



2024 UAF® SUMMIT

ACTIONABLE ARCHITECTURE IN THE 21ST CENTURY – A HYBRID EVENT

Hosts



Laura E. Hart



Dr. Aurelijus Morkevicius



Matthew Hause



UAF Annual Events



UAF Annual Events Calendar

1. UAF and MBSE Information Day, 2015, Reston, VA
2. UAF and MBSE Summit, 2016, Reston, VA,
3. UAF and MBSE Summit, 2017, Reston, VA,
4. UAF, UPDM, and MBSE tutorials, 2017, Reston, VA,
5. UAF and MBSE Summit, 2017, Brussels, Belgium
6. UAF and MBSE tutorials, 2017, Brussels, Belgium
7. UAF and MBSE Summit, 2018, Reston, VA
8. UAF and MBSE tutorials, 2018, Reston, VA
9. MBSE-inspired Actionable Enterprise Architectures Summit, 2018, Ottawa, Canada
10. MBSE-inspired Actionable Enterprise Architectures Tutorials, 2018, Ottawa, Canada
11. MBSE-inspired Actionable Enterprise Architectures Summit, 2019, Reston, VA
12. UAF in the context of the NATO Architecture Framework (NAF), 2019, Amsterdam, Netherlands
13. UAF Summit: Actionable Architecture in the 21st century, 2020, Virtual
14. UAF Summit: Actionable Architecture in the 21st century and beyond, 2021, Virtual
15. UAF Summit: Actionable Architecture in the 21st century - Hybrid event, 2022, Reston, VA
16. UAF Tool Vendor Roadshow, - Hybrid event, 2022, Austin, TX
17. UAF Summit: Actionable Architecture in the 21st century - Hybrid event, 2023, Reston, VA
18. **UAF Summit: Actionable Architecture in the 21st century - Hybrid event, 2024, Reston, VA**

<https://www.brighttalk.com/search/?q=UAF>

Morning Agenda

Welcome Address

Co-Chair: Aurelijus Morkevicius, Industry Process Consulting Director (Dassault Systèmes)

Morning Keynote: The Dawn of Enterprise Architecture in The Air Force

Jeffrey W. Eggers, DISL, Air Force ISR Chief Architect

Morning Break

Federated Model Management

Tony Mallia, Senior Enterprise Architect, Odyssey Consulting

Enabling Enterprise Transformation Using Enterprise Architecture Principles and Concepts

James Martin, Distinguished Engineer (The Aerospace Corporation)

Applying UAF for Dairy & Livestock Production Systems Engineering

Dr.-Ing. Christian von Holst, Global Tractor Systems Engineering Lead @ John Deere GmbH & CO KG

Lunch Break

Time (EST)

9:00 – 9:30

9:30 – 10:15

10:15 – 10:45

10:45 – 11:15

11:15 – 11:45

11:45 – 12:15

12:15 – 13:30

Afternoon Agenda

Afternoon Keynote: Digital Mission Architecture. Architecture-Based Decision Making for Mission Engineering and Integration

Jaime J. Bestard, Chief Engineer, Digital Mission Architecture, Department of Defense

Darth Vader's Secret Weapon: Implementing Mission Engineering with UAF

Matthew Hause, Principal, SSI/INCOSE

MBAcq User Managed Community

Laura Hart, Research Engineer Senior Manager (Lockheed Martin)

Afternoon Break

MOSA Domain Overlay – Status Update

Richard Wise, Senior Research Engineer (Georgia Tech Research Institute)

UAF OR SYSML? Yes!

Gene Shreve, Senior Systems Engineer (Integration Innovation, Inc.)

Laura Hart, Research Engineer Senior Manager (Lockheed Martin)

Closing Address: Q&A Session and Discussion

Co-Chair: Aurelijus Morkevicius, Industry Process Consulting Director (Dassault Systèmes)

Co-Chair: Laura Hart, Research Engineer Senior Manager (Lockheed Martin)

Co-Chair: Matthew Hause, Principal Consultant (System Strategy)

Time (EST)

13:30 – 14:15

14:15 – 14:45

14:45 – 15:15

15:15 – 15:45

15:45 – 16:15

16:15 – 16:45

16:45 – 17:00

Who is behind?

Tool vendors:

- Dassault Systemes
- IBM
- MEGA
- Sparx Systems
- Zuken Vitech Inc.

Industry/ Government Contributors:

- 88solutions
- Aerospace Corporation
- Airbus
- agnos.ai UK Ltd
- Arcfield
- Auxilium Technology Group
- BAE Systems
- Boeing
- CAG Syntell
- Department of Navy (US)
- Elparazim
- Georgia Institute of Technology
- Lockheed Martin
- MITRE
- Northrop Grumman
- Office of the Secretary of Defense
- oose eG
- Rolls-Royce Corporation
- RTX
- Sierra Nevada
- Thales
- INCOSE and GfSE

Leadership



Laura E.
Hart



Dr. Aurelijus
Morkevicius



Matthew
Hause



2024 UAF® OVERVIEW



UAF is a Standard...

- To develop architectural descriptions for **commercial industries, federal governments and military organizations**
- Is compatible with **DoDAF** and **NAF**
- Has many different use cases from **Enterprise Systems Engineering** and **SoS Engineering** to enabler for **Business Transformation planning**
- Developed by Object Management Group (OMG) with the leadership from Dassault Systemes, Lockheed Martin and System Strategy
- Is an international ISO standard **ISO/IEC 19540:1 and ISO/IEC 19540:2**
- Current version of UAF specification is 1.2
<https://www.omg.org/spec/UAF/1.2/About-UAF>

