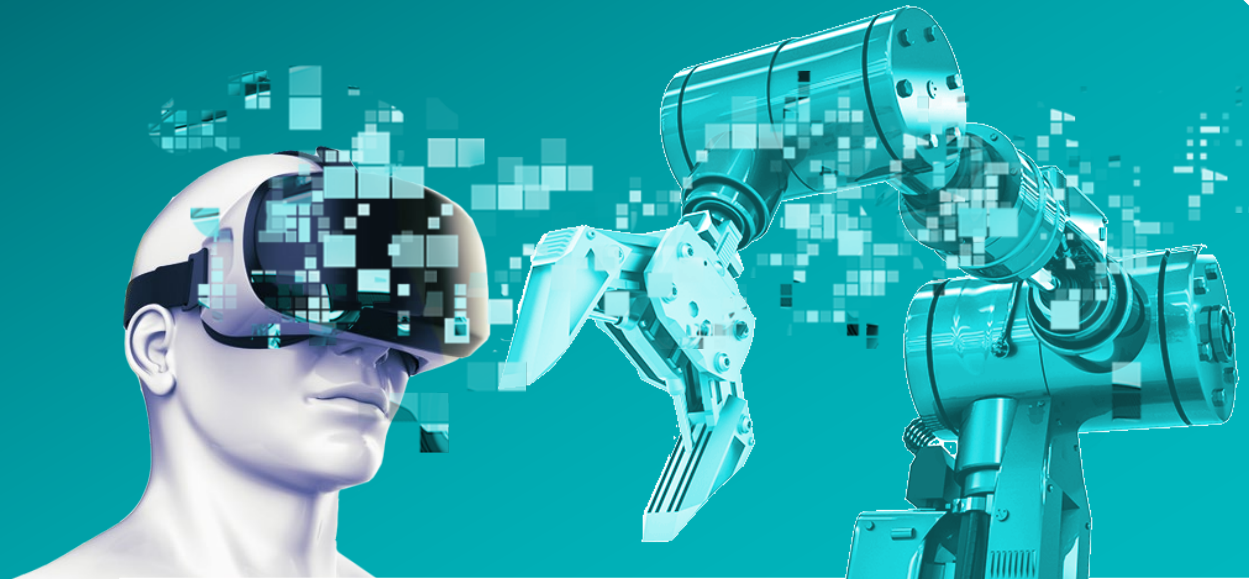
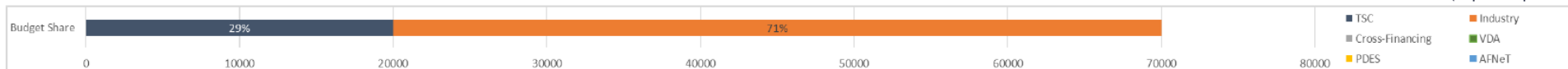


Model Based Verification for Design (MBV)

prostep ivip TSC Meeting
20 November 2019
Kenneth Swope
The Boeing Company



Model Based Verification



Goals

Develop an Industry Standard for specifying cross company verification approaches using Model Based environments

Chair:

Don Farr
(The Boeing Company)



Coordinator:

Michael McIvor
(The Boeing Company)

Participants:

Boeing
Airbus
RLE International
Engineering Methods AG
Safran (Tentative)
Gulfstream (Tentative)

Prostep ivip coordination
with membership in work

Business Need

- Today, product requirements verification is either done by the OEM or delegated to the supplier using a document based approach. This leads to miss-alignment in verification objectives, lost time in information exchange, and poor quality through missed requirements. Additionally, the project will investigate expanding to product certification use cases.
- This project will specify an approach to the SySML based architecture that includes the Verification intent for a set of requirements/functions being provided to a supplier for verification back to the system design. The verification results will be passed back to the OEM in a similar approach.
- The transfer of this data/information will be across companies in order to establish (or prototype) exchange methods across the different development environments.

