

# Systems Engineering Transformation Surrogate Pilot Experiments: Doing Everything in Models to Demonstrate the Art-of-the-Possible

**Sponsor: NAVAIR and CCDC-AC**

**By**

**Dr. Mark Blackburn**

**11<sup>th</sup> Annual SERC Sponsor Research Review**

**November 19, 2019**

**FHI 360 CONFERENCE CENTER**

**1825 Connecticut Avenue NW, 8<sup>th</sup> Floor**

**Washington, DC 20009**

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- NAVAIR characterized the Systems Engineering Transformation (SET) Framework for a Digital Engineering (DE)-enabled acquisition. This presentation discusses the Surrogate Pilot use cases, models and lessons learned in assessing the SET Framework for collaboration between government and industry.
- This is an evolving version of a briefing that summarizes the Systems Engineering Transformation (SET) Surrogate Experiments. It provides an overview to set the context of the SET Framework concept and Functional Areas. Research is one of the functional areas that was defined along with an evolving set of objectives that are being used to guide the experiments, and trace the results to the objectives.
- These experiments are being conducted by a team of NAVAIR Subject Matter Experts, SERC Collaborators from Stevens Institute and Georgia Tech, and a Surrogate Contractor from Altair. The ongoing results and lessons learned are captured on the All Partners Network (APAN.org @ <https://community.apan.org/wg/navair-set/set-surrogate-pilot/>) and being shared with Industry and Government.
- This briefing is Distribution A.

RT-48	RT-168 – Phase I & II	RT-195	ART-002
Mark Blackburn (PI), Stevens	Mark Blackburn (PI), Stevens	Mark Blackburn (PI), Stevens	Mark Blackburn (PI), Stevens
Rob Cloutier (Co-PI) - Stevens	Dinesh Verma (Co-PI) – Stevens	Mary Bone - Stevens	Dinesh Verma (Co-PI) – Stevens
Eirik Hole - Stevens	Ralph Giffin	Ralph Giffin - Stevens	Kunal Batra – Stevens
Gary Witus – Wayne State	Roger Blake - Stevens	Benjamin Kruse - Stevens	Mary Bone - Stevens
RT-118	Mary Bone – Stevens	Russell Peak – Georgia Tech.	John Dzielski, Stevens
Mark Blackburn (PI), Stevens	Andrew Dawson – Stevens (Phase I)	Stephen Edwards – Georgia Tech.	Steven Hoffenson - Stevens
Rob Cloutier - Stevens	Rick Dove	Adam Baker (Grad) – Georgia Tech.	Steve Hespelt - Stevens
Eirik Hole - Stevens	John Dzielski, Stevens	Marlin Ballard (Grad) – Georgia Tech.	Roger Jones - Stevens
Gary Witus – Wayne State	Paul Grogan - Stevens	Donna Rhodes - MIT	Benjamin Kruse - Stevens
RT-141	Deva Henry – Stevens (Phase I)	Mark Austin – Univ. Maryland	Chris Snyder - Stevens
Mark Blackburn (PI), Stevens	Bob Hathaway - Stevens	Maria Coelho (Grad) – Univ. Maryland	Brian Chell (Grad) – Univ. Maryland
Mary Bone - Stevens	Steven Hoffenson - Stevens	WRT-1008	Ian Grosse – Univ. of Massachusetts
Gary Witus – Wayne State	Eirik Hole - Stevens	Mark Blackburn (PI), Stevens	Tom Hagedorn – Univ. of Massachusetts
RT-157	Roger Jones – Stevens	Mary Bone - Stevens	
Mark Blackburn (PI), Stevens	Benjamin Kruse - Stevens	Benjamin Kruse - Stevens	
Mary Bone - Stevens	Jeff McDonald – Stevens (Phase I)	Bill Rouse – Stevens/Georgetown	
Roger Blake - Stevens	Kishore Pochiraju – Stevens	Russell Peak – Georgia Tech.	
Mark Austin – Univ. Maryland	Chris Snyder - Stevens	Selcuk Cimentalay – Georgia Tech.	
Leonard Petnga – Univ. of Maryland	Gregg Vesonder – Stevens (Phase I)	Marlin Ballard (Grad) – Georgia Tech.	
RT-170	Lu Xiao – Stevens (Phase I)	Alanna Carnevale (Grad) – Georgia Tech.	
Mark Blackburn (PI), Stevens	Brian Chell (Grad) – Stevens	William Stock (Grad) – Georgia Tech.	
Mary Bone - Stevens	Luigi Ballarinni (Grad) – Stevens	Donna Rhodes - MIT	
Deva Henry - Stevens	Harsh Kevadia (Grad) – Stevens	Mark Austin – Univ. Maryland	
Paul Grogan - Stevens	Kunal Batra (Grad) – Stevens	Maria Coelho (Grad) – Univ. Maryland	
Steven Hoffenson - Stevens	Khushali Dave (Grad) – Stevens		
Mark Austin – Univ. of Maryland	Rob Cloutier – Visiting Professor		
Leonard Petnga – Univ. of Maryland	Robin Dillon-Merrill – Georgetown Univ.		
Maria Coelho (Grad) – Univ. of Maryland	Ian Grosse – Univ. of Massachusetts		
Russell Peak – Georgia Tech.	Tom Hagedorn – Univ. of Massachusetts		
Stephen Edwards – Georgia Tech.	Todd Richmond – Univ. of Southern California (Phase I)		
Adam Baker (Grad) – Georgia Tech.	Edgar Evangelista – Univ. of Southern California (Phase I)		
Marlin Ballard (Grad) – Georgia Tech.			

- WHAT: Context and Scope of NAVAIR SE Transformation
- HOW: Use Evolving Surrogate Pilot and Experiments to Demonstrate Art-of-the-Possible
- HOW: Transformation Elements Moving from Documents to Models
- HOW: Phase II Objectives (FY19) Aligns with SE Transformation (SET) Priorities
- HOW WELL: Contributing Modeling Examples to Support Workforce Development demonstrating Art-of-the-Possible



# **WHAT: Context and Scope of NAVAIR SE Transformation**

## **Research in the Context of Surrogate Pilot Experiments**

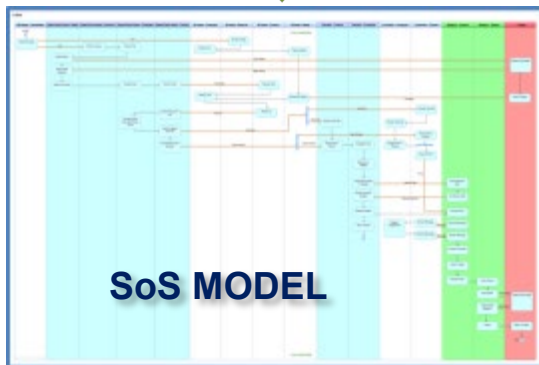
# Capability Based Acquisition - Outpacing the Threat

## Digital Thread enables rapid delivery of Integrated Capabilities

### Integration and Interoperability (I&I)

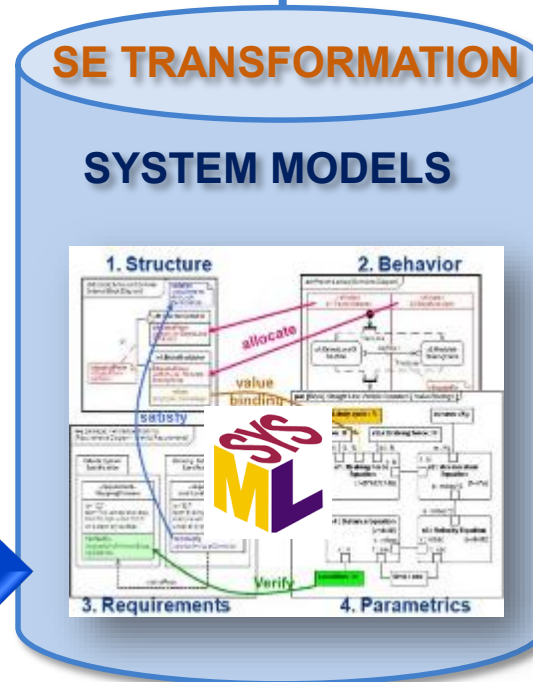


Integrated Warfare Analysis establishes CONEMPS and Effects-Chains

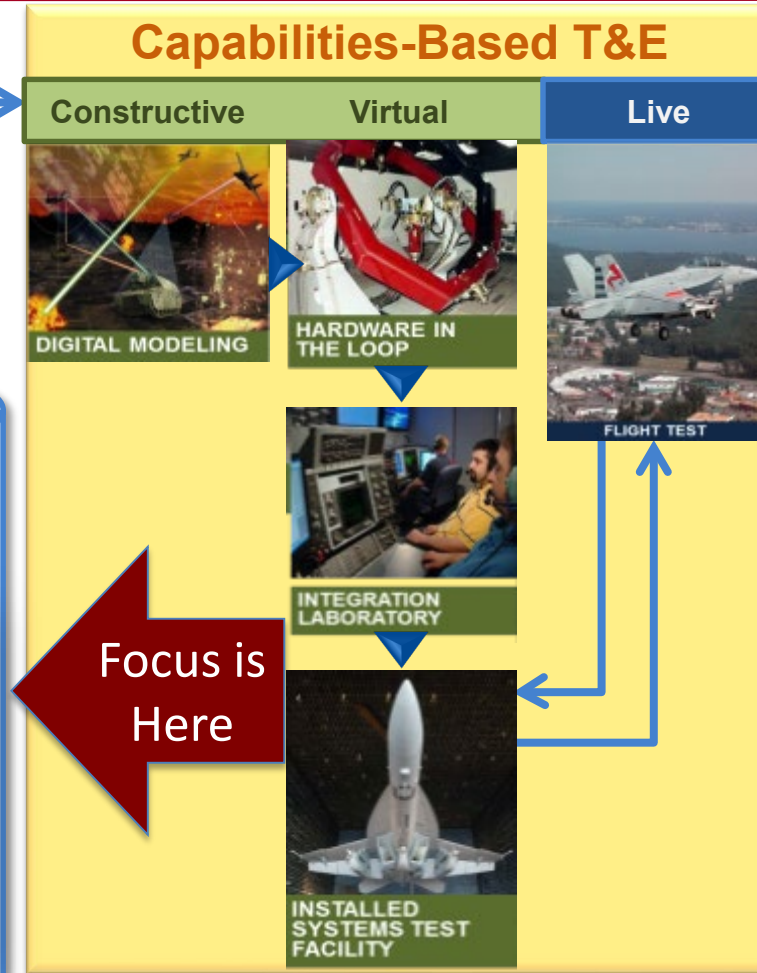


CONEMPS and Effects Chains are modeled at the System of Systems (SoS) level

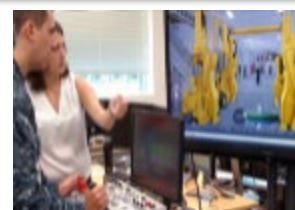
System models form "Constructive" basis for LVC M&S environment