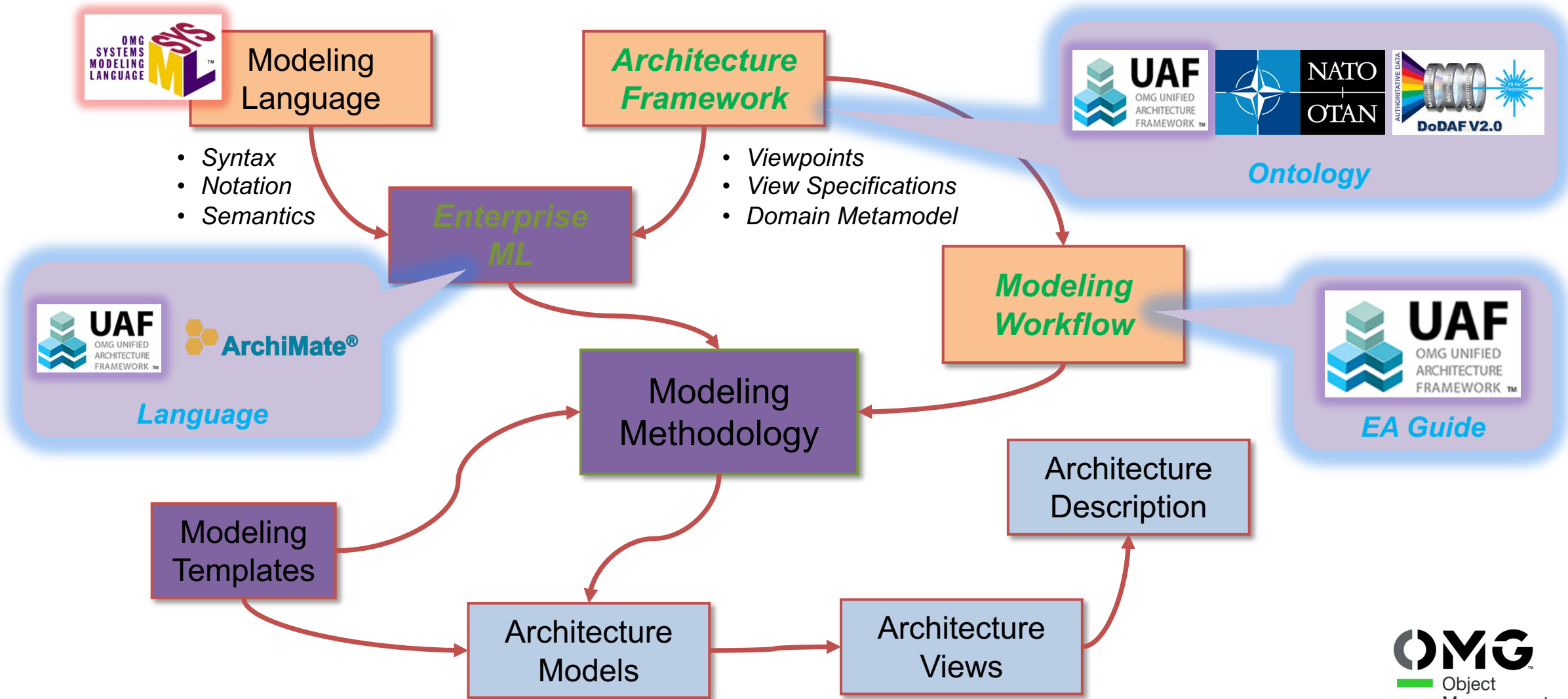
UAF Use Cases

15288 System Lifecycle Processes
Acquisition Decision Making
AOA (Analysis of Alternatives)
Application Portfolio Management
Budget Planning
Business and Mission Analysis - INCOSE
Business Process Reengineering
Business Transformation Planning
Capability Gaps Analysis
Capability Planning
Capability Portfolio Management
Capability-based Assessment
Certification Planning
Defense Acquisition System
Define and analyze problem space
Describe SoS
Design Surety
Digital Engineering Planning and Execution
Digital Transformation Planning
Digital Twin
Doctrine Development
Ecosystem Sustainability
Enterprise Planning
Enterprise Systems Engineering - INCOSE
Federated Mission Network (FMN)
JCIDS
Logistics Support Planning
Mission Assurance

Mission Criticality
Mission Engineering
Operational Analysis
Operational Sustainability
Operations
Operations Planning
Optimization
Organizational and Strategic Planning
Performance Management
Policy Formulation
Portfolio Management
PPBE
Predictive Analytics
Program Assessment and Evaluation
Program Formulation
Program Planning
Requirements Development and Flowdown
Risk and Opportunity Management
Security Analysis
Simulation Support
Strategic Planning and Execution
Sustainability
Sustainment Engineering
System Lifecycle Management
System Security Engineering
System Sustainability
Technology Planning and Assessment
Test Planning and Execution
Training