Deliverables

Since last TSC meeting:

- N/A

Planned for next TSC meeting:

- Project initialization: charter refinement, project membership, development approach
- Further detailing/extension of the product backlog (Epics, User-Stories and Tasks)
- Definition of an Minimum Viable Product for Verification

News

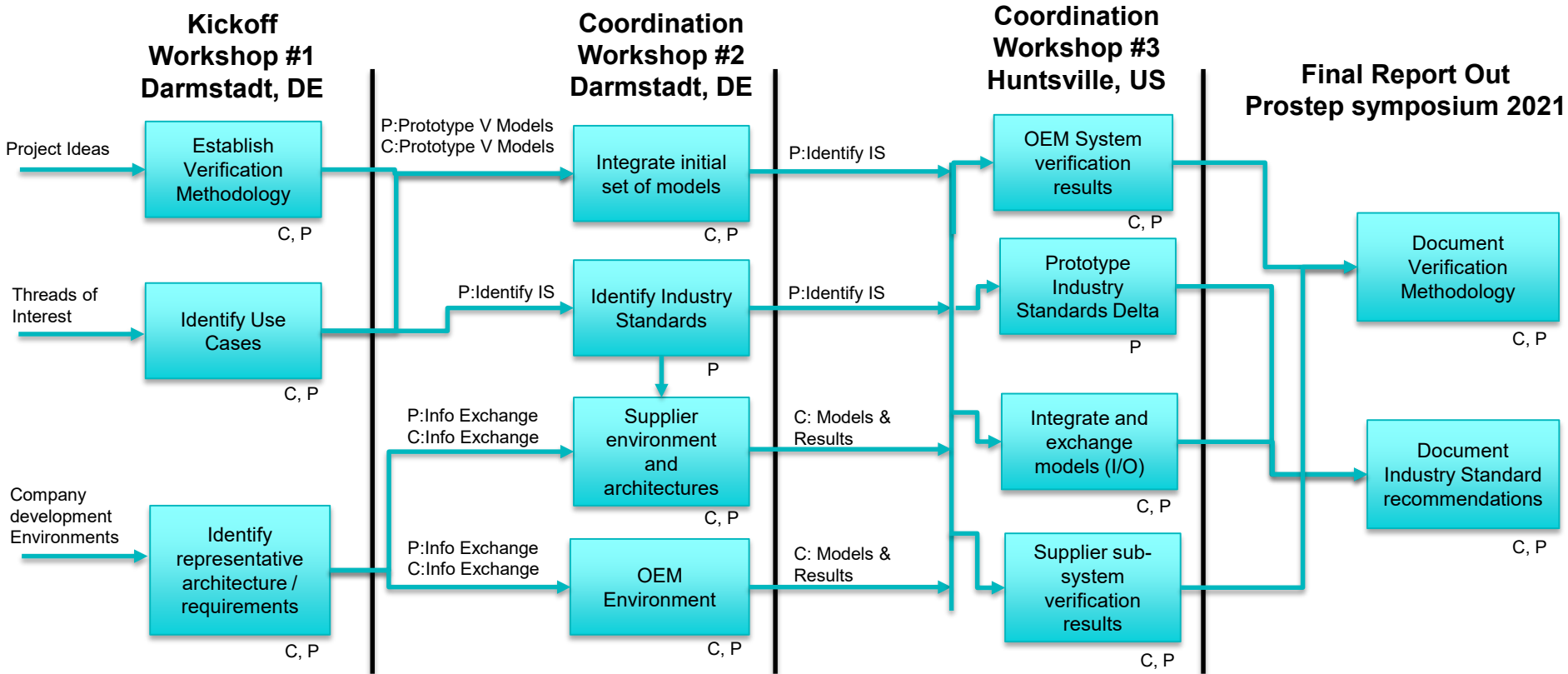
Highlights

- New proposal between prostep ivip and Aerospace & Defense PLM Action Group

Impediments

- Data transfer of SySML architecture models.
- Alignment of Verification approaches at an Industry level

MBE Verification Approach:





MBE Verification Approach:



IVIP

Event	Description	Opportunities	Deliverables
Kickoff	Establish project plans, assignments, and responsibilities	ProStep: <ul style="list-style-type: none"> Establish a set of Use Cases (UC) ID Industry Standards Companies: <ul style="list-style-type: none"> Provide Relevant UC Define Environments Info Exchange 	<ul style="list-style-type: none"> Consolidated set of UCs Project plan & schedule <ul style="list-style-type: none"> ProStep tasks defined Company assignments defined List of IS to be modified Initial Verification Approach defined
Workshop #1	Review Project progress and path forward. Initial Integration effort	ProStep: <ul style="list-style-type: none"> Modify UC to align to work completed Initial changes to Industry Standards Initial integration of models in workshop. Companies: <ul style="list-style-type: none"> Review initial Model Structure & Info Exchange <ul style="list-style-type: none"> OME and Supplier models Development Environment Information Exchange 	<ul style="list-style-type: none"> Updated set of UCs Initial OEM and Supplier models Initial IS info to be changed Initial Verification Approach defined Info being passed to accomplish verification
Workshop #2	Review Project progress	Expand effort from Workshop #1	<ul style="list-style-type: none"> Updated products from Workshop #1
Workshop #3 Huntsville, AL	Review Project results and integrated model verification results review.	ProStep: <ul style="list-style-type: none"> Prototyped changes to Industry Standards Integration of models in workshop. Companies: <ul style="list-style-type: none"> Review initial Model Structure & Info Exchange <ul style="list-style-type: none"> Supplier provides sub-system Ver results OME demonstrated integrated Ver results 	<ul style="list-style-type: none"> Integrated OEM & Supplier models Recommended IS changes Demonstrate Verification Approach Info being passed to accomplish verification
Final Report Out	Final report out of project to include all deliverables.	ProStep: <ul style="list-style-type: none"> Generate final report Generate IS change recommendations. Companies: <ul style="list-style-type: none"> Provide input into above tasks 	<ul style="list-style-type: none"> Integrated OEM & Supplier models Recommended IS changes Demonstrate Verification Approach Info being passed to accomplish verification

Model Based Verification Project

Partner Participants

Company	Representative	Commitment
Boeing	Don Farr	Yes
RLE International	Uwe Kloss	Yes (email 10/01)
Engineering Methods AG	Dr. Marcus Krastel	Yes (email 10/23)
Airbus	Henrik Weimer	Yes (email 10/21)
Safran	Fredric Paci	Tentative pending concurrence with Gildas
Gulfstream	Greg Weaver	Tentative pending concurrence with Dan Gansder
GE Aviation	Eric Hall	No commitment
Dassault Aviation	Jean-Francois Cugy, Rosanne Serrano, Florent Gateau	No commitment
Embraer	Joao Zerbini, Priscilla Kobo	No commitment
P&W Canada	Robert Gutwein	No, checking with P&W America and also Collins
Mitsubishi Heavy Ind.	Shinichiro Taura	No commitment
Rolls Royce	Chris Spaul	No confirmation, received email June 27 stating interest
CIMdata	Jim Roche, Don Tolle	Yes, but only for coordination between PLM and prostep

Plan & Budget 2020, Model Based Verification

Budget Plan - MBV 2020		
as of 06/20/2019	Plan 2020	
	PD	Euro
I. Sourcing:		
prostep ivip Association		20,000
VDA		
Project Partner (10)		50,000
Total Budget		70,000
II. Organisation:		
II.1. Project Management	15.00	10,740
II.2. Public Relations	5.00	3,580
Total Organisation	20.00	14,320
III. Technical Work:		
III.1 Situation Analysis and Scoping	8.00	6,976
III.2 Reference Processes & Use Cases	44.00	38,368
III.3 Technical Concept MBV	12.00	10,464
Total Technical Work	64.00	55,808
IV. Travel Expenses:		0
TOTAL	84.00	70,128

Budget Request

Budget Request (TSC) 2020: 20.000 €

10 industry partners at 5.000€

To be discussed: socialization with prostep ivip membership

Goals 2020

- Agreed to architecture framework
- Use cases defined
- Common Industry Requirements