Systems are developed in a Model-Based environment



Focus is Here

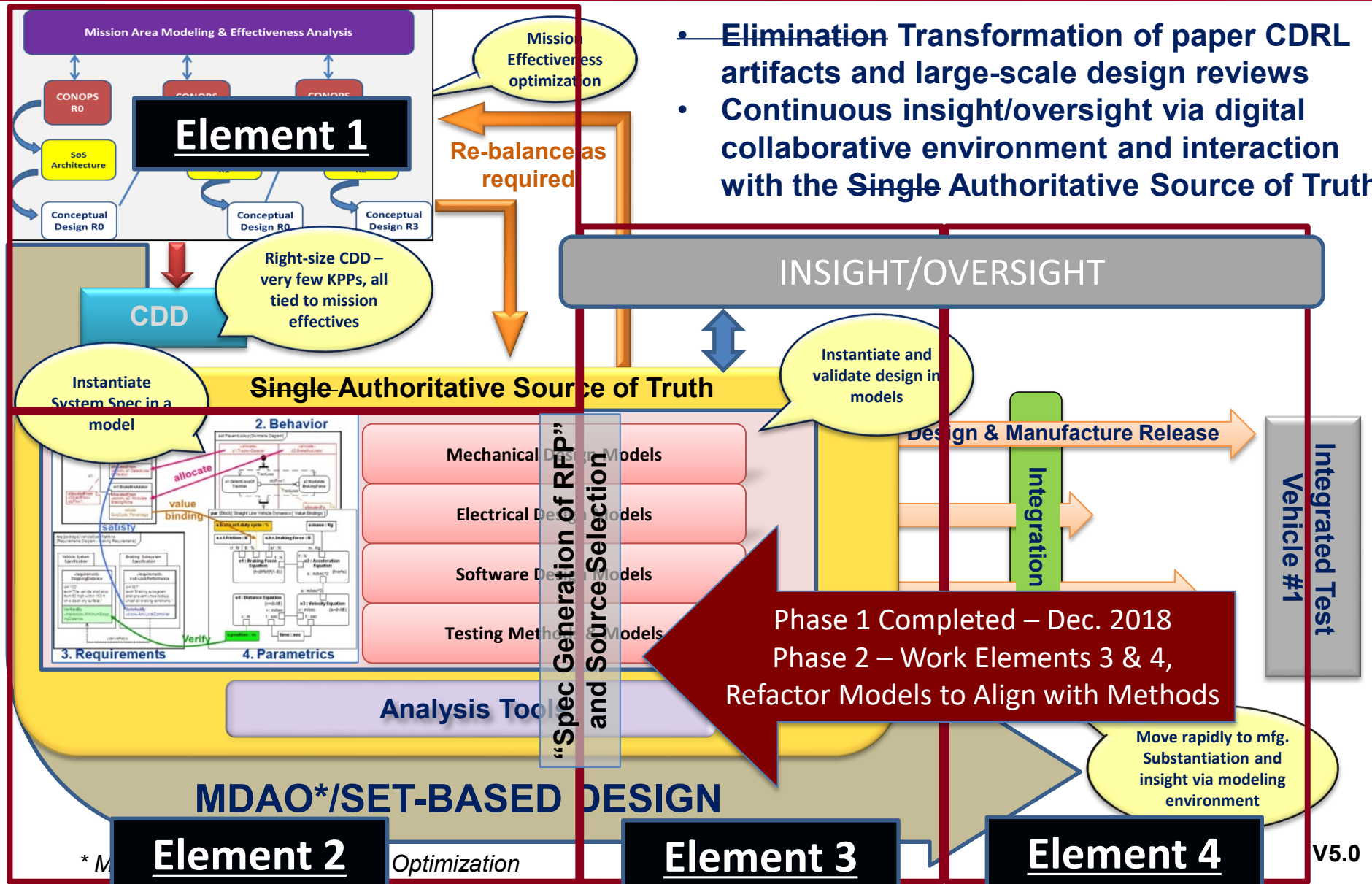


LVC-based Training maximizes Fleet proficiency



# Surrogate Pilot focus is on Characterizing, Assessing, and Refining SET Framework for Model-Based Acquisition

SET Framework Concept Initially Rolled Out 2016

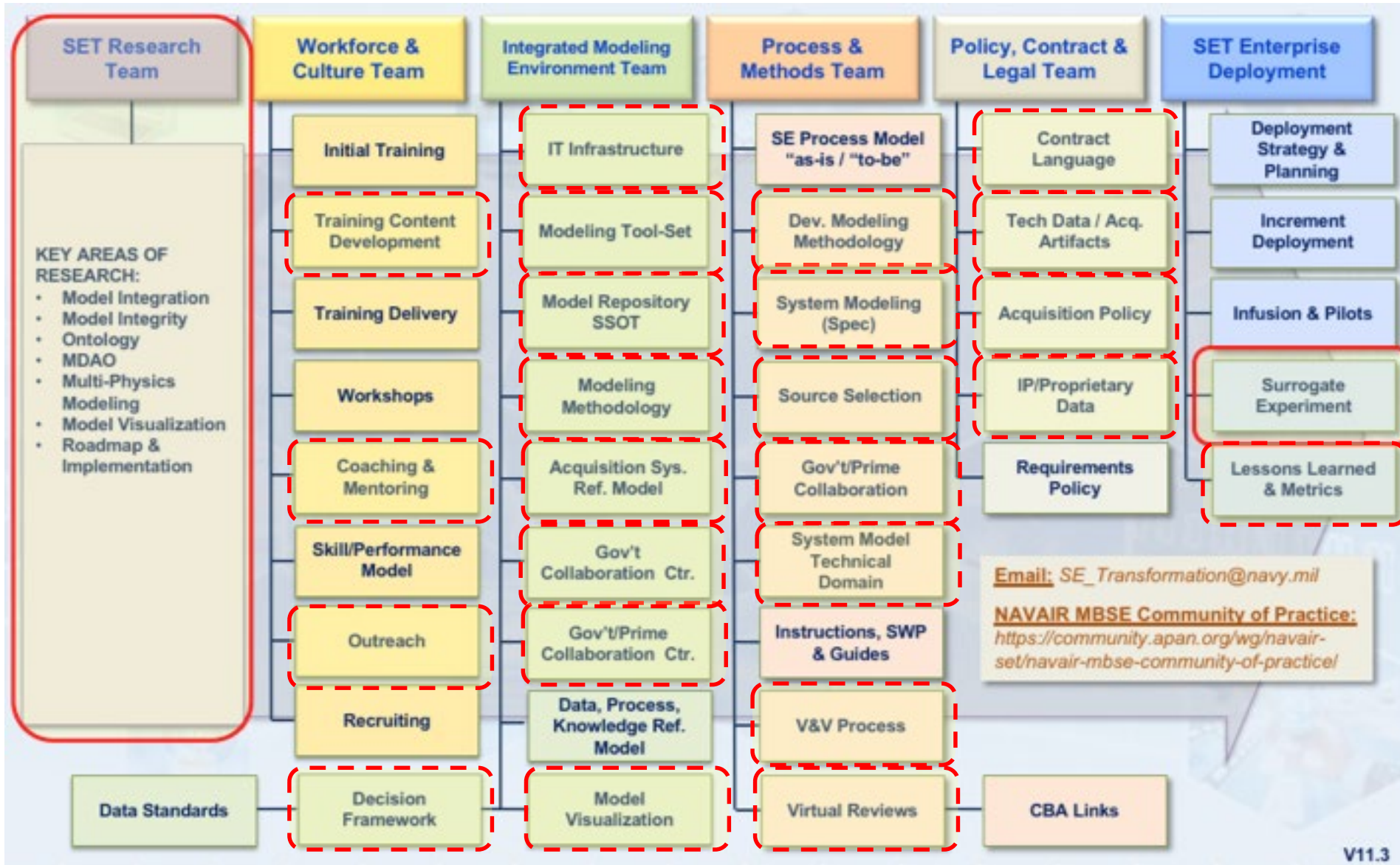


- ~~Elimination~~ Transformation of paper CDRL artifacts and large-scale design reviews
- Continuous insight/oversight via digital collaborative environment and interaction with the **Single Authoritative Source of Truth**

CDRL: Contract Data Requirements List



# Research and Surrogate Experiment contributes broadly to SET Functional Areas



## **HOW:**

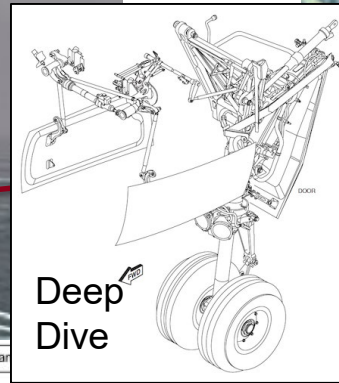
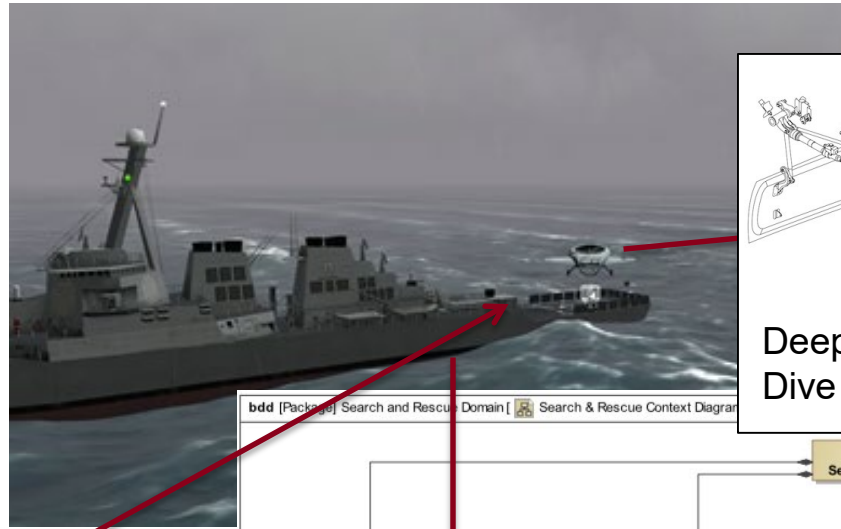
# **Use Evolving Surrogate Pilot and Experiments to Demonstrate Art-of-the-Possible**

- **Doing “Everything” in Models to show we can**
- **Operating in a Collaborative Environment**
- **Using an Authoritative Source of Truth**

# Surrogate Pilot Scenario: Skyzer UAS & Launch and Recovery for Landing Gear Deep Dive

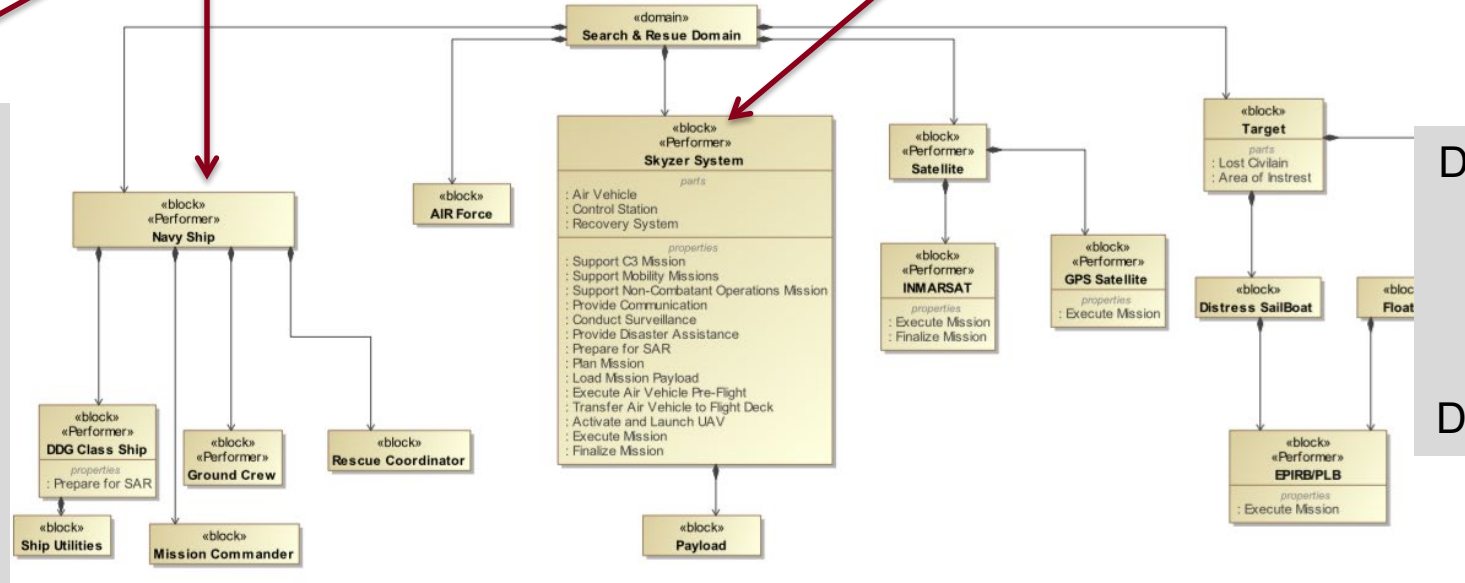
Graphical CONOPS Scenario:  
Search & Rescue

Performance constraints force Multi-physics  
Design considerations - similar to Bell Eagle Eye



bdd [Package] Search and Rescue Domain [ ] Search & Rescue Context Diagram

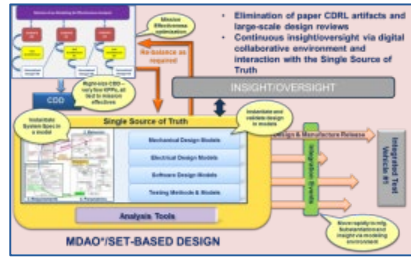
Phase II is adding ship-based Launch and Recovery Capability & Deep Dive supports Airworthiness Use Case



