



FLIGHT PROJECTS DIRECTORATE

BUSINESS CHANGE INITIATIVE

Windchill for Project CM / IS&T Colloquium

Jon.Verville @ nasa.gov / September 2015





Outline

A) Project
Background

B) How IT best
meets user needs



Background - Project Objectives

- Replicate all existing functionality of heritage flight project CM systems
 - Build off CM requirements developed Fall 2014
- Evaluate new approach for leveraging COTS tool
- Partner with flight project to fully develop requirements and concept of operations (CONOPS)
- Minimize up-front and sustaining engineering costs
- Minimize CM system complexity
- Provide system flexibility to meet multiple mission needs





Background - Schedule

	Detail
2013	Code 400 Business Change Initiative (BCI) initiative to assess the next generation of Data Management
January – June 2014	Conducted a feasibility study for a center-wide system <ul style="list-style-type: none"> Met with staff from 5 NASA centers (MSFC, SSC, KSC, GRC, JSC) and APL
July – December 2014	Developed a prototype system <ul style="list-style-type: none"> Developed 108 requirements with 30+ Goddard staff <ul style="list-style-type: none"> 12 flight projects and many roles (PM, MSE, QA, PDL, CM) 15+ hours of in person meetings Testing used a full verification process
January – Oct 2015	Fully implement requirements and ops concept for mission



WFIRST T~AFTA

Wide-Field Infrared Survey Telescope



WFIRST Partnership

- Early 2015, started work with pilot team
 - System planning meetings
 - Software testing
- Fully documented all system configurations in Functional Description Doc (FDD)

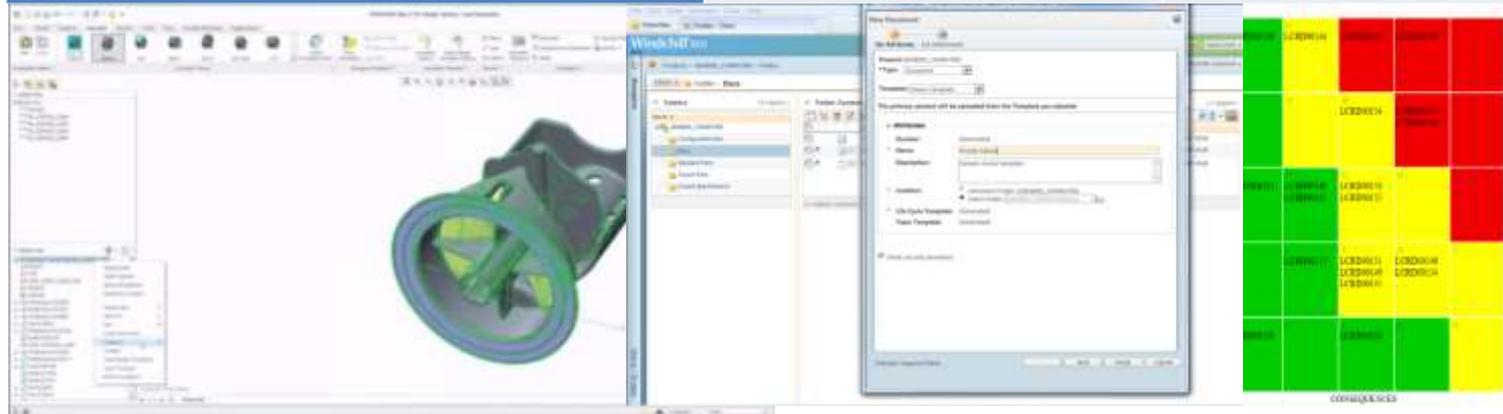
The collage displays four screenshots from the PTC Windchill software interface:

- Top Left:** Product management view for 'WFIRST'. It shows a tree structure with folders like '01 Project Management', '02 Systems Engineering', and '03 Safety & Reliability'.
- Top Right:** 'Controlled Document - WFIRST-PLAN-00630, Windchill'. It shows document details such as 'Document Title: Windchill', 'Status: Check', and 'Modified By: Duster'.
- Middle Left:** 'Team: Product - WFIRST'. It lists team members and their roles, with options for 'Copy', 'Paste', and 'Add Member'.
- Middle Right:** 'Assembly - 2209731_asm.asm, -6'. It shows a 3D model of a yellow component and its attributes, including 'File Name: 220971', 'Number: 220971', and 'Status: Check'.
- Bottom:** A dashboard with three charts: 'Change Requests', 'Change Orders', and 'Change Orders'. Below the charts are sections for 'Full Track for Back Track Changes' and 'All System Reports'.