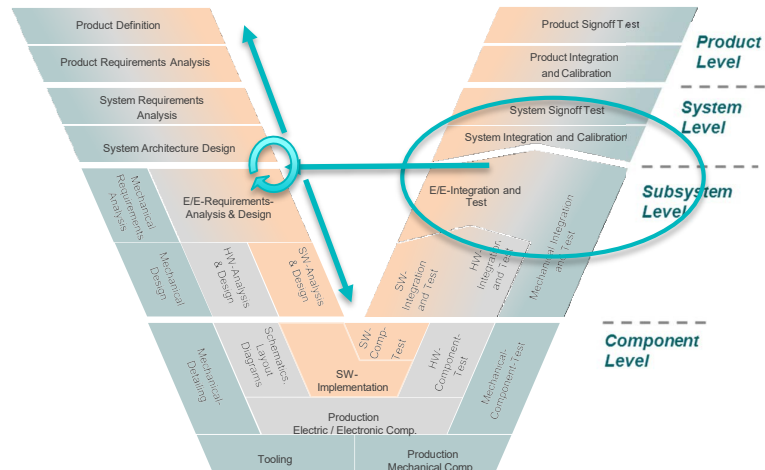
Benefits

- Multi-Industry common requirements for verification
- Prioritization for standards bodies on needed capabilities