Descriptive Model (e.g., SysML) replace Documents

Skyzer System & Mission Models developed using SysML

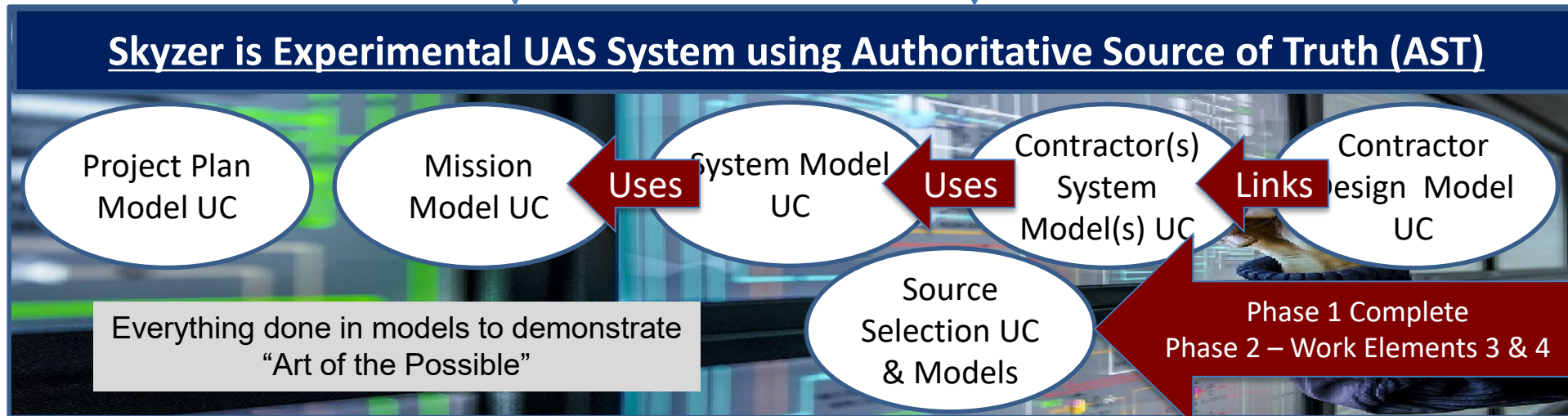




Assess SE Framework Concept



We are Collaborating in AST

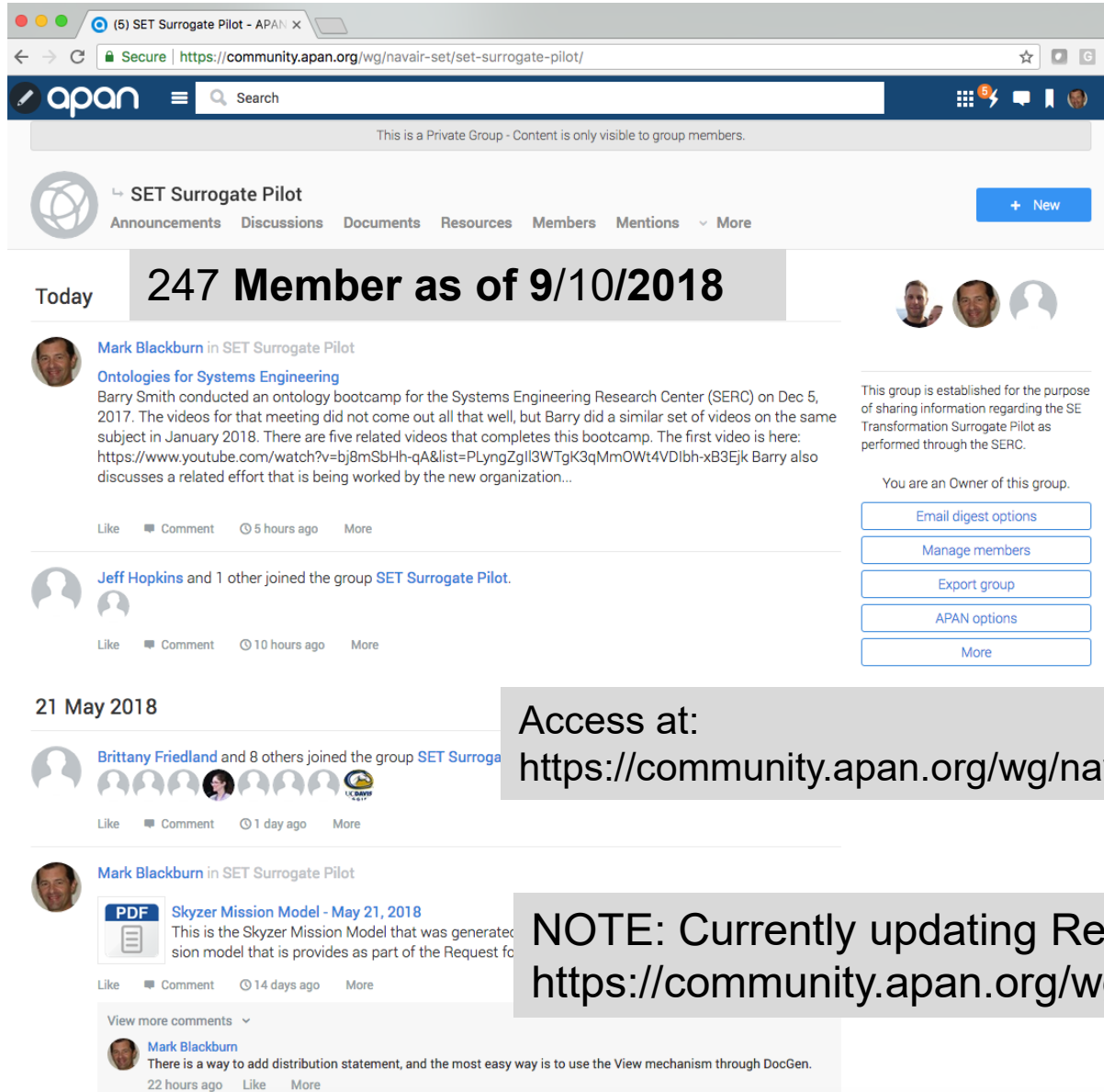


Mission Models  
System Models  
SOW Models  
Evaluation Model  
Based on Standards



Proposal for Design Models focused to demonstrate aspects for Producability Decisions involving **Multi-physics**

GFI:  
Government  
Furnished  
Information



(5) SET Surrogate Pilot - APAN x

Secure | <https://community.apan.org/wg/navair-set/set-surrogate-pilot/>

apan Search

This is a Private Group - Content is only visible to group members.

SET Surrogate Pilot

Announcements Discussions Documents Resources Members Mentions More

+ New

Today **247 Member as of 9/10/2018**

Mark Blackburn in SET Surrogate Pilot

**Ontologies for Systems Engineering**

Barry Smith conducted an ontology bootcamp for the Systems Engineering Research Center (SERC) on Dec 5, 2017. The videos for that meeting did not come out all that well, but Barry did a similar set of videos on the same subject in January 2018. There are five related videos that completes this bootcamp. The first video is here: <https://www.youtube.com/watch?v=bj8mSbHh-qA&list=PLyngZgI3WTgK3qMmOWt4VDIbh-xB3Ejk> Barry also discusses a related effort that is being worked by the new organization...

This group is established for the purpose of sharing information regarding the SE Transformation Surrogate Pilot as performed through the SERC.

You are an Owner of this group.

Email digest options

Manage members

Export group

APAN options

More

Like Comment 5 hours ago More

Jeff Hopkins and 1 other joined the group SET Surrogate Pilot.

Like Comment 10 hours ago More

21 May 2018

Brittany Friedland and 8 others joined the group SET Surrogate Pilot.

Like Comment 1 day ago More

Mark Blackburn in SET Surrogate Pilot

**Skyzer Mission Model - May 21, 2018**

This is the Skyzer Mission Model that was generated for the Request for Information (RFI) mission model that is provided as part of the Request for Information (RFI)...

Like Comment 14 days ago More

View more comments

Mark Blackburn

There is a way to add distribution statement, and the most easy way is to use the View mechanism through DocGen.

22 hours ago Like More

- Briefings
- Videos
- Models
- Discussion threads
- Instructs to see models on AWS

Access at:

<https://community.apan.org/wg/navair-set/set-surrogate-pilot/>

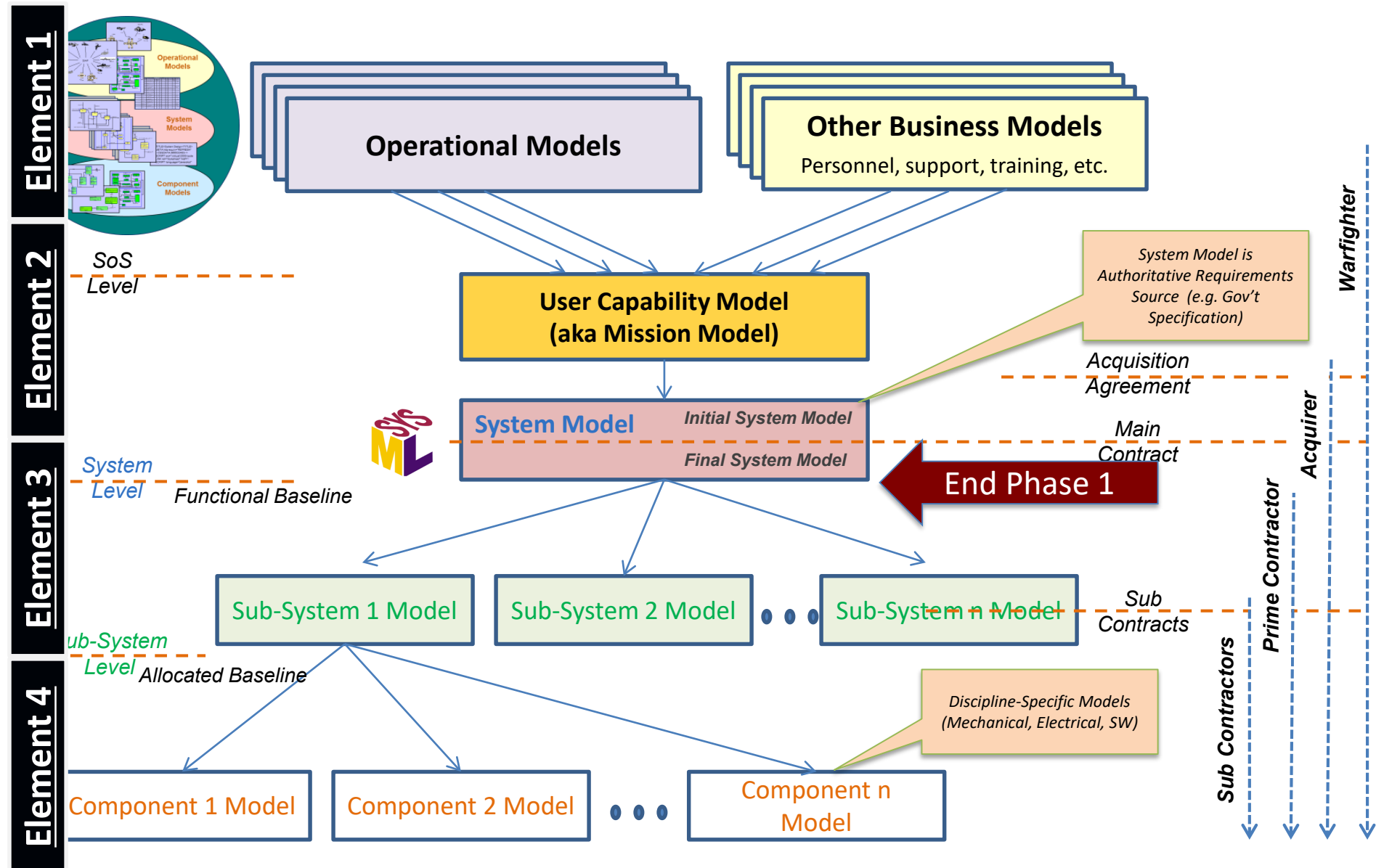
NOTE: Currently updating Research Group for Phase II  
<https://community.apan.org/wg/navair-set/research/>

