



# Engineering Bill of Materials with Live Parts List

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PLM Road Map™ & PDT North America 2023  
*The Digital Thread in a Heterogeneous, Extended Enterprise Reality*  
*A call for PLM Professionals to share their knowledge & experience*  
May 3 & 4



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# Business Overview



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# GE Aerospace \$26.1B Revenue

## Commercial Engines & Services



## Avio Aero



## Military Engines & Services



## Avionics & Digital Systems



## BGA & Integrated Systems



## Additive & Other



(a-Includes CFM and EA revenue  
CFM is a 50/50 Joint Venture between GE and Safran Aircraft Engines  
EA is a 50/50 Joint Venture between GE and Pratt & Whitney

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Powering the world's airline fleets with 39,000 engines

**0:02** Every 2 seconds an aircraft with GE engine technology\* is taking off somewhere in the world

**3 / 4 takeoffs** Three out of every four takeoffs are powered by GE Aerospace\*

**400,000+** ~400k people are in the air right now depending on our engines

**GE Aerospace**

\*Includes joint venture engines built by CFM and EA  
CFM is a 50/50 Joint Venture between GE and Safran Aircraft Engines  
EA is a 50/50 Joint Venture between GE and PW

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Powering the world's military fleets with 27,000 engines

<b>2/3</b> fighters in the U.S. fleet are powered by GE Aerospace	<b>2/3</b> helicopters in the US fleet are powered by GE Aerospace	<b>1/2</b> of the bombers in the Air Force fleet are powered by GE Aerospace	<b>3/4</b> gas turbine powered combat surface vessels within global Navy fleet
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\*Includes joint venture engines built by CFM  
CFM is a 50/50 Joint Venture between GE and Safran Aircraft Engines

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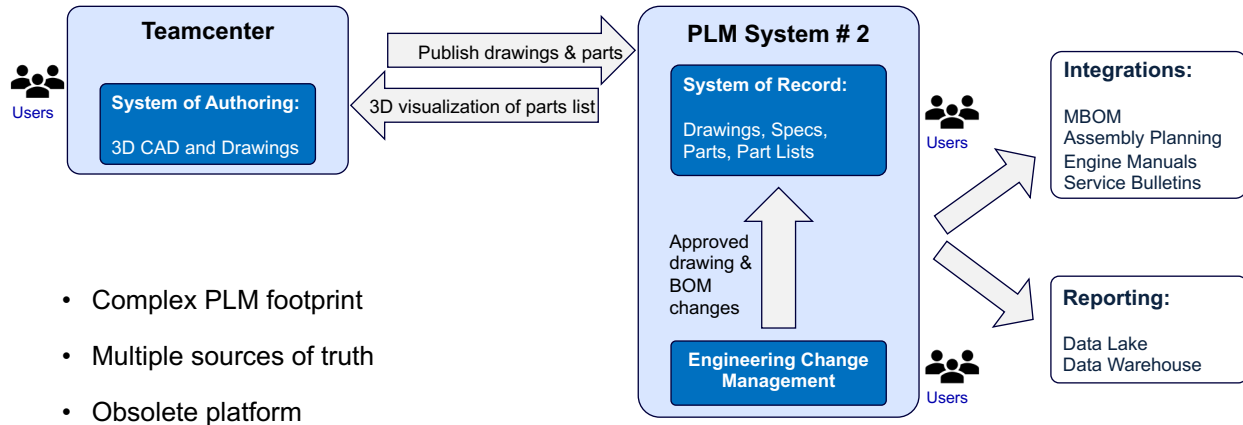


 GE Aerospace

# Business Drivers

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## Background



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## Business Need

- Simplify PLM footprint
- Single source of truth for engineering data
- Ensure business continuity and adherence to cyber compliance
- Reimagine all processes using LEAN principles
- Implement next-gen engineering BOM capabilities