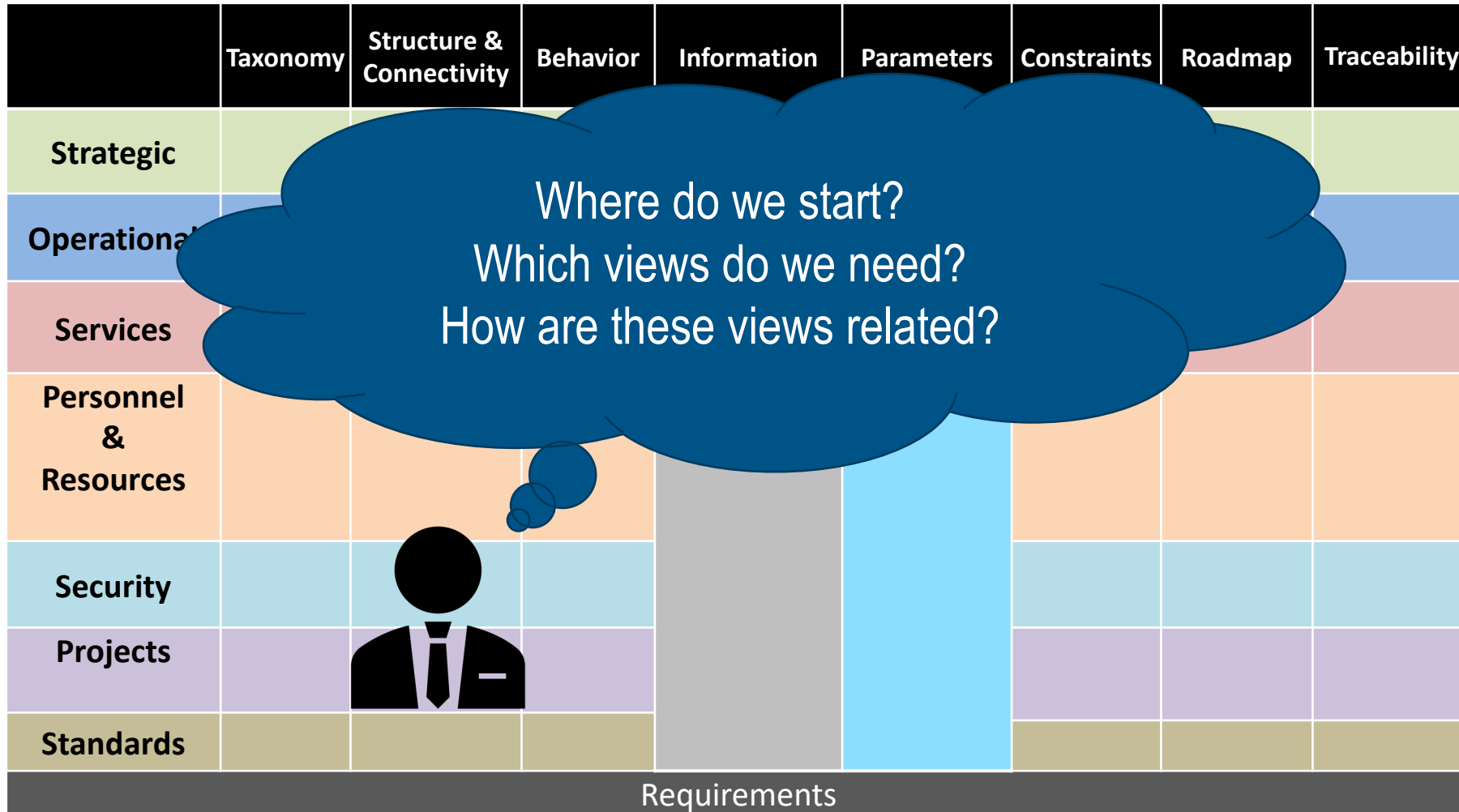


The Modeling Landscape



UAF UNIFIED ARCHITECTURE FRAMEWORK™	Motivation Mv	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Sequences Sq	Information ^c If	Parameters ^d Pm	Constraints Ct	Roadmap Rm	Traceability Tr	
Architecture Management ^a Am	Architecture Principles Am-Mv	Architecture Extensions Am-Tx ^e	Architecture Views Am-Sr	Architecture References Am-Cn	Architecture Development Method Am-Pr	Architecture Status Am-St		Dictionary Am-If	Architecture Parameters Am-Pm	Architecture Constraints Am-Ct	Architecture Roadmap Am-Rm	Architecture Traceability Am-Tr	
Summary & Overview Sm-Ov													
Strategic St	Strategic Motivation St-Mv	Strategic Taxonomy St-Tx	Strategic Structure St-Sr	Strategic Connectivity St-Cn	Strategic Processes St-Pr	Strategic States St-St		Strategic Information St-If	Environment En-Pm-E and Measurements Me-Pm-M and Risks Rk-Pm-R	Strategic Constraints St-Ct	Strategic Deployment, St-Rm-D Strategic Phasing St-Rm-P	Strategic Traceability St-Tr	
Operational Op	Requirements Rq-Mv	Operational Taxonomy Op-Tx	Operational Structure Op-Sr	Operational Connectivity Op-Cn	Operational Processes Op-Pr	Operational States Op-St	Operational Sequences Op-Sq	Operational Information Op-If		Operational Constraints Op-Ct		Operational Traceability Op-Tr	
Services Sv		Services Taxonomy Sv-Tx	Services Structure Sv-Sr	Services Connectivity Sv-Cn	Services Processes Sv-Pr	Services States Sv-St	Services Sequences Sv-Sq			Services Constraints Sv-Ct	Services Roadmap Sv-Rm	Services Traceability Sv-Tr	
Personnel Ps		Personnel Taxonomy Ps-Tx	Personnel Structure Ps-Sr	Personnel Connectivity Ps-Cn	Personnel Processes Ps-Pr	Personnel States Ps-St	Personnel Sequences Ps-Sq	Resources Information Rs-If		Personnel Availability Ps-Rm-A Personnel Evolution PS-Rm-E Personnel Forecast Ps-Rm-F	Personnel Traceability Ps-Tr		
Resources Rs		Resources Taxonomy Rs-Tx	Resources Structure Rs-Sr	Resources Connectivity Rs-Cn	Resources Processes Rs-Pr	Resources States Rs-St	Resources Sequences Rs-Sq			Resources Constraints Rs-Ct	Resources evolution Rs-Rm-E Resources forecast Rs-Rm-F	Resources Traceability Rs-Tr	
Security Sc	Security Controls Sc-Mv	Security Taxonomy Sc-Tx	Security Structure Sc-Sr	Security Connectivity Sc-Cn	Security Processes Sc-Pr					Security Constraints Sc-Ct		Security Traceability Sc-Tr	
Projects Pj		Projects Taxonomy Pj-Tx	Projects Structure Pj-Sr	Projects Connectivity Pj-Cn	Projects Processes Pj-Pr							Projects Roadmap Pj-Rm	Projects Traceability Pj-Tr
Standards Sd		Standards Taxonomy Sd-Tx	Standards Structure Sd-Sr									Standards Roadmap Sd-Rm	Standards Traceability Sd-Tr
Actual Resources Ar			Actual Resources Structure, Ar-Sr	Actual Resources Connectivity, Ar-Cn	Simulation ^b						Parametric Execution/ Evaluation ^b		

MODELING WORKFLOW



But isn't this all we need?