## HOW: Transformation Elements Moving from Documents to Models

- **Developing/demonstrating Methods for Mission and System models**
- **Using models collaboratively in Authoritative Source of Truth**
- **Using OpenMBEE/DocGen to Generate Views for Stakeholder and Discipline-Specific Subject Matter Experts**

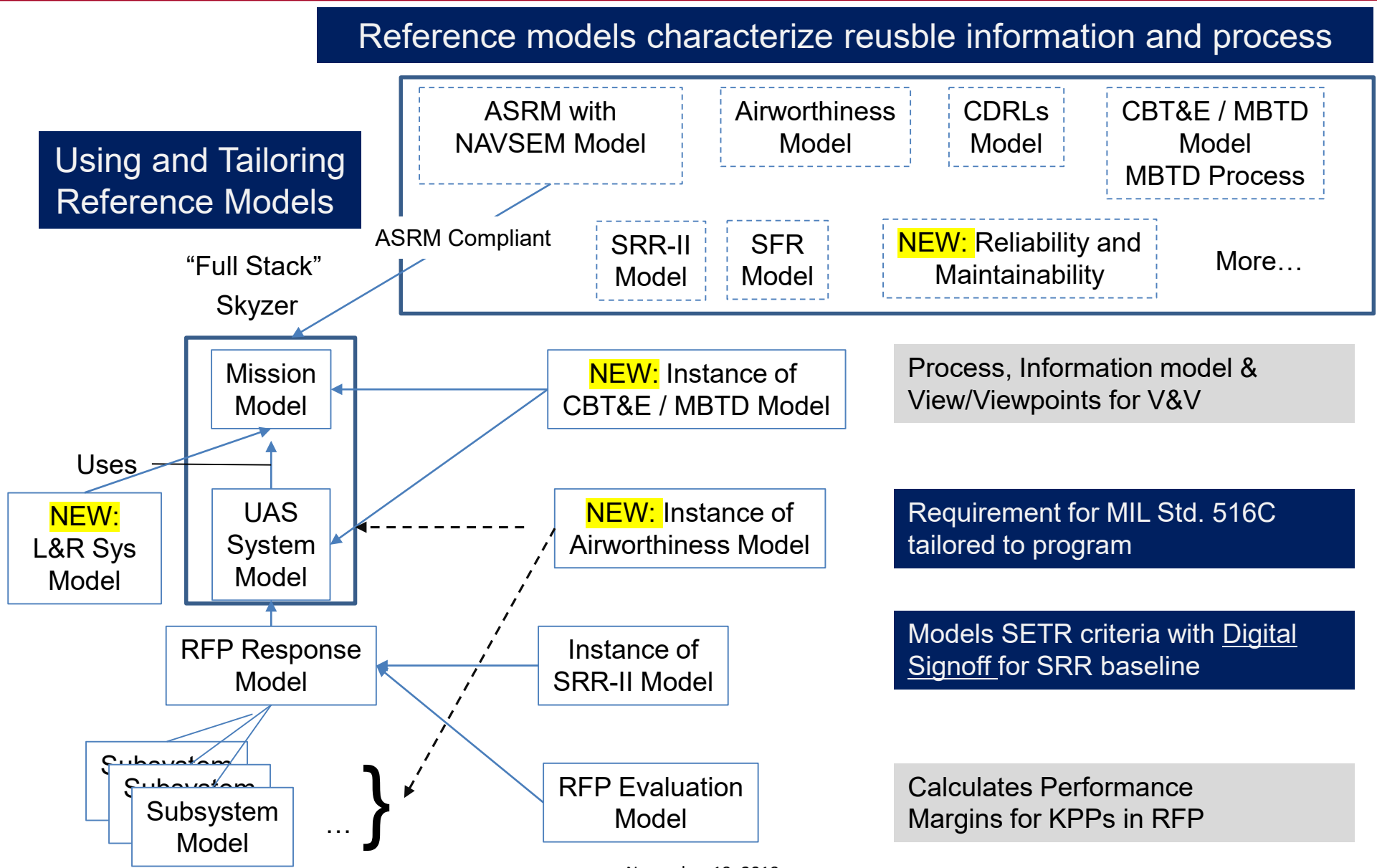
# Skyzer Demonstrates Formalizing the Use of Models and Methods for the SET Framework Elements

Phase II focused on Elements 3 & 4 of SET Framework: How to reduce time by using models to better understand a maturing design

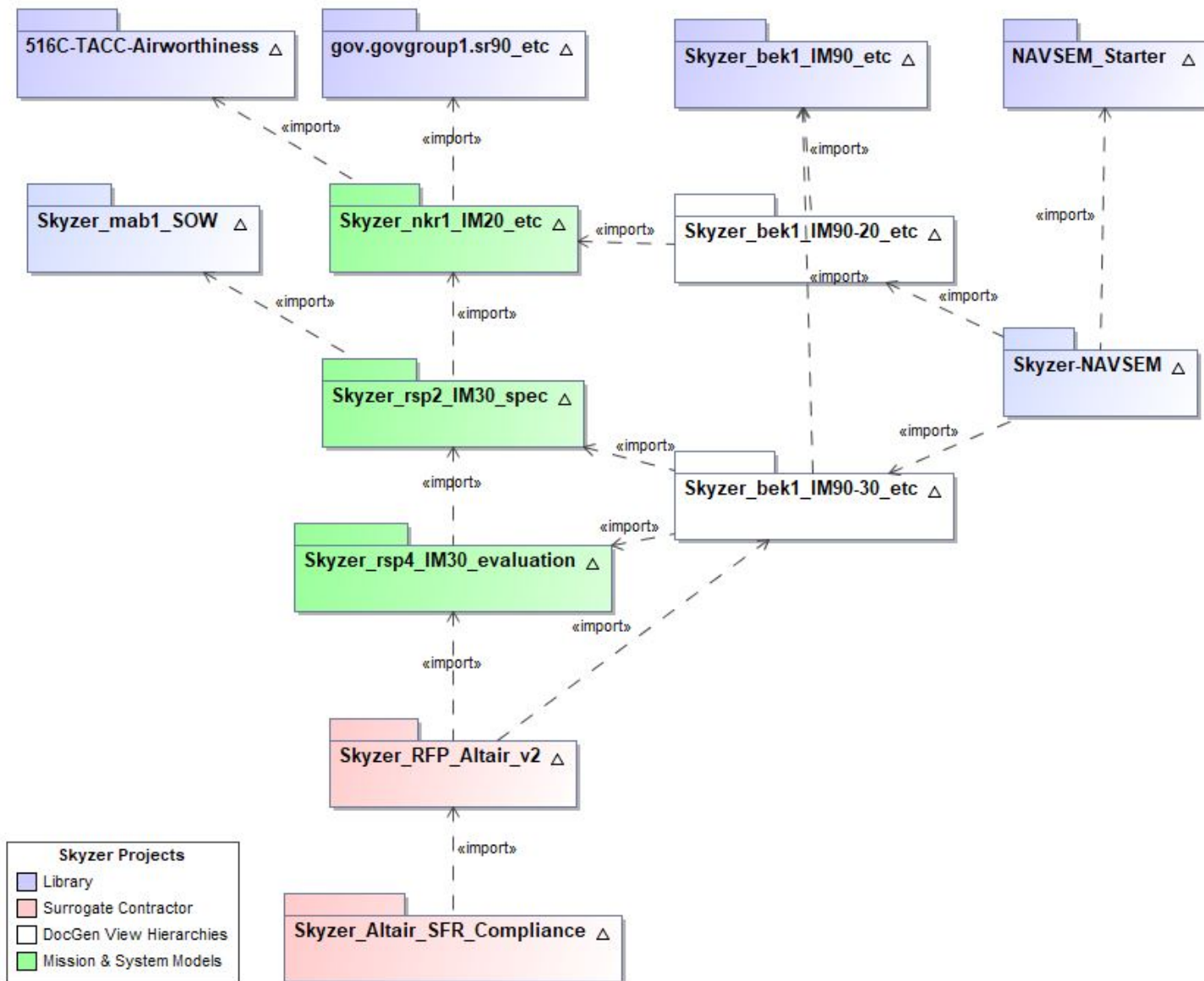




# “Full Stack” of Models using Digital Signoff for Transformed SETR Criteria Represented in a Model

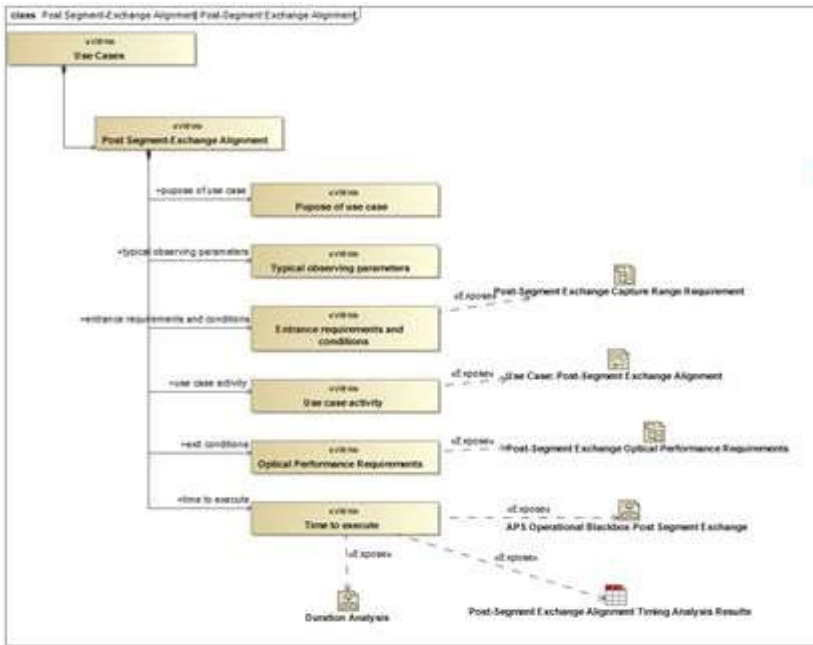


## All Models Linked to Establish Authoritative Source of Truth

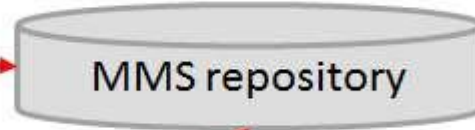


# Leverage Capabilities of OpenMBEE as Part of Integrated Modeling Environment

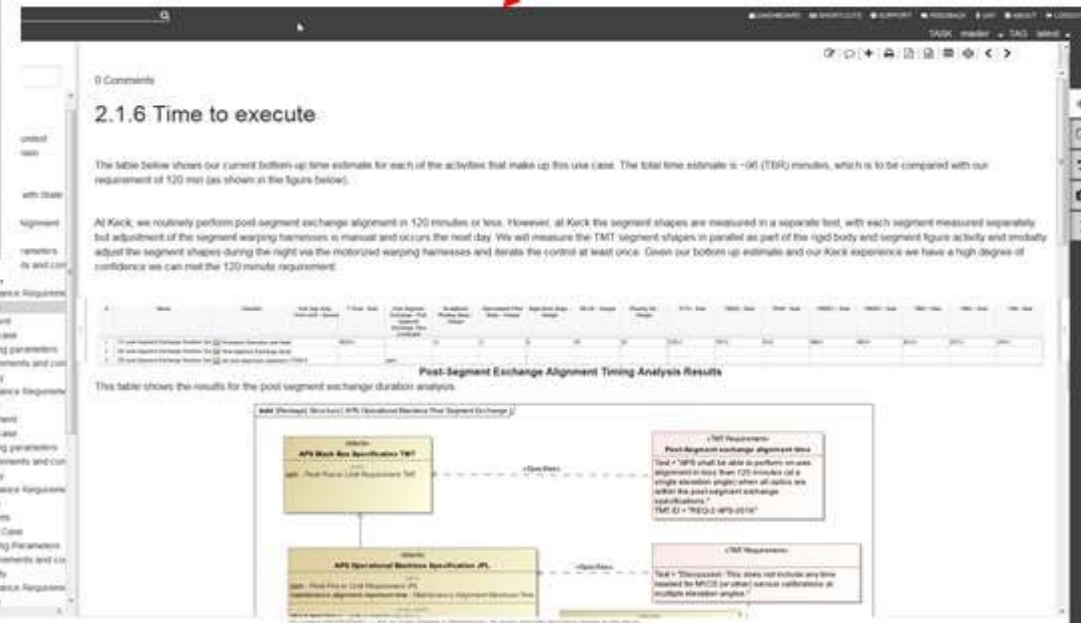
## Model Development Kit/DocGen View and Viewpoint Hierarchy



