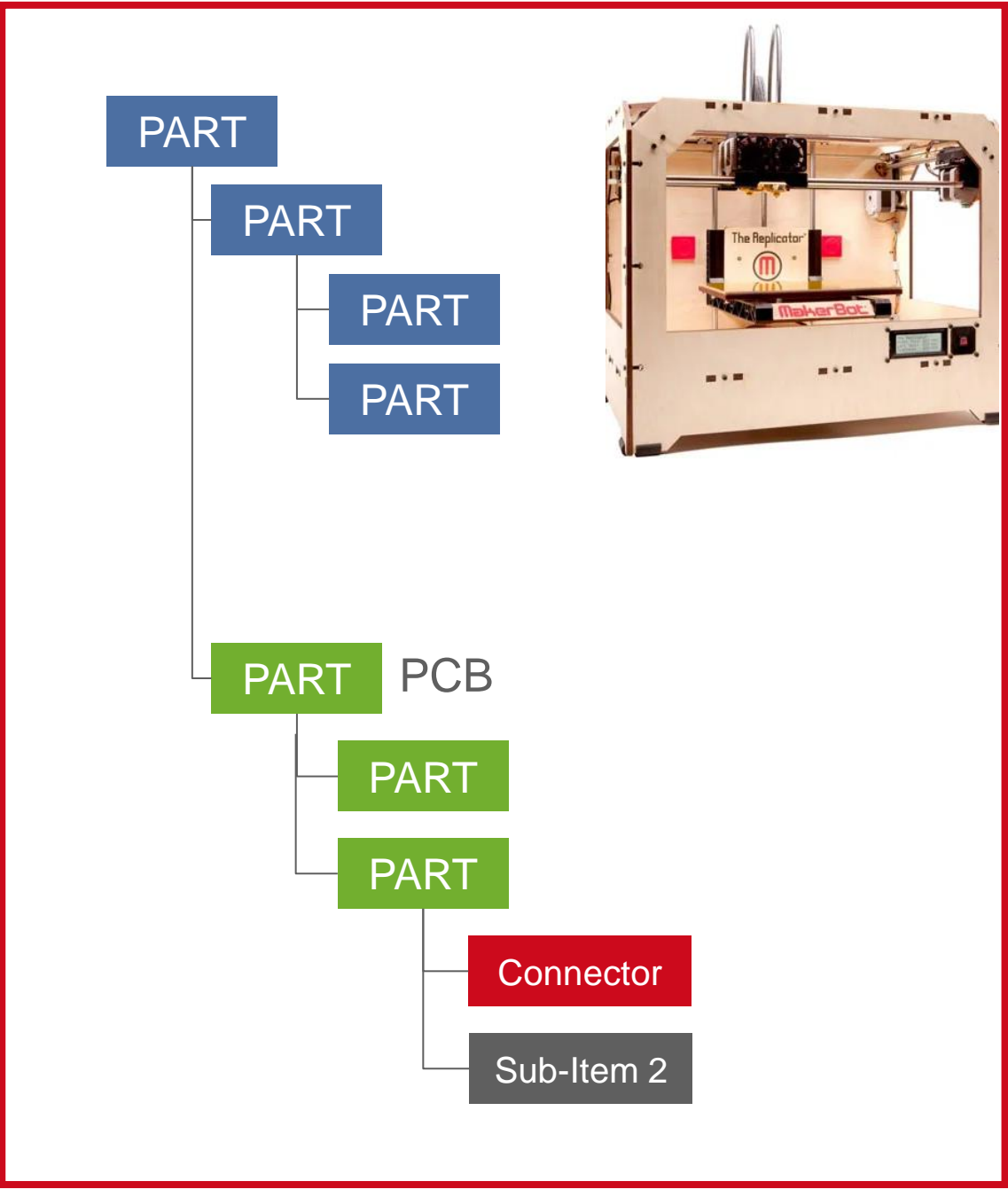
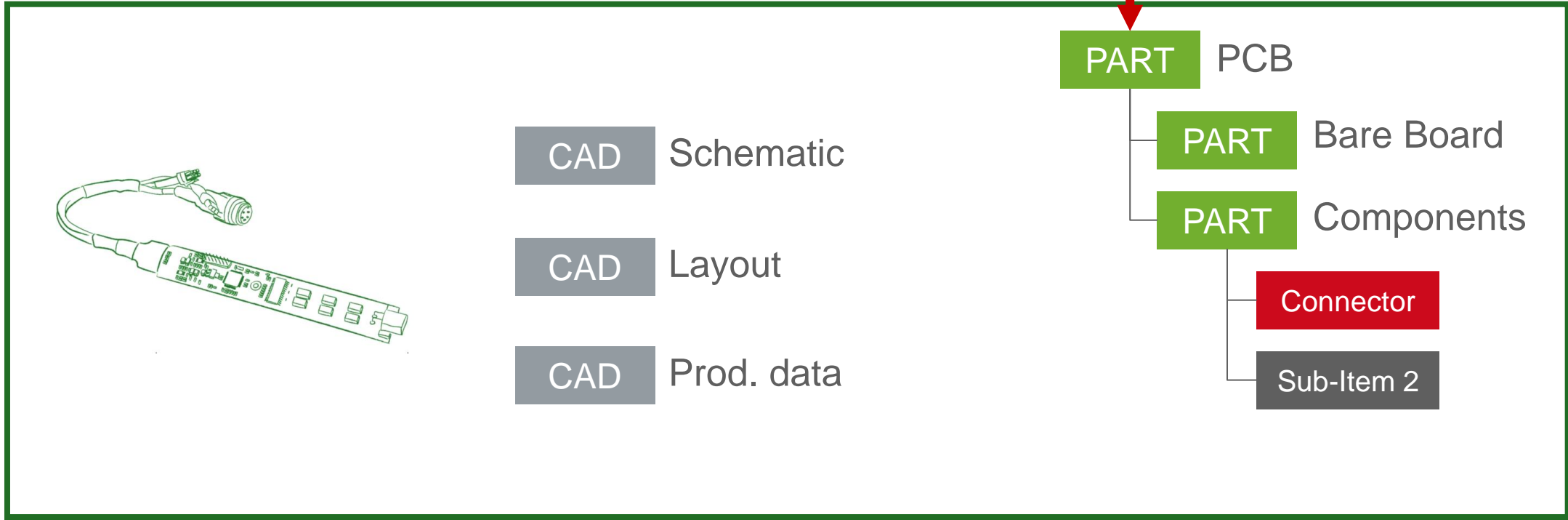
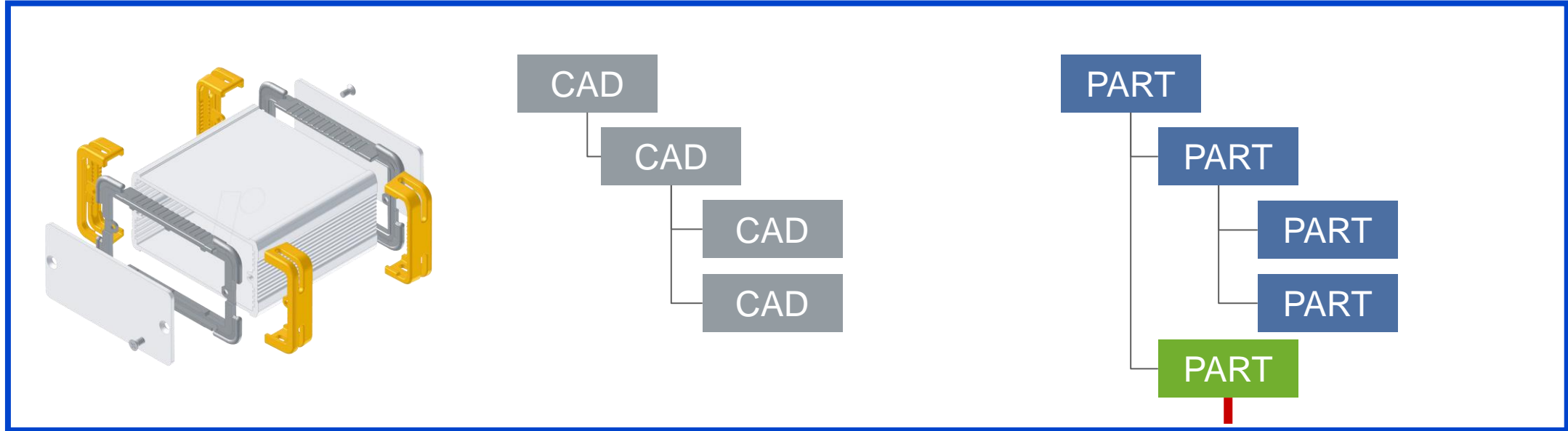


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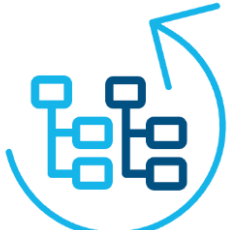
# Mechatronic BOM



# Conclusion



End-to-End Processes



Compare E-BOM & M-BOM



Automation



Fast communication



Component libraries synchronization



MCAD ECAD Collaboration



Development history

Thank you.



Mark Caradonna  
mark.caradonna@xplm.com