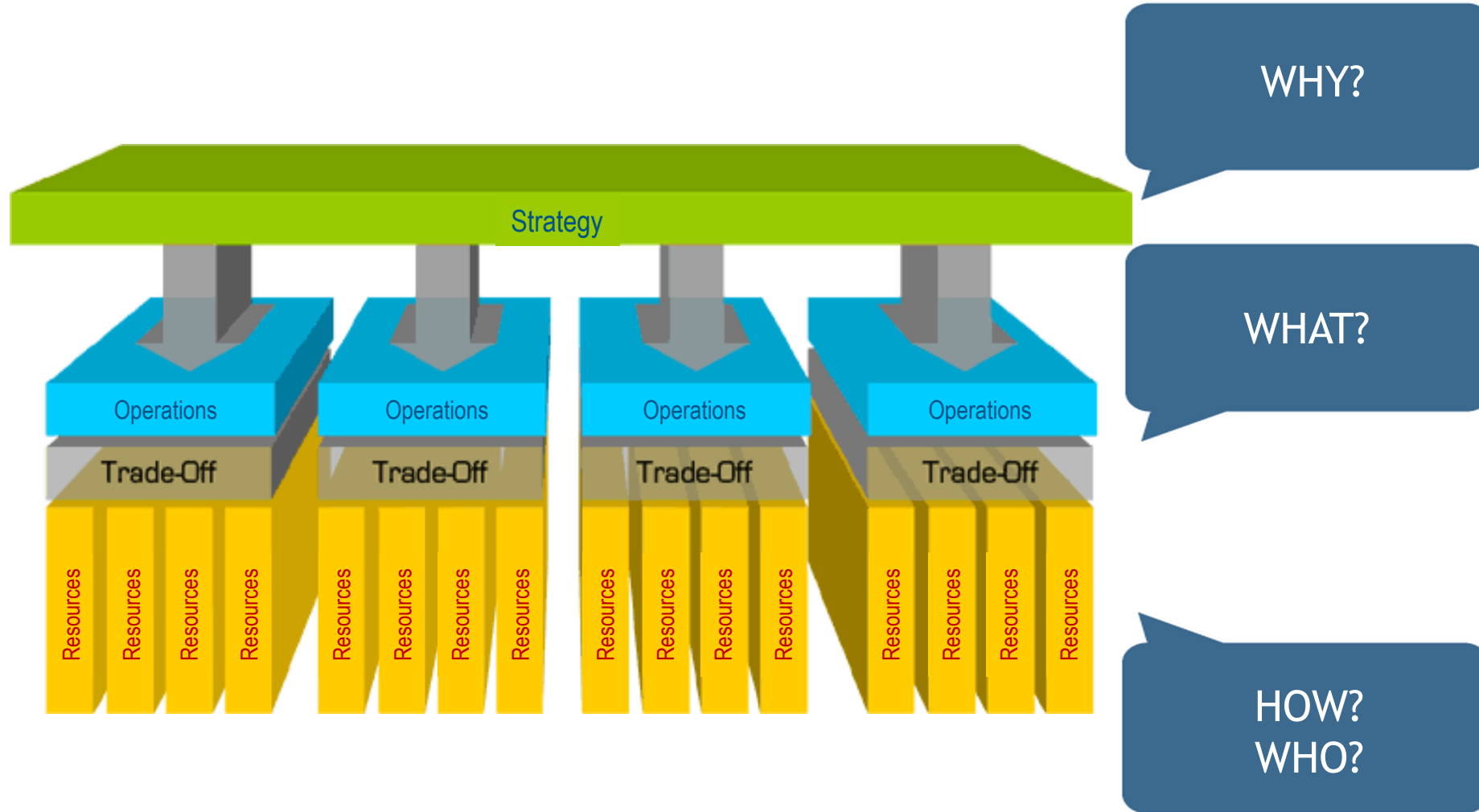
Can we use just these domains and models?

	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Interaction Scenarios Is	Information If	Parameters Pm	
Operational Op	Operational Taxonomy Op-Tx	Operational Structure Op-Sr	Operational Connectivity Op-Cn	Operational Processes Op-Pr	Operational States Op-St	Operational Interaction Scenarios Op-Is	Conceptual Data Model,	Environment Pm-En	
Services Sv	Service Taxonomy Sv-Tx	Service Structure Sv-Sr	Service Connectivity Sv-Cn	Service Processes Sv-Pr	Service States Sv-St	Service Interaction Scenarios Sv-Is			
Personnel Pr	Personnel Taxonomy Pr-Tx	Personnel Structure Pr-Sr	Personnel Connectivity Pr-Cn	Personnel Processes Pr-Pr	Personnel States Pr-St	Personnel Interaction Scenarios Pr-Is			Logical Data Model,
Resources Rs	Resource Taxonomy Rs-Tx	Resource Structure Rs-Sr	Resource Connectivity Rs-Cn	Resource Processes Rs-Pr	Resource States Rs-St	Resource Interaction Scenarios Rs-Is			Physical schema, real world results
							Dictionary * Dc		
							Summary & Overview SmOv		
							Requirements Rq		