Model Management System

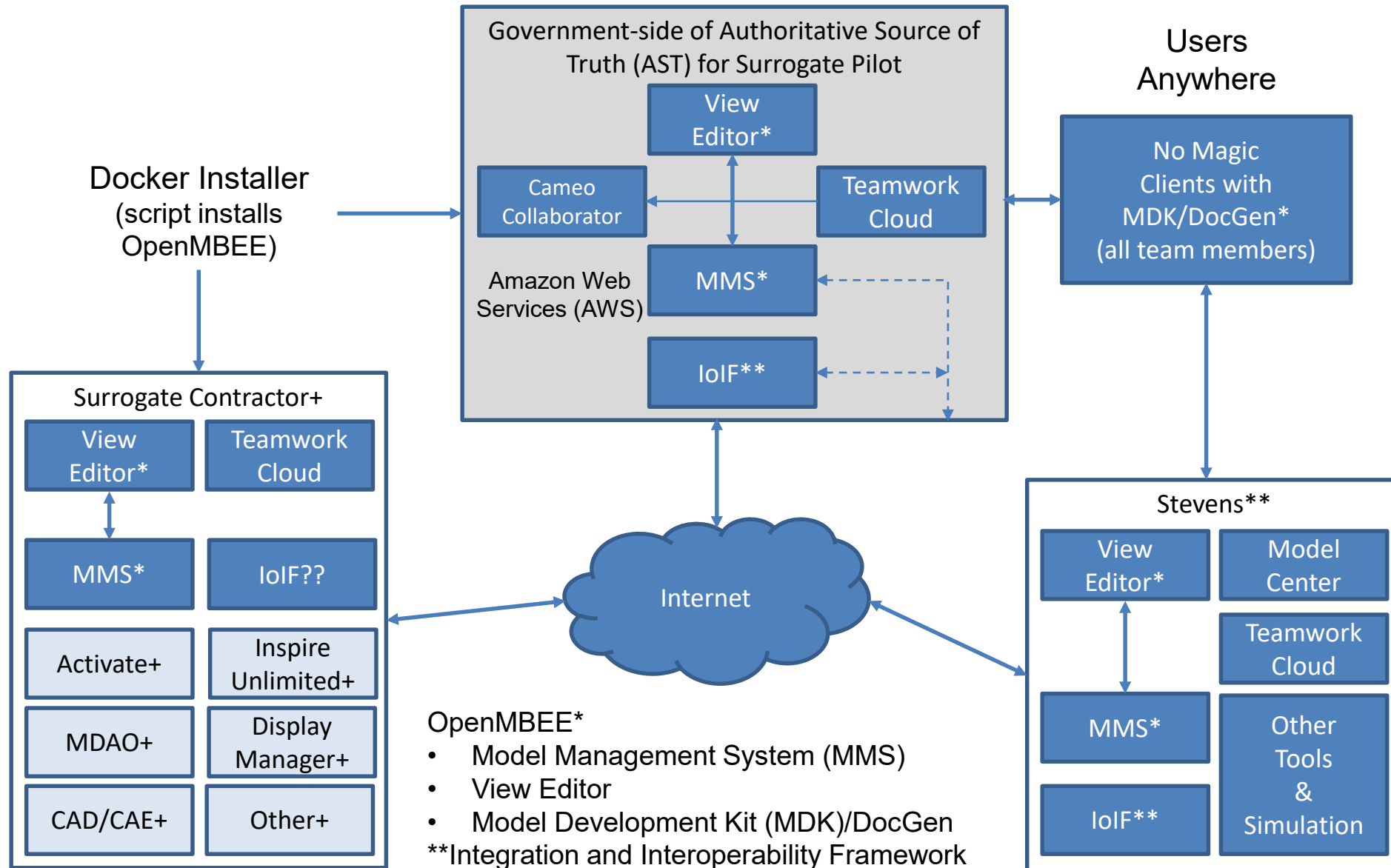


View Editor

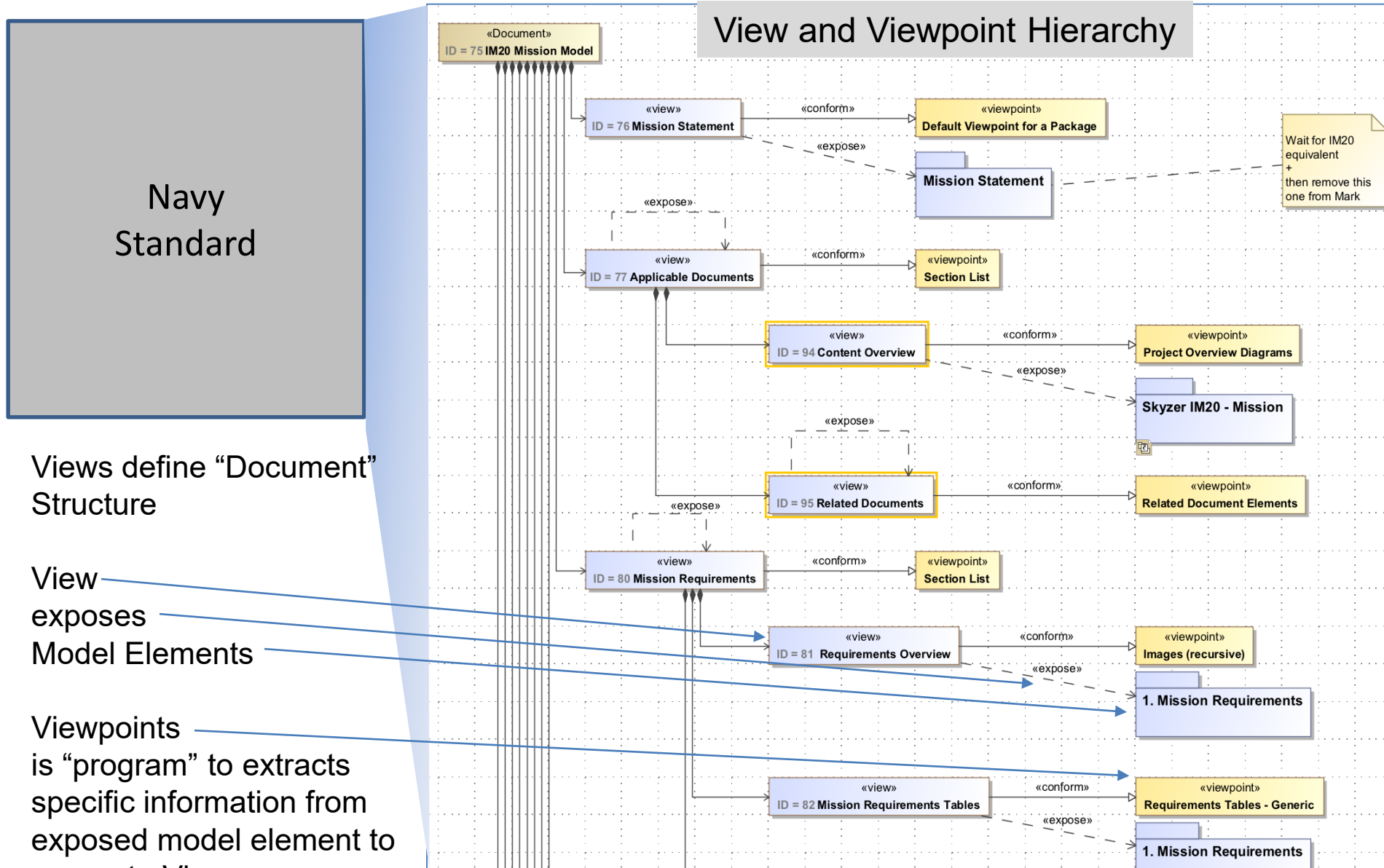


Visualization in View Editor (allows edits to be pushed back into model)

# Elements of Authoritative Source of Truth



# Example View and Viewpoint Hierarchy Used by DocGen



Navy Standard

Views define "Document" Structure

View exposes Model Elements

Viewpoints is "program" to extracts specific information from exposed model element to generate View

# Example: View Editor shows Skyzer Mission Model View

VE Surrogate Pilot [Switch Org](#)
Search selected project
UAT Help

Project: Skyzer\_bek1\_IM90-20\_etc
Skyzer IM20 Mission Model
Branch: master

Filter items in the tree

- ▼ Skyzer IM20 Mission Model
  - ▶ 1 Mission Statement
  - ▶ 2 Applicable Documents
  - ▼ 3 Requirements
    - 3.1 Requirements Overview
    - ▶ 3.2 Mission Requirements
    - ▶ 3.3 Operational Requirements
    - ▶ 3.4 Functional Requirements
    - ▶ 3.5 Performance Requirement
    - ▶ 3.6 Design Constraints
    - ▶ 3.7 Key Performance Paramet
    - ▶ 3.8 Mission Requirements Tra
  - ▶ 4 Mission Structure
  - ▶ 5 Mission Use Cases
  - ▶ 6 Mission Behavior
  - ▶ 7 Mission Parametrics
  - ▶ 8 Mission Interface Definitions
  - ▶ 9 Skyzer UAV
  - ▶ 10 Ground Station
  - ▶ 11 Support Elements

DOCLIB
EXPORT

## 3.5 Performance Requirements

#	Id	Name	Text	requirementKind
1	1.3.2	1.3.2 Cruise Speed	The UAV shall have a cruise speed of 170 knots	KPP
2	1.3.3	1.3.3 Max Payload Weight	The mission payload shall be not less than 200 lbs total in four individually deployable segments 50 lb or more.	KPP
3	1.3.7	1.3.7 UAV Operation Period	The system shall have minimum endurance of 4 hr loiter at 50 nm radius	KPP
4	1.3.4	1.3.4 Operational Radius	The Skyzer UAV shall have and operational radius of 200nm while sustaining cruise speed, carrying at least 100 lb of payload and hovering 15 minutes at the turn around point.	KPP
5	1.3.5	1.3.5 Recovery Condition	The Skyzer UAV shall be able to be recovered with at least 30% remaining fuel weight and at least 200 lb of payload.	KPP
6	1.3.1	1.3.1 Max Speed	The UAV shall have a max speed of 200 knots	
7	1.3.6	1.3.6 Operational Altitude	The Skyzer UAV shall be able to fly at an altitude of at least 15,000 ft. while maintaining minimum maneuverability requirements.	