Modules

Module	Typical Roles Involved	Training Packages Developed
Configuration Mgmt (CM) /Doc Mgmt (DM)	CM, PM, CSO, Systems, PDL	5
CDRL	CM, PM, PDL	1
Drawing/Model Mgmt	CM, Systems, PDL	3
Action Items	CM, PM, Systems, PDL	2
Risk	CM, PM, CSO, Systems, PDL	2
WOA (including Photo/Video)	CM, PM, CSO, Systems, PDL	2





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How IT best meets user needs (Jon's perspective)

1. Tools
2. Requirements gathering
3. Customer face-time
4. Alignment with customer



How IT best meets user needs

1. Encourage use of state of the art tools
 - “We are very efficient in using our inefficient tools”

Lead Time Always Evaporates

- *Your vendor was supposed to deliver all the materials for a design conformance review a month before the review date.*
 - *They failed and you got them all the week before.*
 - *Your reviewers are grumpy because they have 3,000 pages of reading you need finished in three days.*
 - *Project needs that review finished on time successfully.*
 - *You finish the meeting with 30 open items and 6 documents still not reviewed.*
 - *It's your technical judgment you can't sign off on the successful completion.*

NOW WHAT?



Product Development Lead Training Program

24

Space Systems Company Portfolio



Video Link: <http://snipurl.com/2a7a80x> (play 10:08 until 13:00)



Key New Feature: Manage Bill of Materials (BOM) in Collaborative Database

- All parts in BOM go through project release process
- All project documents associated to released parts

Product Structure									
Number	Actions	Name	Line Number	Find Number	Quantity	Version	State		
087144301000-02	Actions	CCA, RIU ACS INTERFACE FLT				-3 (Design)	WIP		
0871443010P0	Actions	PWB, RIU ACS INTERFACE	1	0001	1 each	-1 (Design)	WIP		
0871443010L0	Actions	SCHEMATIC, RUI ACS INTERFACE	2	0002	0 reference	-1 (Design)	WIP		
0871-FTP44310	Actions	RIU ACS INTERFACE CARD ASSY FUNCTIONAL TEST PROCEDURE	3	0003	0 reference	-1 (Design)	WIP		
ASME Y14.100	Actions	ENGINEERING DRAWING PRACTICES	4	0004	0 reference	-3 (Design)	WIP		
ASME Y14.100.DOCX	Actions	ENGINEERING DRAWING PRACTICES				-2	WIP		
ASME Y14.100.PDF	Actions	ENGINEERING DRAWING PRACTICES				-1	WIP		
SSG-PS1041	Actions	AUTOMATIC LEAD-FORMING OPERATION	5	0005	0 reference	-3 (Design)	WIP		
SSG-PS1041.DOCX	Actions	AUTOMATIC LEAD-FORMING OPERATION				-2	WIP		
SSG-PS1041.PDF	Actions	AUTOMATIC LEAD-FORMING OPERATION				-1	WIP		
TM-3145	Actions	ESD CONTROL PLAN	6	0006	0 reference	-2 (Design)	WIP		
TM-3145.PDF	Actions	ESD CONTROL PLAN				-1	WIP		
TM-3145.XLSX	Actions	ESD CONTROL PLAN				-1	WIP		
087341243140-02	Actions	COMPONENTS BUS ASSY	7	0007	1 each	-2 (Design)	WIP		
087341243140-02.ASM	Actions	COMPONENTS BUS ASSY				-1	WIP		
087341243140-02.DRW	Actions	COMPONENTS BUS ASSY				-1	WIP		
087341243140-02.PDF	Actions	COMPONENTS BUS ASSY				-1	WIP		
TO-PS1001	Actions	INSTRUCTIONS FOR MAKING P/N ON MANUFACTURING PARTS	14	0014	0 reference	-2 (Design)	WIP		
TO-PS1001.PDF	Actions	INSTRUCTIONS FOR MAKING P/N ON MANUFACTURING PARTS				-1	WIP		

Mechanical design standard

Gold standard now 3D model (not PDF)