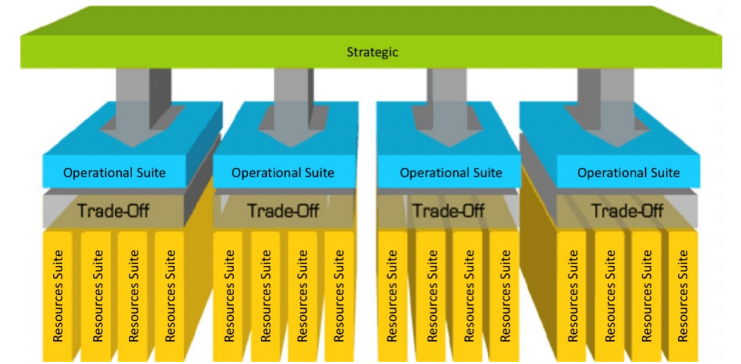
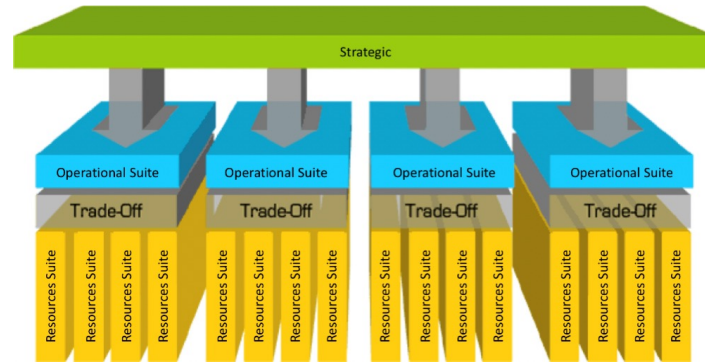
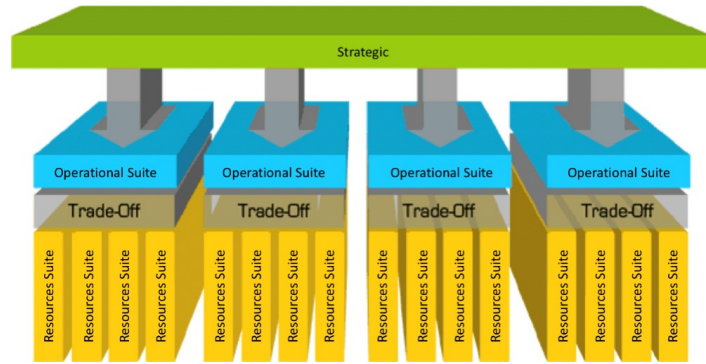
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SOLVING UAF PUZZLE – PRINCIPLE SCHEMATICS



ARCHITECTURE EVOLUTION

Phase 1 → Phase 2 → Phase 3



UAF Use Cases

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Enterprise Planning
Enterprise Systems Engineering - INCOSE
Federated Mission Network (FMN)
JCIDS
Logistics Support Planning
Mission Assurance

Mission Criticality
Mission Engineering
Operational Analysis
Operational Sustainability
Operations
Operations Planning
Optimization
Organizational and Strategic Planning
Performance Management
Policy Formulation
Portfolio Management
PPBE
Predictive Analytics
Program Assessment and Evaluation
Program Formulation
Program Planning
Requirements Development and Flowdown
Risk and Opportunity Management
Security Analysis
Simulation Support
Strategic Planning and Execution
Sustainability
Sustainment Engineering
System Lifecycle Management
System Security Engineering
System Sustainability
Technology Planning and Assessment
Test Planning and Execution
Training