### 1.3 Performance Requirements

(No Text)

Max Speed

ID:

1.3.1

Text:

The UAV shall have a max speed of 200 knots

Stereotype:

performanceRequirement

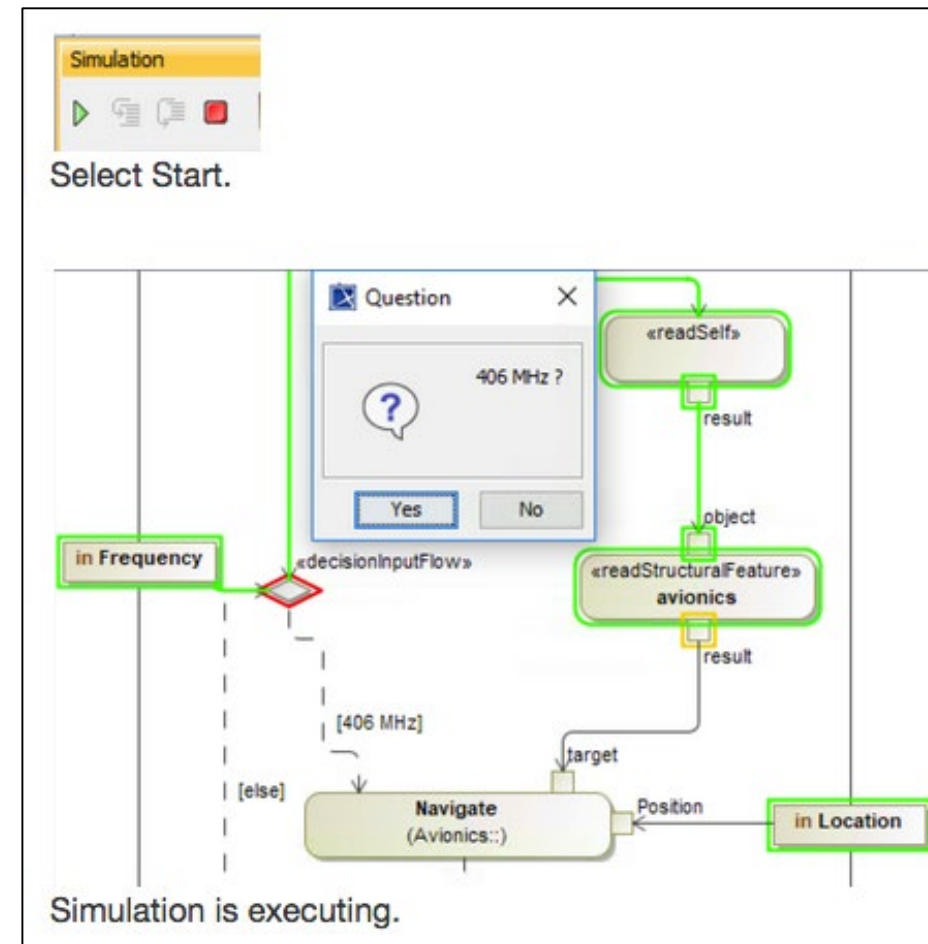
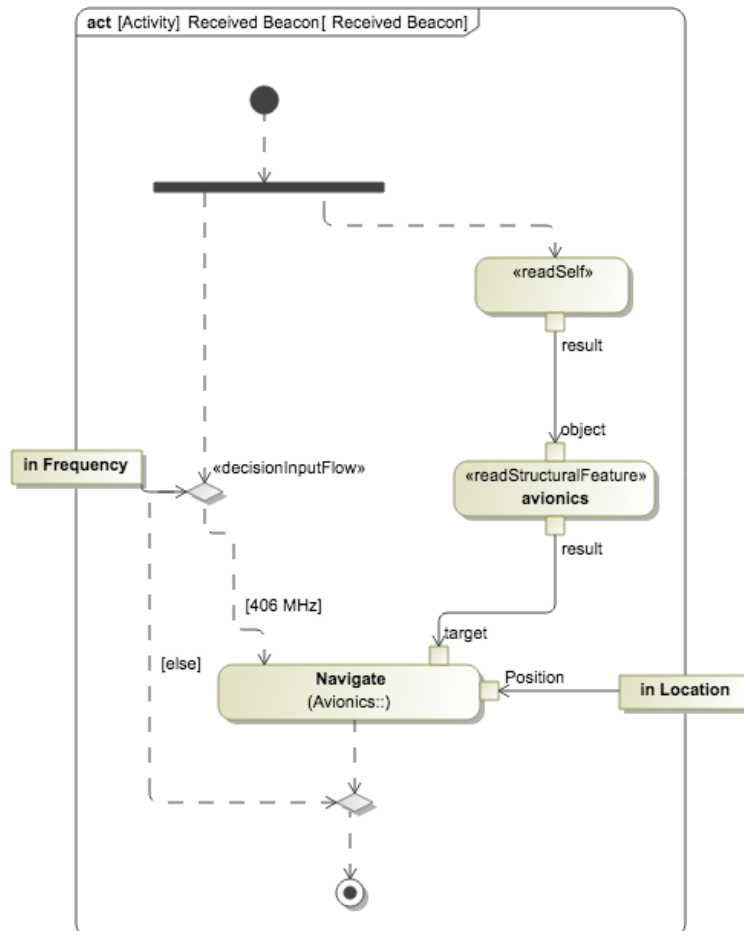
Cruise Speed

**Model information  
can be “edited” in  
View Editor (e.g., by SME)  
and pushed  
back into Model  
(Fundamental to AST)**



# Mission Requirements Refined into Behaviors and Analyzed through Simulations in Skyzer System Model

- State Machine Simulation in System Model supports analysis for understanding/visualizing dynamic behaviors – getting the right model and getting the model right