*Do this with zero disruption and FTY=1*


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## Challenges

 <div style="border: 1px solid #0070C0; border-radius: 10px; padding: 5px; margin: 10px auto; width: 80%; text-align: center;">Data Complexity</div> <ul style="list-style-type: none"> <li>• Large volume</li> <li>• WIP data</li> <li>• Merging historical with current data</li> </ul>	 <div style="border: 1px solid #FF8C00; border-radius: 10px; padding: 5px; margin: 10px auto; width: 80%; text-align: center;">Technology</div> <ul style="list-style-type: none"> <li>• End of life HW and SW</li> <li>• Highly customized system</li> <li>• 200+ integrations</li> </ul>	 <div style="border: 1px solid #008000; border-radius: 10px; padding: 5px; margin: 10px auto; width: 80%; text-align: center;">Driving User Adoption</div> <ul style="list-style-type: none"> <li>• 5K users across 15 sites</li> <li>• Re-imagined business process</li> <li>• Business critical systems</li> </ul>
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### Effectivity vs Revision BOM Management

Revision Based BOM			
		Chg 1	Chg 2
Occ ID	Rev 1	Rev 2	Rev 3
001	A	E	F
002	B	B	G
003	C	C	C
004	D	D	D

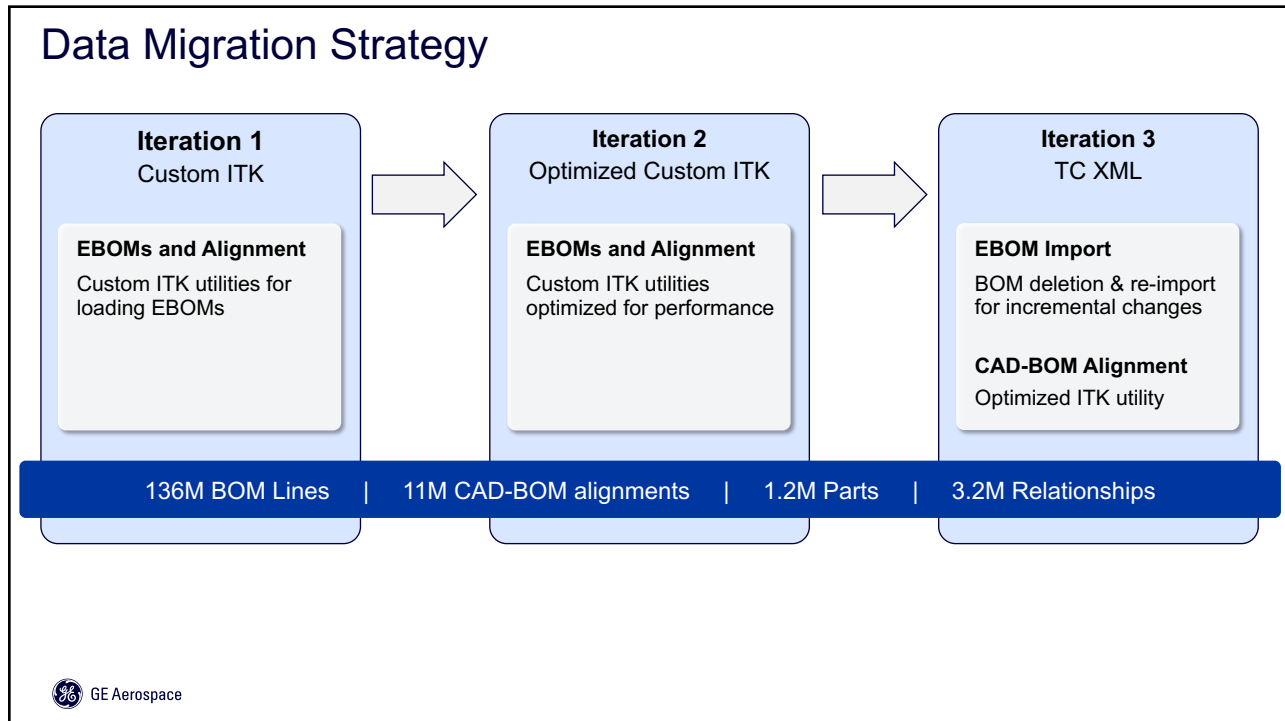
12 BOM lines, 3 BOM revisions

Effectivity Based BOM					
		Effectivity			
Occ ID		C/I Chg	C/I Date	C/O Chg	C/O Date
001	A	ORIG	Date 0	Chg 1	Date 1
001	E	Chg 1	Date 1	Chg 2	Date 2
001	F	Chg 2	Date 2		
002	B	ORIG	Date 0	Chg 2	Date 2
002	G	Chg 2	Date 2		
003	C	ORIG	Date 0		
004	D	ORIG	Date 0		

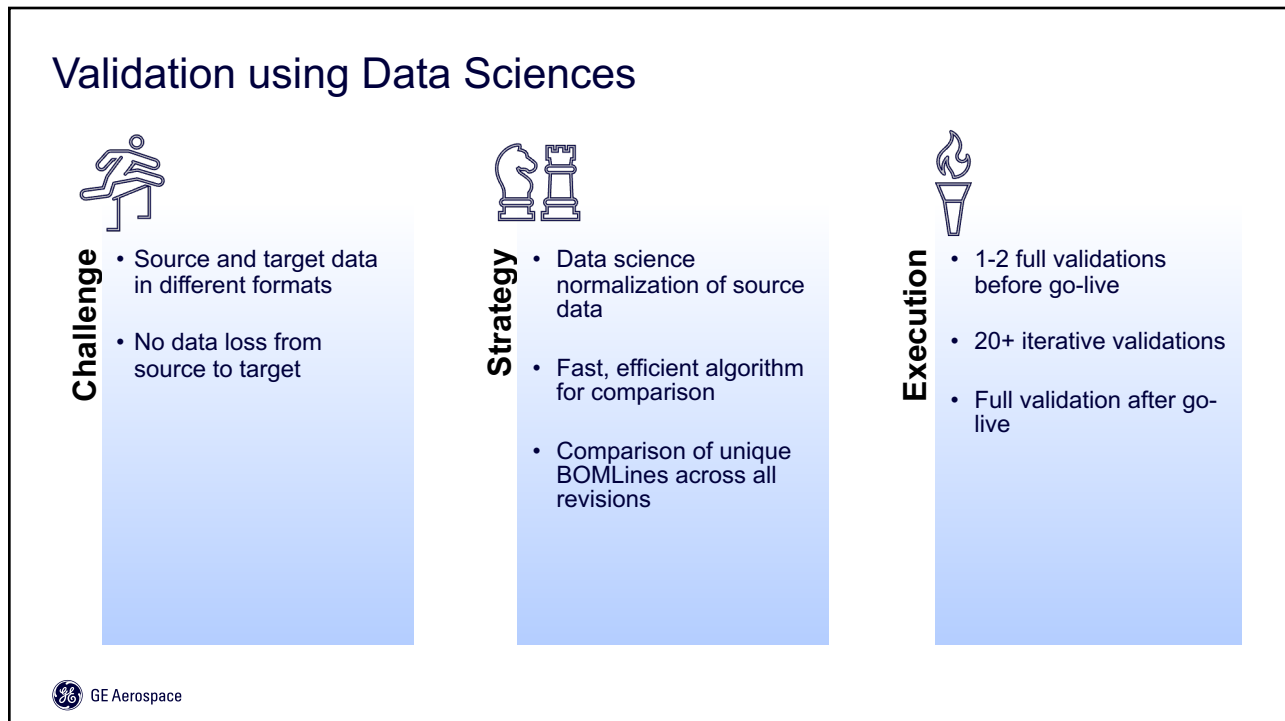
7 BOM lines, 1 revision (Single comprehensive BOM)