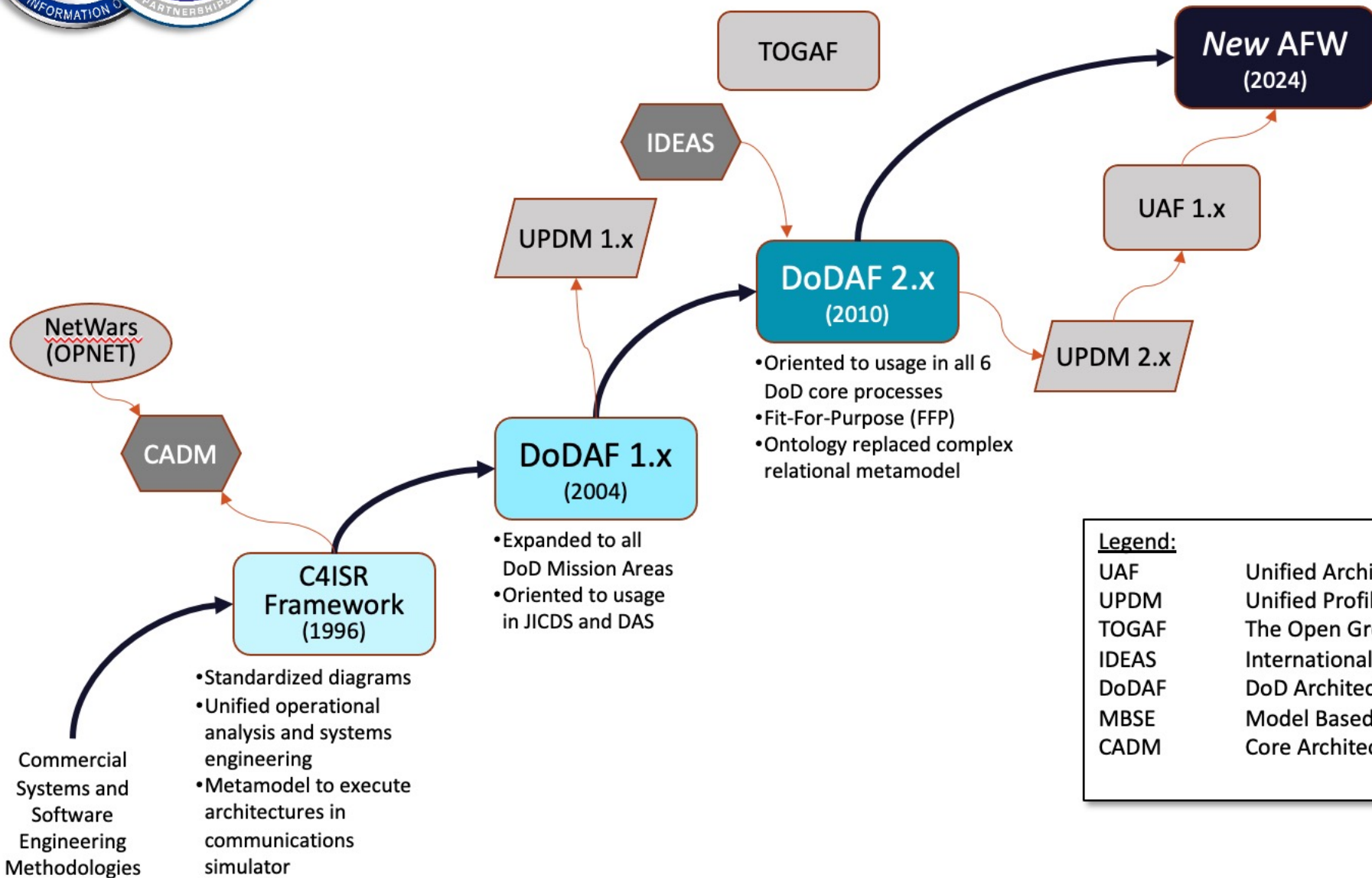


UAF V2 REQUIREMENTS

#	Name	Text	Documentation
1	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 Mandatory Requirements		
2	<input type="checkbox"/> <input type="checkbox"/> 1.1 Provide UAF Metamodel	The standard shall include a normative meta model that captures the concepts of UAF without regard to the target implementation selected. The meta model shall be derived from UAF 1.2 meta model. The meta model shall be expressed in UML. [Note]: The purpose of the meta model is to ensure that the concepts of UAF are adequately covered and provide a basis for communication between the domain stakeholders and the implementers of UAF V2. It serves as the specification for the UAFMLs.	This is most likely replaced by KerML-based metamodel.
3	<input type="checkbox"/> <input type="checkbox"/> 1.2 Provide UML Profile for UAF	The Standard shall define a normative UML profile for UAF. The profile shall inherit SysML V1.7 stereotypes, to the fullest extent possible. The profile shall provide: A. A list of stereotypes and relationships between them, tag definitions, and constraints. B. Mapping between UAF profile stereotypes and UAF Metamodel concepts.	It is questionable if we are to provide one. We need to see if SysML V2 is going to provide the profile to keep consistency
4	<input type="checkbox"/> <input type="checkbox"/> 1.12 Provide SysML V2 Model Library for UAF	The Standard shall define a normative SysML V2 Model Library for UAF. The library shall provide: A. A list of elements and relationships between them, properties, and constraints. B. Mapping between elements in the model library and UAF Metamodel concepts.	
5	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1.3 Architecture Modeling Support for Defense Organizations	The standard shall provide the ability to represent an internally consistent common core of artifacts for a set of defined viewpoints that support Defense Organizations' modeling needs. Proposals shall provide the ability to represent viewpoints defined in DoDAF and NAF.	
6	<input type="checkbox"/> <input type="checkbox"/> 1.3.1 DOD Support	The standard shall support DOD needs for mission engineering, Joint Architectures for Capabilities, and Systems (JACS), and Joint Capabilities Integration and Development System.	
7	<input type="checkbox"/> <input type="checkbox"/> 1.3.2 NATO Support	The standard shall support NATO needs for building NAF compliant architectures.	
8	<input type="checkbox"/> <input type="checkbox"/> 1.4 Enable the Expression Of Business Process Models	The standard shall utilize the BPMN syntax and semantics to enable the expression of business process models. This requirement shall be met using the UML Profile for BPMN standard. The elements appearing on a business process model shall be integrated and constitute part of the Architecture Description (AD). [Note]: This requirement applies to implementation of UAF meta model based on UML Profile for UAF only.	Critical show stopper with SysML V2.
9	<input type="checkbox"/> <input type="checkbox"/> 1.5 Use of SysML Parametrics Elements and Diagrams Mapped to Measurements	The standard shall provide the ability to use SysML Parametrics, Elements and Diagrams to specify mathematical constraints on the structural elements of an AD. These elements shall be reflected in the UAF V2 views and constituent models.	



DoD AFW History



Legend:

UAF	Unified Architecture Framework
UPDM	Unified Profile for DoDAF and MODAF
TOGAF	The Open Group Architecture Framework
IDEAS	International Defence Enterprise Architecture Specification
DoDAF	DoD Architecture Framework
MBSE	Model Based Systems Engineering
CADM	Core Architecture Data Model