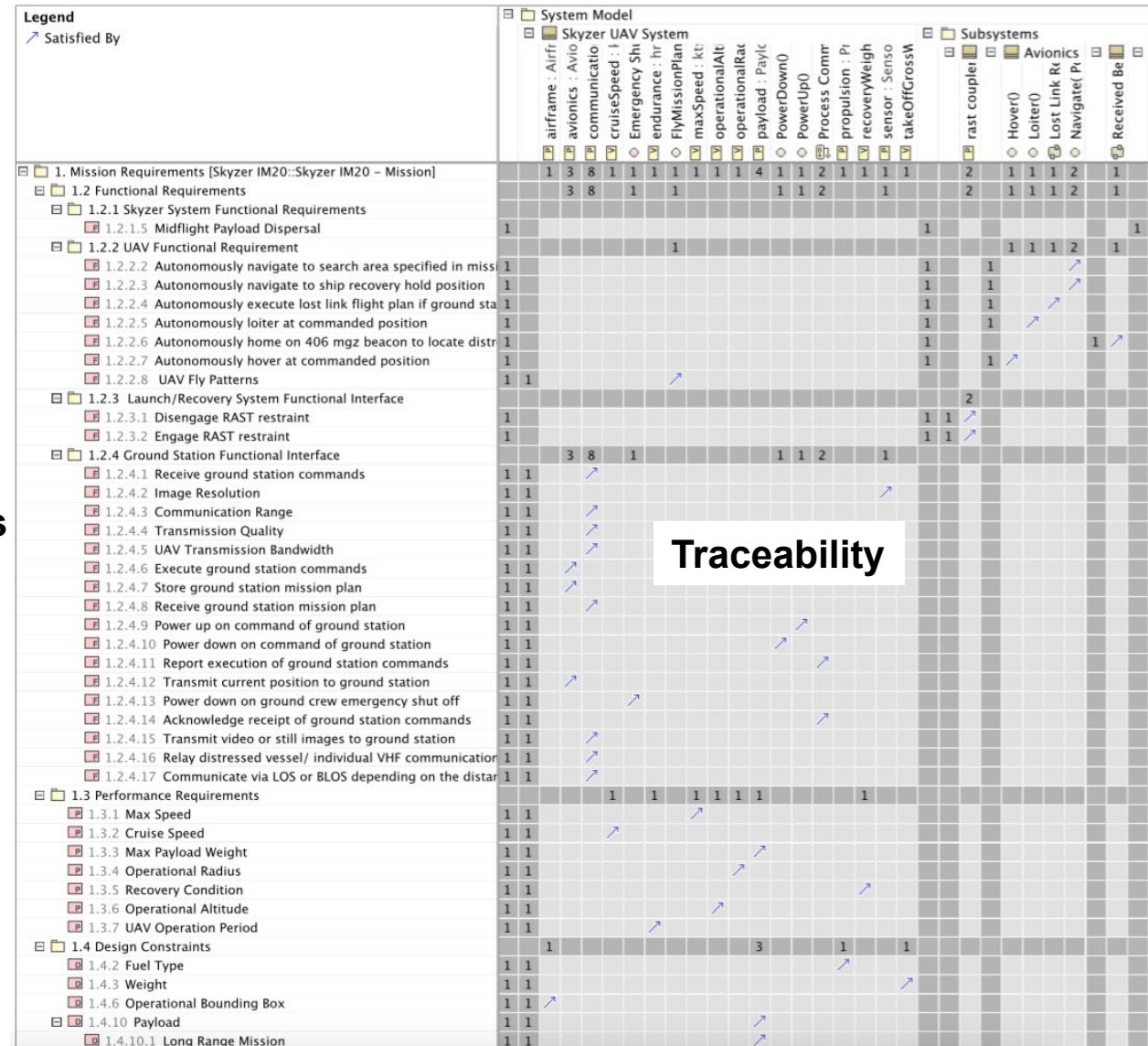


# Skyzer Mission and System Requirements Traceability in Skyzer System Model

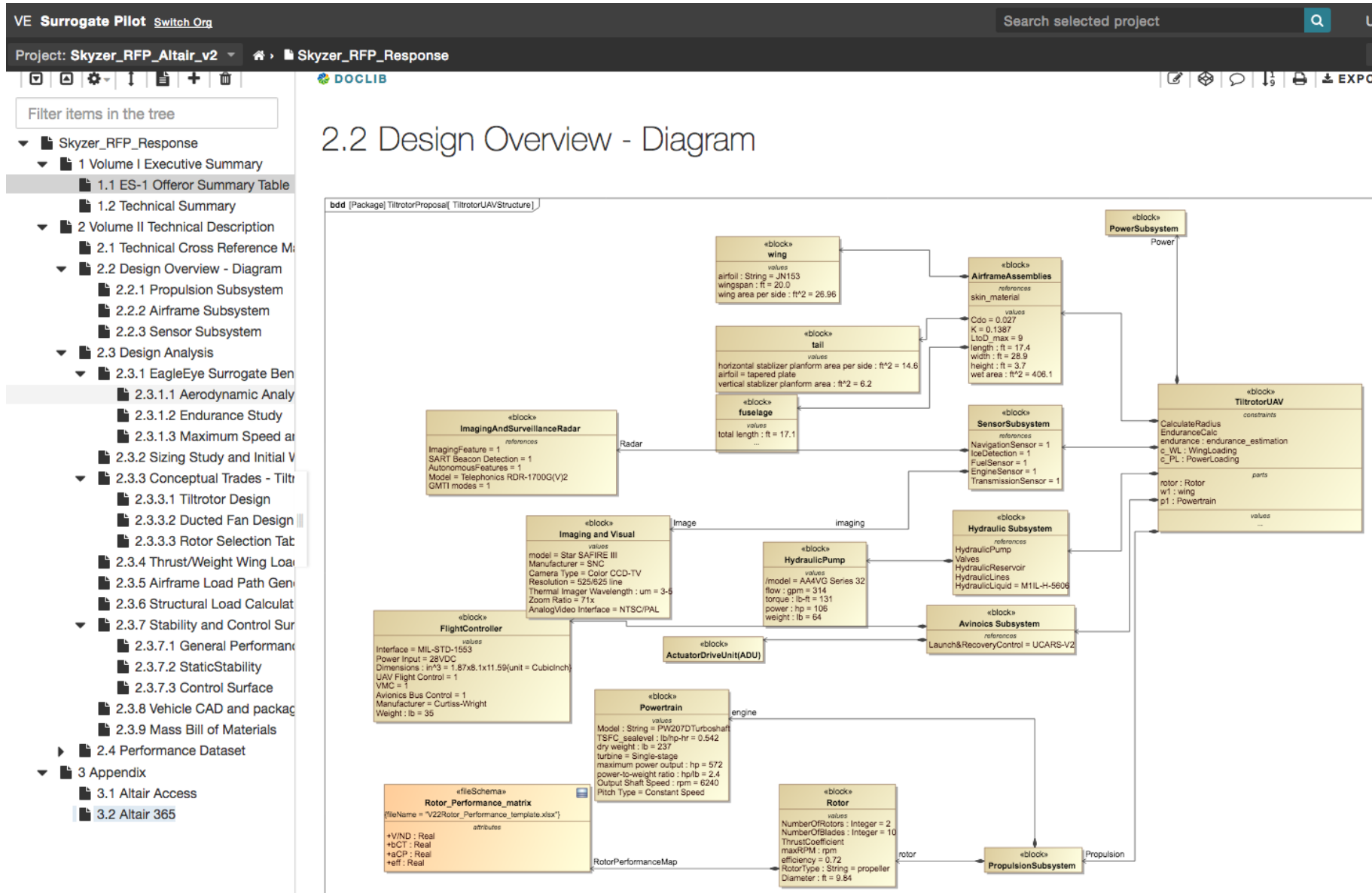
Figure 6.1. Requirements Satisfiability

Mission Requirements

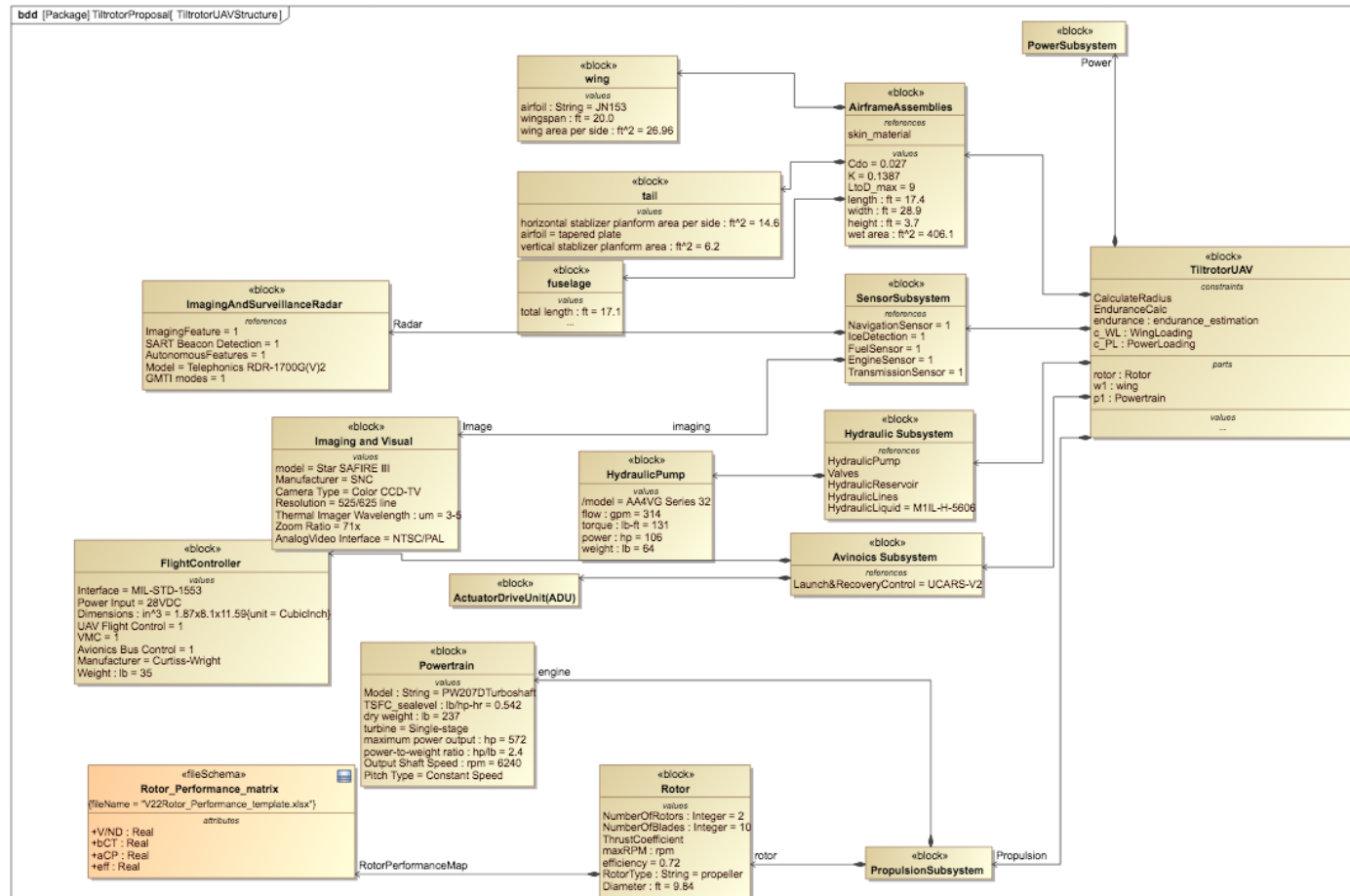
System Requirements



# RFP Response Extends and Refines Skyzer System Model provided by Government as GFI



## 2.2 Design Overview - Diagram



# View of RFP Response Hyperlinks to Discipline-Specific Models Provided in Generated View

VE Surrogate Pilot [Switch Org](#) Search selected project UAT Help M

Project: Skyzer\_RFP\_Altair\_v2 Skyzer\_RFP\_Response Branch: master

Filter items in the tree

- ▼ Skyzer\_RFP\_Response
  - ▼ 1 Volume I Executive Summary
    - 1.1 ES-1 Offeror Summary Table
    - 1.2 Technical Summary
  - ▼ 2 Volume II Technical Description
    - 2.1 Technical Cross Reference M
    - ▼ 2.2 Design Overview - Diagram
      - 2.2.1 Propulsion Subsystem
      - 2.2.2 Airframe Subsystem
      - 2.2.3 Sensor Subsystem
    - ▼ 2.3 Design Analysis
      - ▼ 2.3.1 EagleEye Surrogate Ben
        - 2.3.1.1 Aerodynamic Analy
        - 2.3.1.2 Endurance Study
        - 2.3.1.3 Maximum Speed ar
      - 2.3.2 Sizing Study and Initial V
      - ▼ 2.3.3 Conceptual Trades - Tilt
        - 2.3.3.1 Tiltrotor Design
        - 2.3.3.2 Ducted Fan Design
        - 2.3.3.3 Rotor Selection Tab
      - 2.3.4 Thrust/Weight Wing Loa
      - 2.3.5 Airframe Load Path Gen
      - 2.3.6 Structural Load Calculat
      - ▼ 2.3.7 Stability and Control Sur
        - 2.3.7.1 General Performanc
        - 2.3.7.2 StaticStability
        - 2.3.7.3 Control Surface
      - 2.3.8 Vehicle CAD and packag
      - 2.3.9 Mass Bill of Materials
    - ▶ 2.4 Performance Dataset
    - ▼ 3 Appendix
      - 3.1 Altair Access
      - 3.2 Altair 365

## Engineering Activity Checklist

ENGINEERING ACTIVITY	DELIVERABLES	Offeror's Proposal System Model Element or Documentation Base Vol/Annex and Associated Page Number
Eagle Eye Surrogate Benchmark	Engineering system model, supporting CAE models and performance results to satisfy the "Requirement Model" or "System Model" (IM30) and KPP metrics.	<a href="#">EagleEye Surrogate Benchmark</a>
Sizing Study	Take off weight, empty weight, fuel fraction, warm up, take off, and landing weight fraction. Mission segment fractions.	<a href="#">Sizing Script @ Altair365</a>
Conceptual Trades - Tilt Rotor vs Ducted Fan	Airframe CFD models, co-efficient's of lift and drag, respective propulsive performance results for both concepts.	<a href="#">Conceptual Trades - Tiltrotor vs Ducted Fan</a>
Initial Weight Targets	Targets set from task 1C.	<a href="#">WeightBudgetScript@Altair365</a>
Vehicle CAD and packaging	Vehicle package space definition and major system locations. Technical Data Package.	<a href="#">Vehicle CAD and packaging</a>
Thrust/Weight Wing Loading Calculations	Airframe load case matrix.	<a href="#">Thrust/Weight Wing Loading Calculation</a>
Airframe Load Path Generation	Coarse structural topology optimization results.	<a href="#">Airframe Load Path Generation</a>
Structural Load Calculations	Benchmark of conventional structural arrangement in current design space	<a href="#">Structural Load Calculations</a>
Stability, Performance and Flight Characteristic Calculations	Final stability, performance and flight characteristic report.	<a href="#">Stability and Control Surface Calculations</a>
Mass Bill of Materials	Mass bill of materials generated from the Technical Data Package.	<a href="#">Mass Bill of Materials</a>

VE **Surrogate Pilot** [Switch Org](#)

Project: **Skyzer\_RFP\_Altair** [WIP](#)

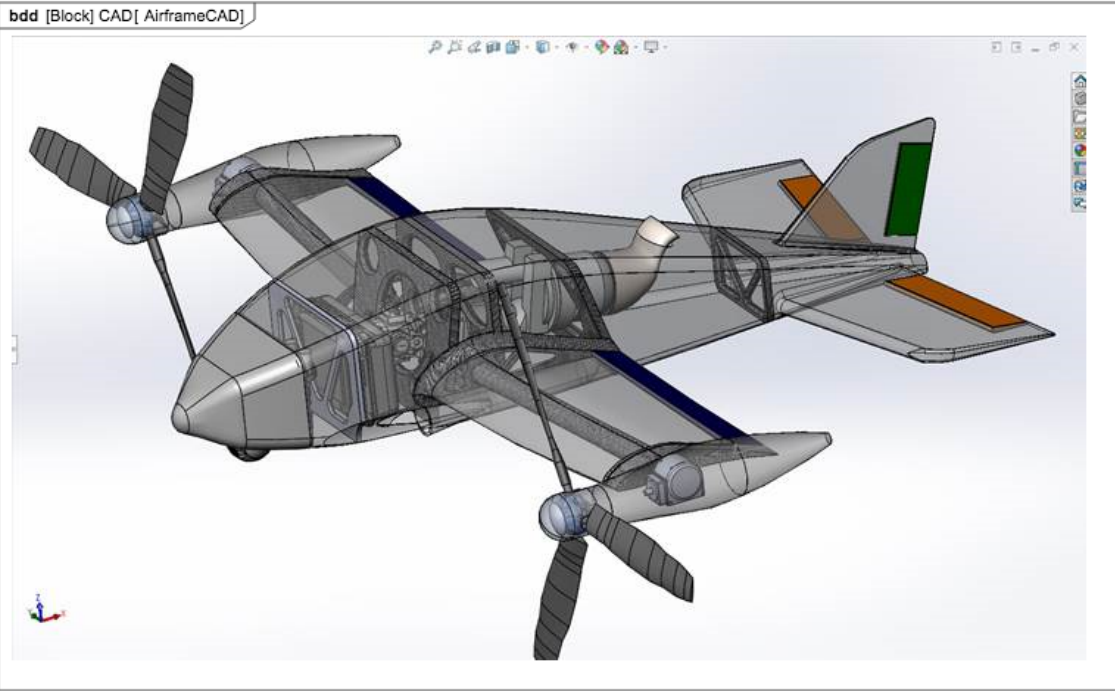
Filter items in the tree

- WIP
  - 1 Volume I Executive Summary
    - 1.1 ES-1 Offeror Summary Table
    - 1.2 Technical Summary
  - 2 Volume II Technical Description
    - 2.1 Technical Cross Reference Matrix
    - 2.2 Design Overview - Diagram
      - 2.2.1 Propulsion Subsystem
      - 2.2.2 Airframe Subsystem
      - 2.2.3 Sensor Subsystem
    - 2.3 Design Analysis
      - 2.3.1 EagleEye Surrogate Benchmark
      - 2.3.2 Sizing Study and Initial Weight Target
      - 2.3.3 Conceptual Trades - Tiltrotor vs Du
      - 2.3.4 Vehicle CAD and packaging
      - 2.3.5 Thrust/Weight Wing Loading Calcul
      - 2.3.6 Airframe Load Path Generation
      - 2.3.7 Weight Study
      - 2.3.8 THPropulsion and Fuel System Inte
      - 2.3.9 Payload and OnBoard System Pac
      - 2.3.10 Launch and Recovery System Inte
      - 2.3.11 Structural Load Calculations
      - 2.3.12 Stability, Performance and Flight
      - 2.3.13 Bill of Materials
    - 3 Appendix
      - 3.1 Altair Access
      - 3.2 Altair 365

DOCLIB

TiltrotorUAVStructure

(No Text)



bdd [Block] CAD[ AirframeCAD]