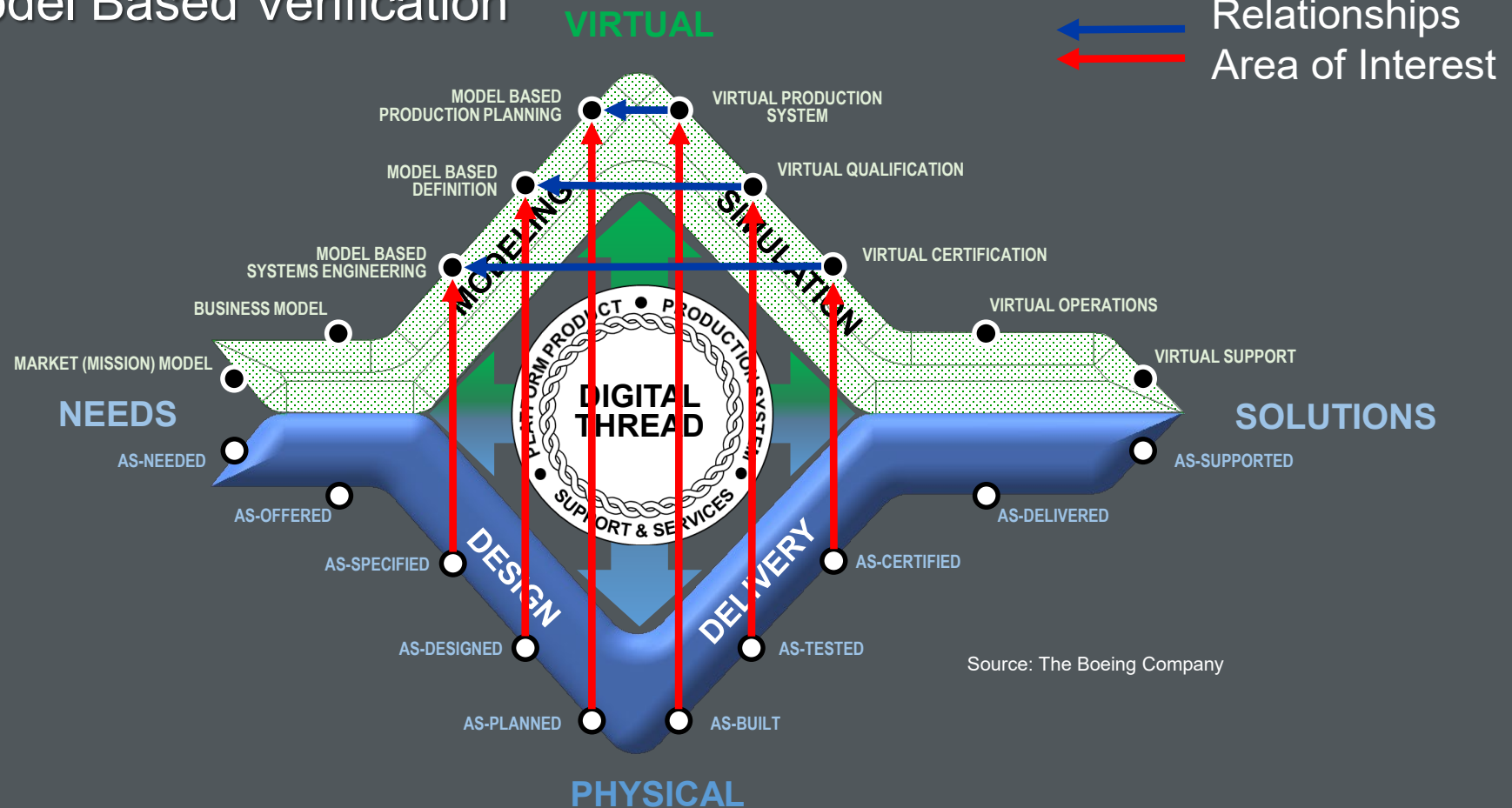
Concept

Verification in aerospace and automotive industry

This project proposes to create a road map for merging these complementary points of view (aerospace & automotive) using a minimum viable product (MVP) approach with the Systems Engineering Lifecycle and the adoption of regulatory requirements as a user story for understanding the necessary architectures and integrations needed to achieve verification using SysML models. From this road map, a focus on those detailed areas, be it standards, work processes, requirements or implementation best practices can be defined and allocated to the appropriate stakeholders.



Model Based Verification



Budget: Status & Forecast

Budget Plan - < Project Acronym > 2019											
as of < Date >	Plan 2019		<ServProv1>		<ServProv2>		Status < Date > (Overall Plan)			Forecast 2019	
	PD	Euro	PD	Euro	PD	Euro	PD	Euro	%	PD	Euro
I. Sourcing:											
prostep ivip Association		0						0			0
VDA		0						0			0
Project Partner (à xxxx €)		0						0			0
Total Budget		0						0			0
II. Organisation:											
II.1. Project Management	0,00	0	0,00	0	0,00	0	0,00	0	#DIV/0!	0,00	0
II.2. Public Relations	0,00	0	0,00	0	0,00	0	0,00	0	#DIV/0!	0,00	0
Total Organisation	0,00	0	0,00	0	0,00	0	0,00	0	#DIV/0!	0,00	0
III. Technical Work:											
III.1 WP1	0,00	0	0,00	0	0,00	0	0,00	0	#DIV/0!	0,00	0
III.2 WP2	0,00	0	0,00	0	4,00	2.864	0,00	0	#DIV/0!	0,00	0
III.3 WP3	0,00	0	0,00	0	4,00	2.864	0,00	0	#DIV/0!	0,00	0
III.4 WP4	0,00	0	0,00	0	0,00	0	0,00	0	#DIV/0!	0,00	0
Total Technical Work	0,00	0	0,00	0	8,00	5.728	0,00	0	#DIV/0!	0,00	0
IV. Travel Expenses:		0		0		0		0	0%		0
TOTAL	0,00	0	0,00	0	8,00	5.728	0,00	0	#DIV/0!	0,00	0

Affinity Topics

- Single Thread of the Data with Tools
 - Requirements - Verification
- Configuration Management of models
 - Business Process Design & Efficiency
 - Regulatory Integration
 - Design Control of the Baseline
 - Manage Reuse
- Data model interoperability between realization technologies
 - Merge & Interaction of Data
 - Realization Technologies
 - Traceability



Project (Project Acronym), Year

EPIC	< Title >		
User Story	< As a I want to ... so that ... >	Originator	< who created the user story >
Acceptance Criteria	< Measurable criteria for when the user story is fulfilled >	Prio	< priority >
Tasks	< What needs to be done to achieve the objectives >	Story Points	< rating of complexity / effort required >