UAF V2 ROADMAP

UAF V2 Roadmap

Kick-off UAF SST

Submit RFC when SysML V2 is finalized as a new OMG specification

Stop maintaining UAF 1.x right after UAF 2 RFC is accepted by the AB

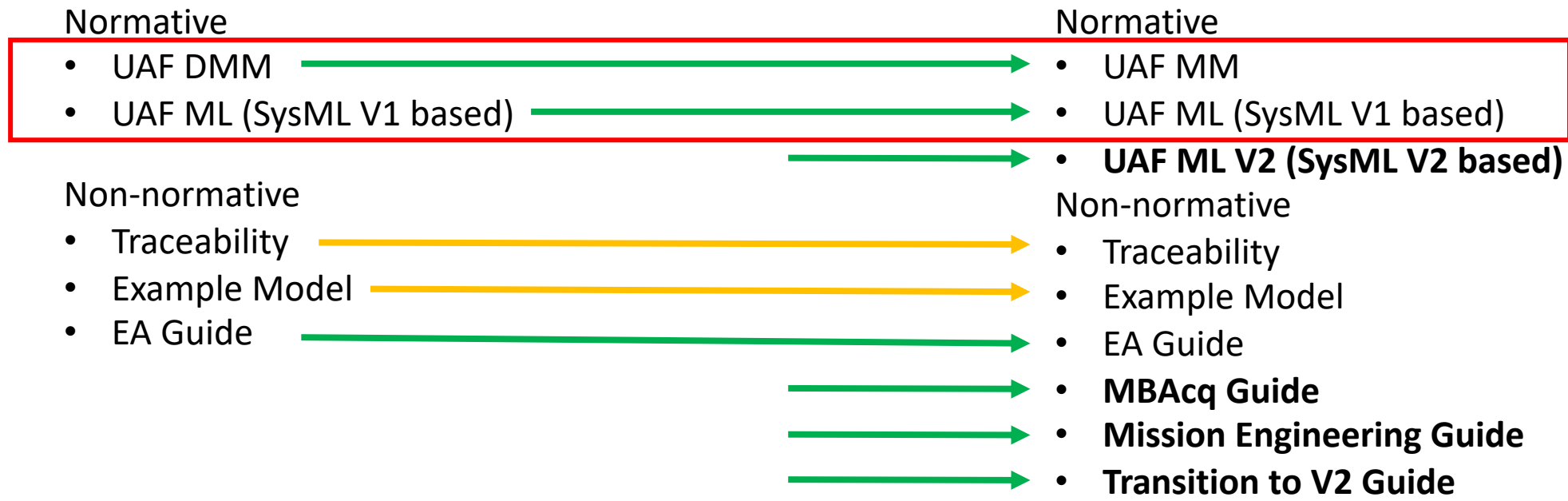
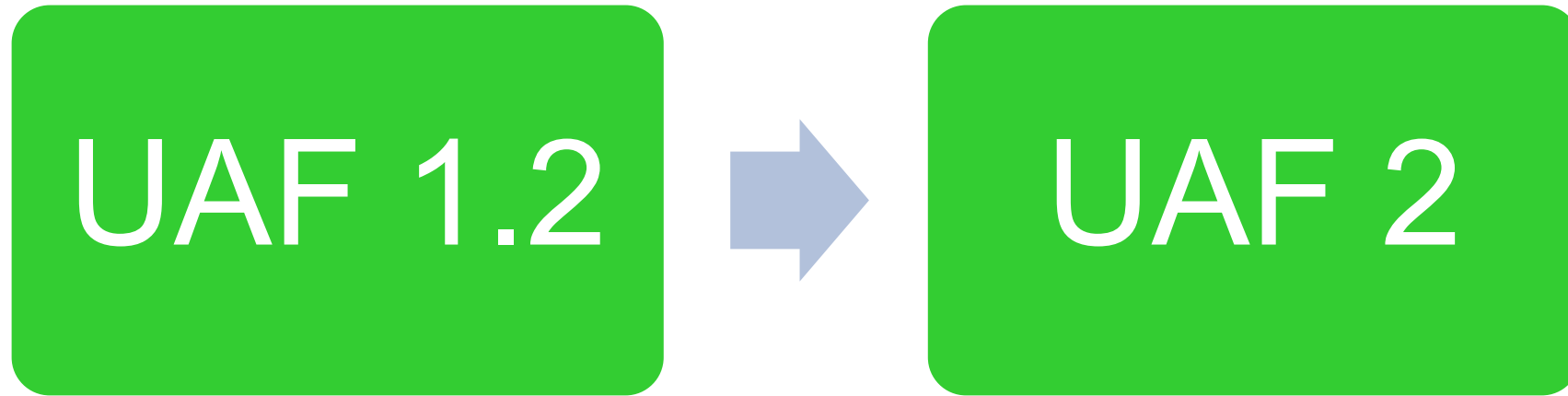
Overhead in terms of resources

Risk of one deviating far from another. UAF V2 should supersede UAF 1.x completely

Provide continues support of SysML V1.x based UAFML implementation under the umbrella of UAF V2.

Submit V2 for ISO update

Transition Plan



Transition Plan



Normative

- UAF MM
- UAF ML (SysML V1 based)
- UAF ML V2 (SysML V2 based)

Normative

- UAF V2.x/3 (SysML V2 based)
- UAF API



Areas of Improvement

Mission Engineering

Addition of Use Cases

Services Modeling Improvements

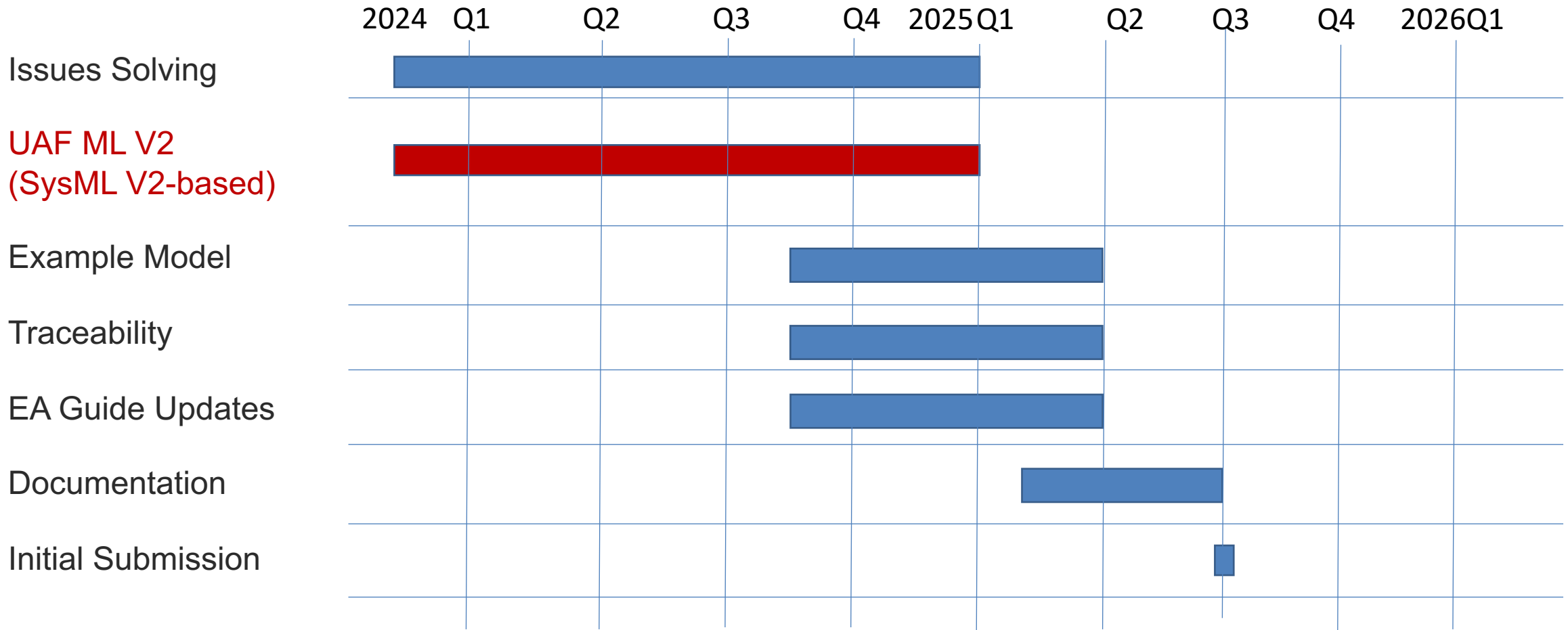
Portfolio concept

Architecture vs. Configuration

Revisit Value Streams

Model-based Acquisition Support

Timeline



UAF V2 IMPLEMENTATION IN SYSML V2

Why SysML V2?