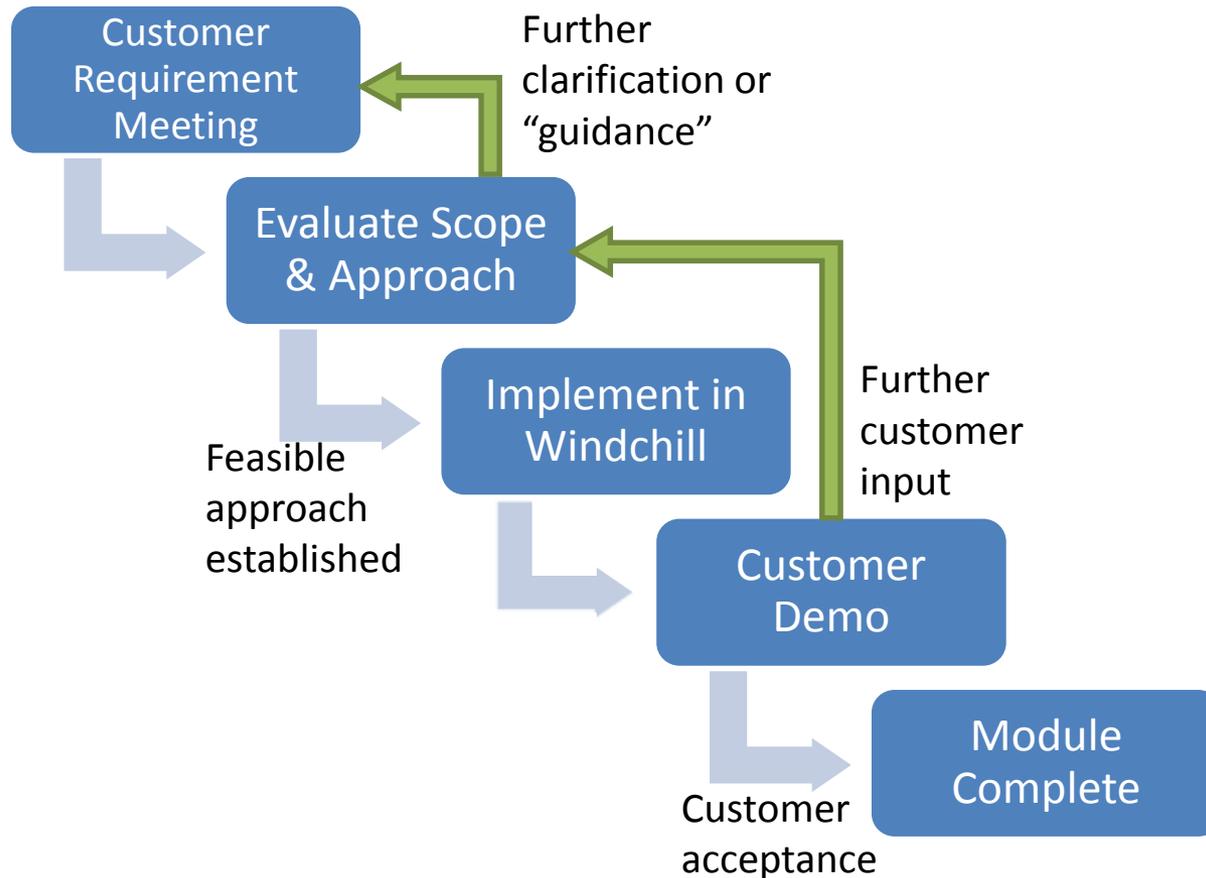
Gold standard for project BOM (bill of materials)/MEL/parts list



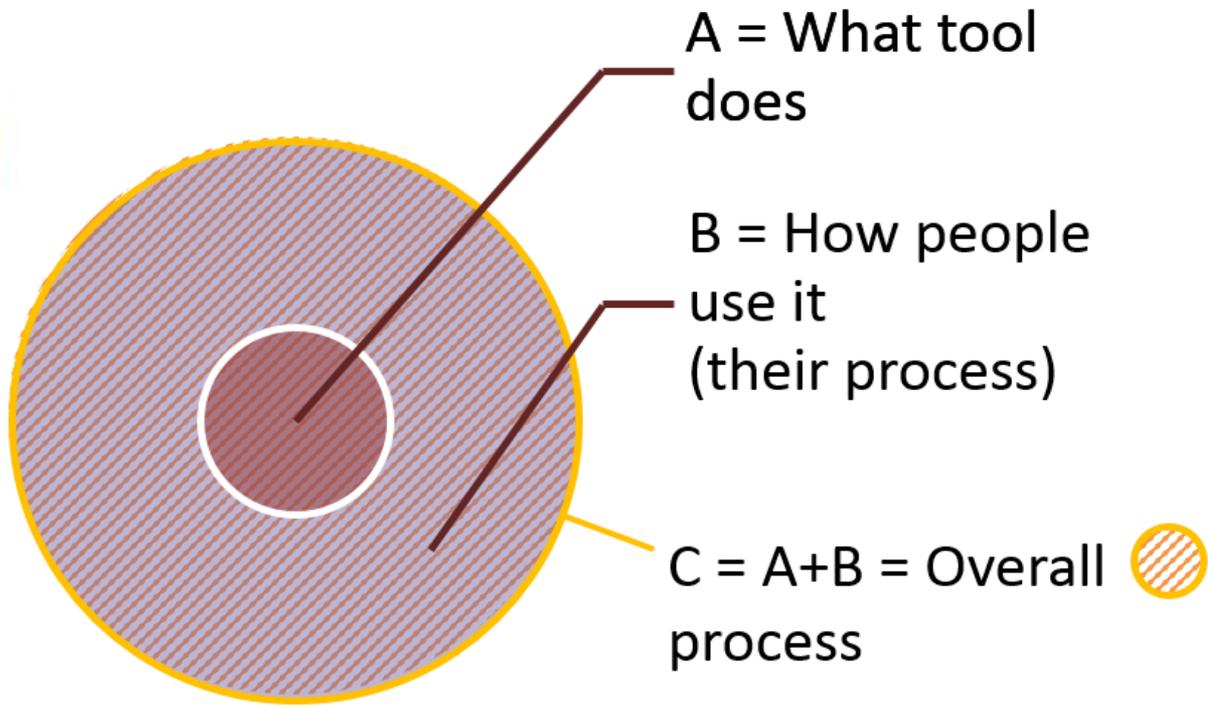
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 - **Requirements** vs concept of operations