**136M → 15M BOMLines to convey the same information**

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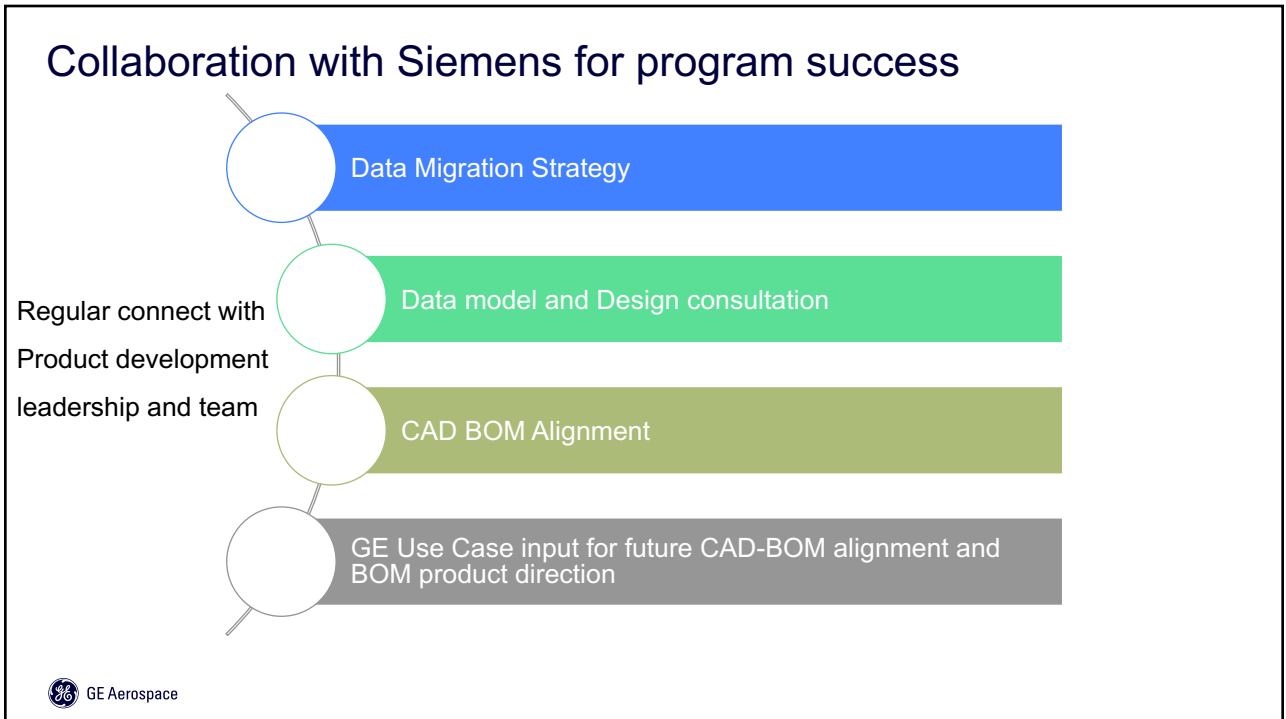
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## Next GEN EBOM – New Features

- Configure BOM by any in-process change or combination of changes to assess impact
- Allow for concurrent/ competing changes for determination of change sequence

**Live Parts List**

- Ability to configure and visually compare in-process changes
- CAD-Part and CAD-BOM Aligned

**Visual EBOM**

- 88% reduction in the number of BOMLines compared to a revision based BOM

**Efficient Data Model**

Revision Based BOM As-Is		Next GEN EBOM	
Development Engines	84M	Development Engines	9M
Production Engines	52M	Production Engines	6M
<b>Total</b>	<b>136M</b>	<b>Total</b>	<b>15M</b>

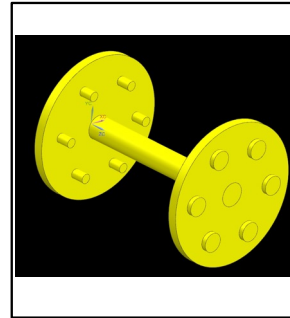
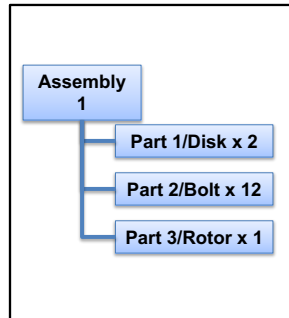
**88% ↓**