Increase adoption and effectiveness of MBSE with SysML by enhancing...

- Precision and expressiveness of the language
- Consistency and integration among language concepts
- Interoperability with other engineering models and tools
- Usability by model developers and consumers
- Extensibility to support domain specific applications
- Migration path for SysML v1 users and implementors
- Comparing SysML v2 with SysML v1

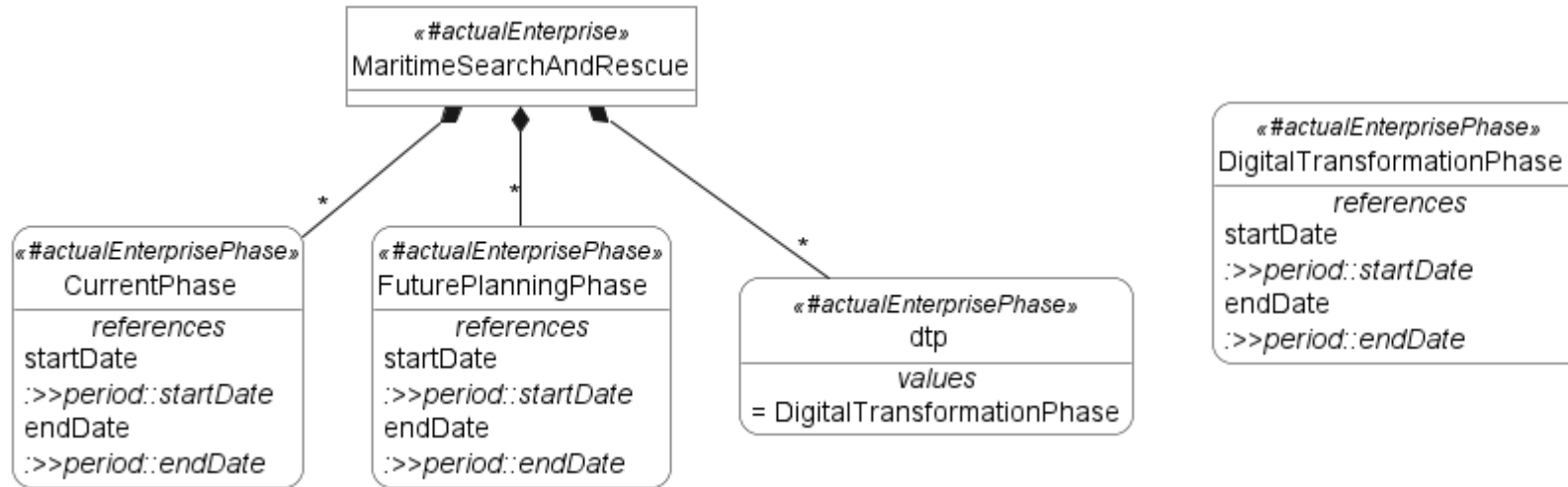
Simpler to learn and use

- More precise
- More expressive
- More extensible
- More interoperable

Current Status

- Established working group focusing on SysML V2 based implementation only (UAF V2 SST)
- Working closely aligned with SysML V2 team
- Reasearching if SysML V2 can address all UAF V2 needs (so far so good)
- Use combined library and metadata approach
- Develop UAF V2 libraries

Example: Actual Enterprise Phases



```

individual #actualEnterprise def MaritimeSearchAndRescue :> SAREntrprise{
  timeslice #actualEnterprisePhase CurrentPhase:>>SARPhase {
    :>>startDate {:>> val = "2022-12-12T12:30:24Z";}
    :>>endDate {:>> val = "2024-12-31T12:30:24Z";}
  }
  timeslice #actualEnterprisePhaseFuturePlanningPhase:>>SARPhase {
    :>>startDate {:>> val = "2025-01-01T12:30:24Z";}
    :>>endDate {:>> val = "2027-12-31T12:30:24Z";}
  }
  timeslice #actualEnterprisePhase dtp:>>SARPhase =
  DigitalTransformationPhase;}
  
```

SUMMARY

UAF is an enabler for **NAF** and **DoDAF**

and

alternatively it is a **STAND ALONE** framework to support a wide variety of architectures in different industries

which

Incorporates the best practices of MBSE

and

Evolves taking into account user feedback

More on UAF

Intro to UAF



https://youtu.be/AWJk_7KtQ0w

<https://www.brighttalk.com/search/?q=UAF>

DAU MBACq Recording

Let's Be Modular and Open Webinar – Model Based Systems Engineering In Acquisition-20230209

Welcome to the Let's Be Modular and Open series

- Mics: Audio will be muted throughout the session
- Recording: This session will be recorded and posted on the event page
- Questions: Please submit questions via chat
- Survey: Link will be provided in chat and posted on event page
- CLPs: Each session qualifies for 1.0 CLPs.

Dial in (audio only) number:
1-571-403-9146, Conference ID: 872 690 282#

The session Link (~30 min presentation and 30 min Q&A) :
<https://www.dau.edu/event/Lets-Be-Modular-and-Open-Webinar-Model-Based-Systems-Engineering-In-Acquisition>



Unified Architecture Framework (UAF)

<https://www.linkedin.com/groups/8878655/>





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Thank you!

Are you too busy to improve?