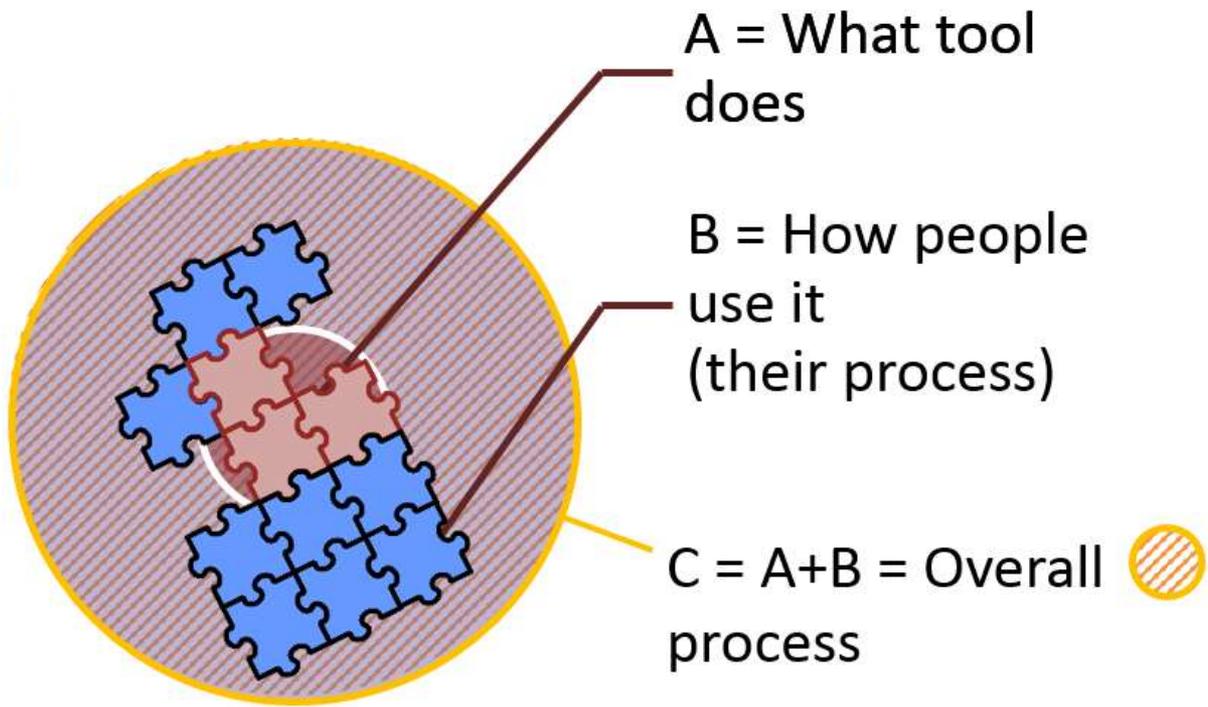
Process – Iterative Development



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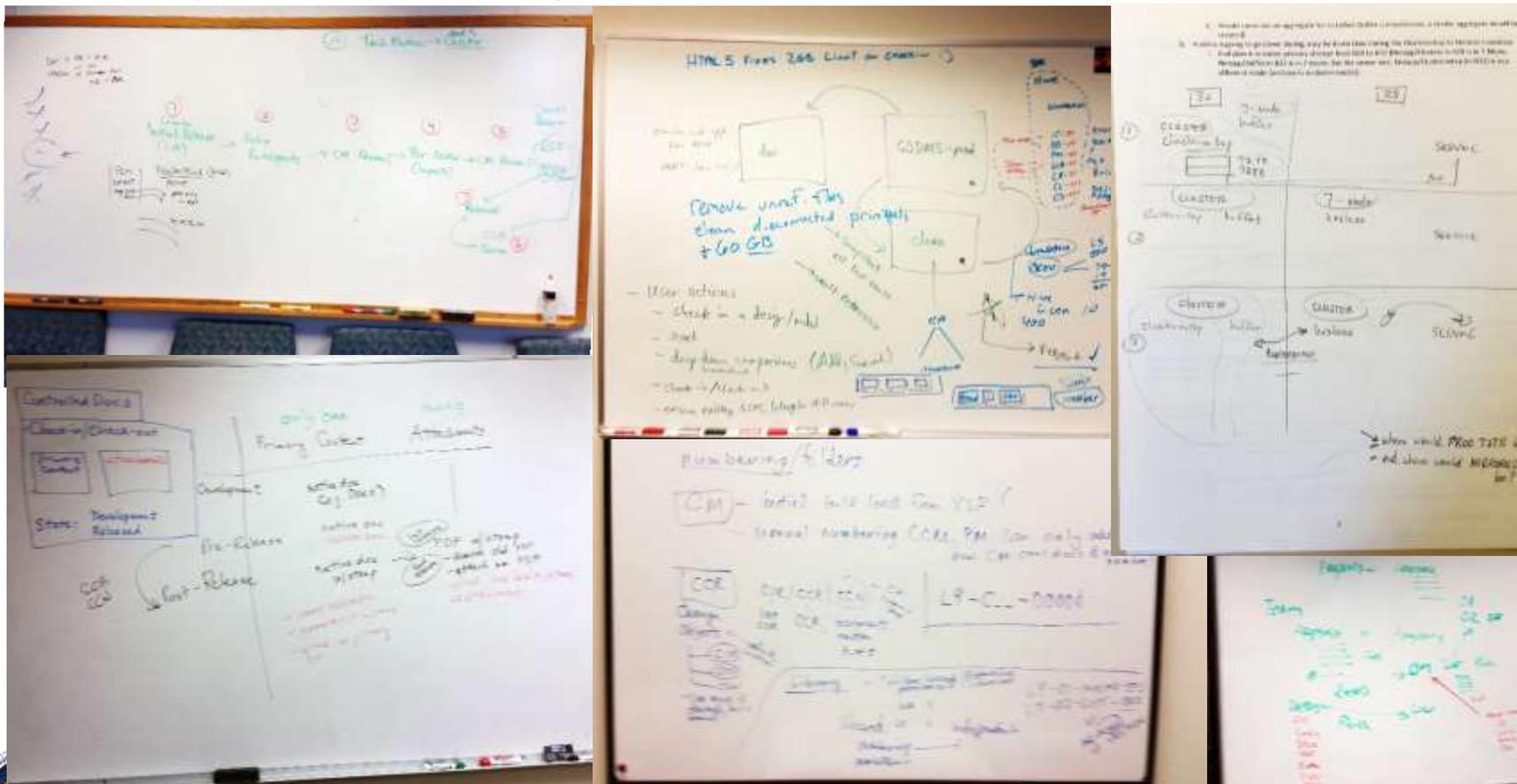
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 - **Requirements** vs concept of operations
3. Allow customer face-time to capture user “use case” accurately
 - Requirements vs **concept of operations**



Whiteboard & Diagrams

- Lots of time spent around whiteboards and diagrams (e.g. FDD) to ensure we get process right
- Sitting with user while using the software



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4. Ensure alignment of what was built with customer
 - For us: Testing and documentation



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Questions?



Windchill Product Data Management (PDM) Data Benefits

- Mechanical design standard
 - Gold standard now 3D model (not PDF)
 - CREO View
 - Gold standard for project BOM (bill of materials)/MEL/parts list
- Increase Data Accuracy and Integrity
- Increase in Management Visibility and Control
- Increase in Engineering Process Efficiencies
- Reduction in Costs
 - System does not require any custom code, changes made through configuration
 - Decrease in IT and Custom application development/maintenance costs
 - Increase Engineering Process time