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## Next Gen EBOM and Live Parts List

EBOM Configured for currently active BOM (Last issued ECO: CID 5)

Configuration Manager	
ECO	In-Process ECO
<b>CID 5</b>	CID 6
CID 4	CID 7
CID 3	
CID 2	
CID 1	
ORIG	

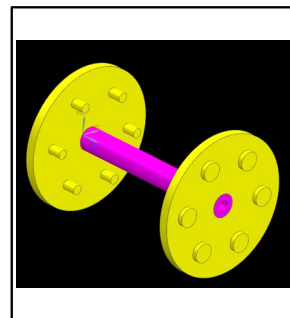
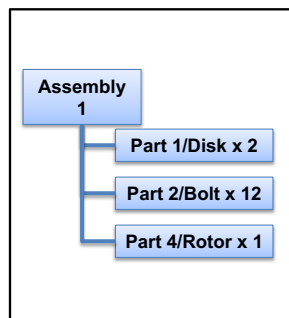


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## Next Gen EBOM and Live Parts List

EBOM Configured for in-Process Change CID 6 (Change to the rotor: Replaces Part 3 with Part 4)

Configuration Manager	
ECO	<b>In-Process ECO</b>
CID 5	<b>CID 6</b>
CID 4	CID 7
CID 3	
CID 2	
CID 1	
ORIG	

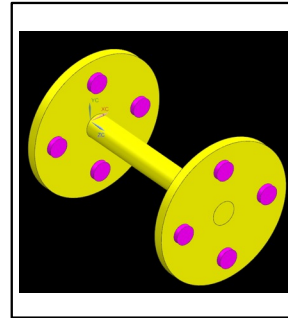
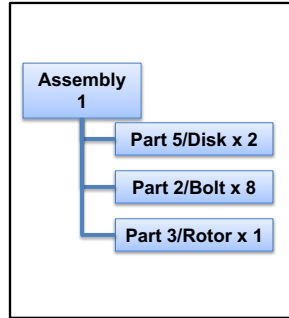


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## Next Gen EBOM and Live Parts List

EBOM Configured for in-Process Change CID 7 (Change to the Disk: Replaces Part 1 with Part 5)

Configuration Manager	
ECO	In-Process ECO
CID 5	CID 6
CID 4	<b>CID 7</b>
CID 3	
CID 2	
CID 1	
ORIG	

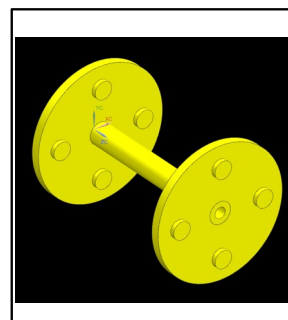
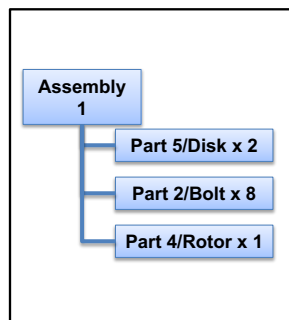


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## Next Gen EBOM and Live Parts List

EBOM Configured for both in-Process Changes CID 6 and CID 7)

Configuration Manager	
ECO	In-Process ECO
CID 5	<b>CID 6</b>
CID 4	<b>CID 7</b>
CID 3	
CID 2	
CID 1	
ORIG	



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## Summary

### In the first week AFTER production release:

- ✓ 5K users transitioned to new systems
- ✓ 100+ design changes issued
- ✓ 100+ BOM loads and 2000+ BOM transactions
- ✓ Zero business disruptions

### What made it possible:

Focus on the Vital Few... Prioritize by Business Value  
 Break the Org Silos... Power of Mission Based Teams  
 Continuous Improvement... Lean driven Transformation  
 Invest in People & Celebrate... Often



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