AirframeCAD

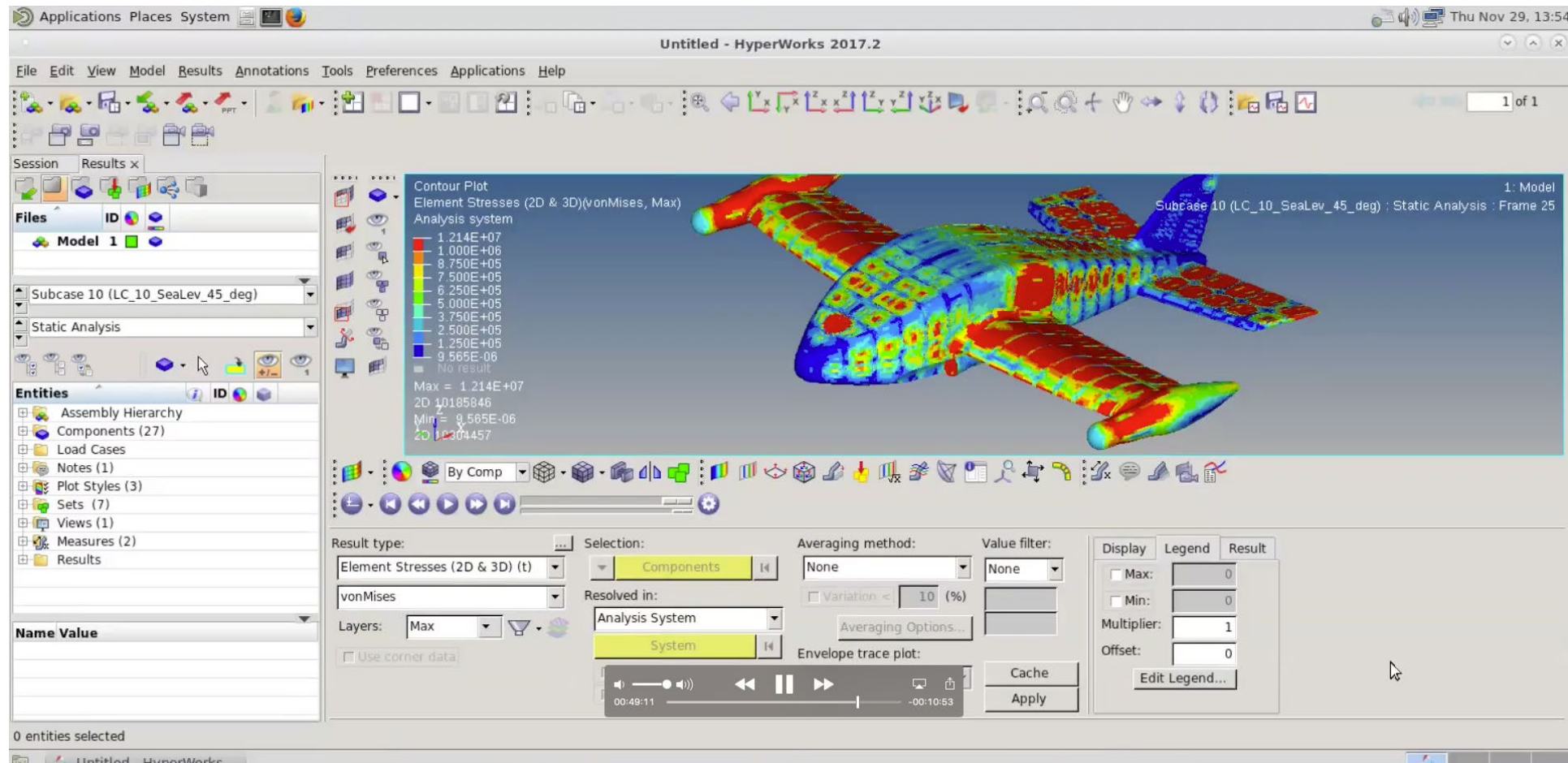
(No Text)

## 2.2.1 Propulsion Subsystem

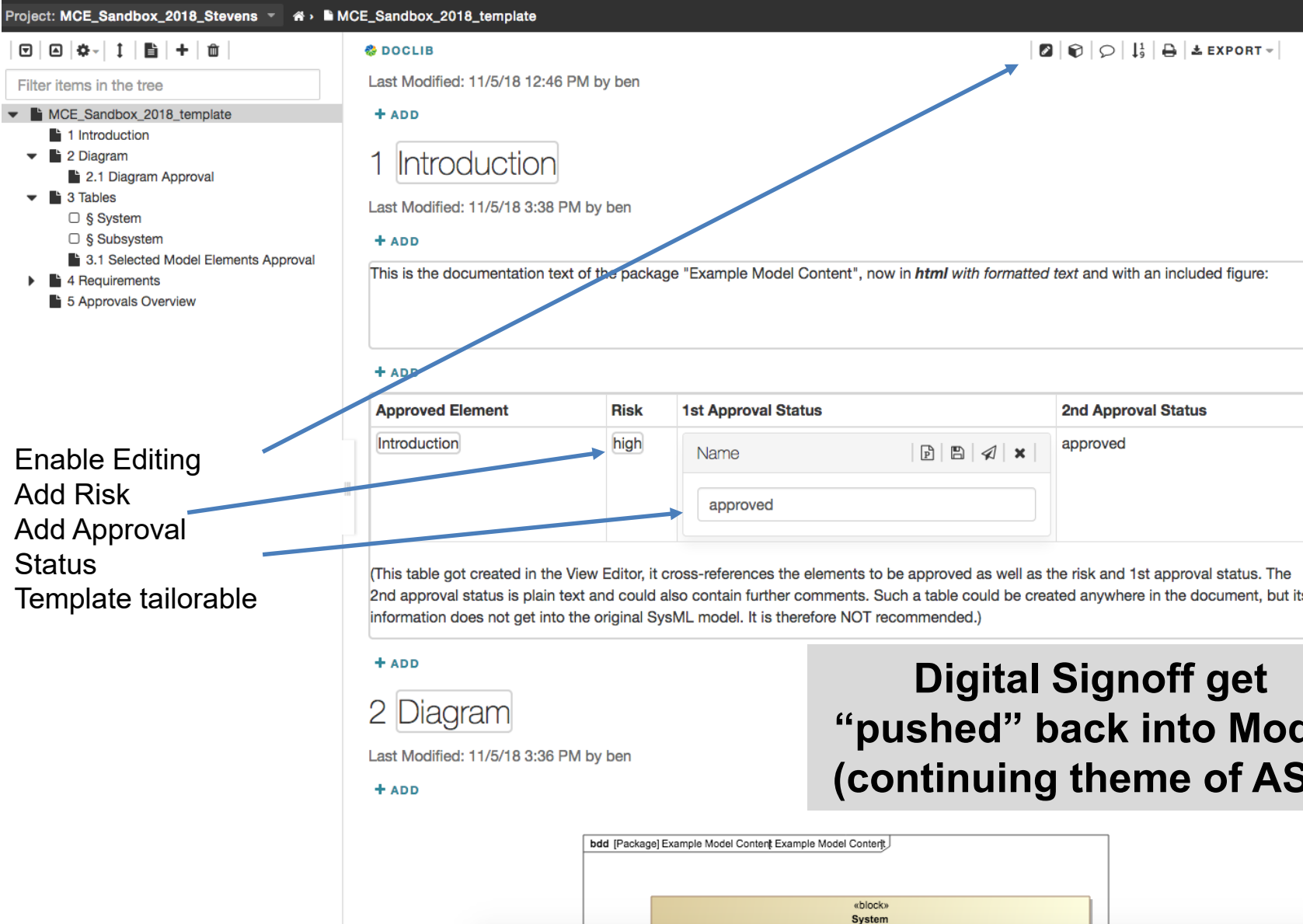


# Views Provides Hyperlinks into Discipline-specific Models and Simulation Analyses

- Research currently investigating how to do reviews and Digital Signoffs in Model for Transforming CDRL/DIDs



# Transform CDRs and DIDS using Digital Signoff in Model Through View Editor



Project: MCE\_Sandbox\_2018\_Stevens

MCE\_Sandbox\_2018\_template

Filter items in the tree

- MCE\_Sandbox\_2018\_template
  - 1 Introduction
  - 2 Diagram
    - 2.1 Diagram Approval
  - 3 Tables
    - § System
    - § Subsystem
    - 3.1 Selected Model Elements Approval
  - 4 Requirements
  - 5 Approvals Overview

DOCLIB

Last Modified: 11/5/18 12:46 PM by ben

+ ADD

## 1 Introduction

Last Modified: 11/5/18 3:38 PM by ben

+ ADD

This is the documentation text of the package "Example Model Content", now in *html with formatted text* and with an included figure:

Approved Element	Risk	1st Approval Status	2nd Approval Status
Introduction	high	Name approved	approved

(This table got created in the View Editor, it cross-references the elements to be approved as well as the risk and 1st approval status. The 2nd approval status is plain text and could also contain further comments. Such a table could be created anywhere in the document, but its information does not get into the original SysML model. It is therefore NOT recommended.)

+ ADD

## 2 Diagram

Last Modified: 11/5/18 3:36 PM by ben

+ ADD

bdd [Package] Example Model Content Example Model Content

```

classDiagram
    class System["«block» System"]
  
```

- 1) Enable Editing
- 2) Add Risk
- 3) Add Approval Status
- 4) Template tailorable

**Digital Signoff get  
"pushed" back into Model  
(continuing theme of AST)**

# Digital Signoff for SRR-II Criteria in Skyzer RFP View

Legend	Skyzer UAV System																																																																								
<ul style="list-style-type: none"> <li>Satisfy</li> <li>Satisfy (Implied)</li> </ul>	<ul style="list-style-type: none"> <li>cruiseSpeed : kts</li> <li>endurance : hr</li> <li>maxSpeed : kts</li> <li>operationalAltitude : ft</li> <li>operationalRadius : nmi</li> <li>payload : Payload</li> <li>recoveryWeight : lb</li> <li>TiltrotorUAV</li> </ul>																																																																								
<b>1.3 Performance Requirements</b> <ul style="list-style-type: none"> <li>1.3.1 Max Speed</li> <li>1.3.2 Cruise Speed</li> <li>1.3.3 Max Payload Weight</li> <li>1.3.4 Operational Radius</li> <li>1.3.5 Recovery Condition</li> <li>1.3.6 Operational Altitude</li> <li>1.3.7 UAV Operation Period</li> </ul>	<table border="1"> <tr> <td>7</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>7</td> </tr> <tr> <td>✓</td><td></td><td>✓</td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> <tr> <td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> <tr> <td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> <tr> <td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> <tr> <td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> <tr> <td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> <tr> <td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td> </tr> </table>	7	1	1	1	1	1	1	1	7	✓		✓						✓	✓								✓	✓								✓	✓								✓	✓								✓	✓								✓	✓								✓
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Model artifact provides evidence for SETR criteria

PerformanceRequirements

+ ADD  
Performance parameters are used in Evaluation model. To maintain the evaluation process, these value can't be redefined in contractor's system model. Therefore, this performance table inherits the value properties defined in Skyzer UAV System.

+ ADD  
2.5.3.1 Performance Requirements SignOff  
Last Modified: 12/7/18 11:47 AM by ben  
+ ADD

Criteria in existing NAVAIR Systems Engineering Technical Review (SETR) for SRR (can Digital Signoff subsume SETR)

EXPORT CSV FILTER TABLE

### Performance Requirements SignOff

Approved Elements	Risk	Approval Status	Approved By	Comment
PerformanceRequirements	medium	Value : [icon] [icon] [icon] [icon] to be defined ✓ undefined approved rejected	[icon]	Criteria SRR-II 1.f. - Requirements traceability from the CDD to the requirements baseline has been documented



# Digital Signoff of Source Selection Technical Evaluation Done In the Model that is Part of Authoritative Source of Truth

VE **Surrogate Pilot** [Switch Org](#) Search selected project  UAT Help

Project: **Skyzer\_RFP\_Altair\_v2** Skyzer\_RFP\_Response Branch: mast

Filter items in the tree

- ▼ Skyzer\_RFP\_Response
  - ▶ 1 Volume I Executive Summary
  - ▶ 2 Volume II Technical Description
  - ▶ 3 Appendix

**2.1.1 Technical Cross Reference Sign Off**

EXPORT CSV FILTER TABLE

### Technical Cross Reference Sign Off

Approved Elements	Risk	Approval Status	Approved By	Comment
Air Vehicle Performance; Operational Radius	medium	approved	Donald Polakovics	Evaluation Worksheet: Overall the aircraft far exceeds the operational radius KPP.  Potential Strengths: Very significant margin for additional mission capability and versatility.  Weaknesses: Aircraft may be larger and more expensive than necessary to do the mission.  Deficiencies: None  Uncertainty: Performance analysis could not be reviewed in its entirety due to some inconsistent data. Margins seems large enough to cover this however.
UAS Capability	very small	undefined	N/A	N/A
Air Vehicle Performance; Endurance	medium	approved	Donald Polakovics	Evaluation Worksheet: Overall the design appears to have sufficient endurance, with adequate development margin.



**Thank you!**

Dr. Mark Blackburn

Principal Investigator

Member of SERC Research Council

Member of OpenMBEE Leadership Team

School of Systems & Enterprises

Systems Engineering Research Center

Stevens Institute of Technology