



Modeling the FAA's NAS

Linking UAF with the Enterprise Data Architecture

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By: FAA – NextGen-B1

Date: March 19, 2025



**Federal Aviation
Administration**

The FAA Transitions Frameworks

Architecture Products [3.1]

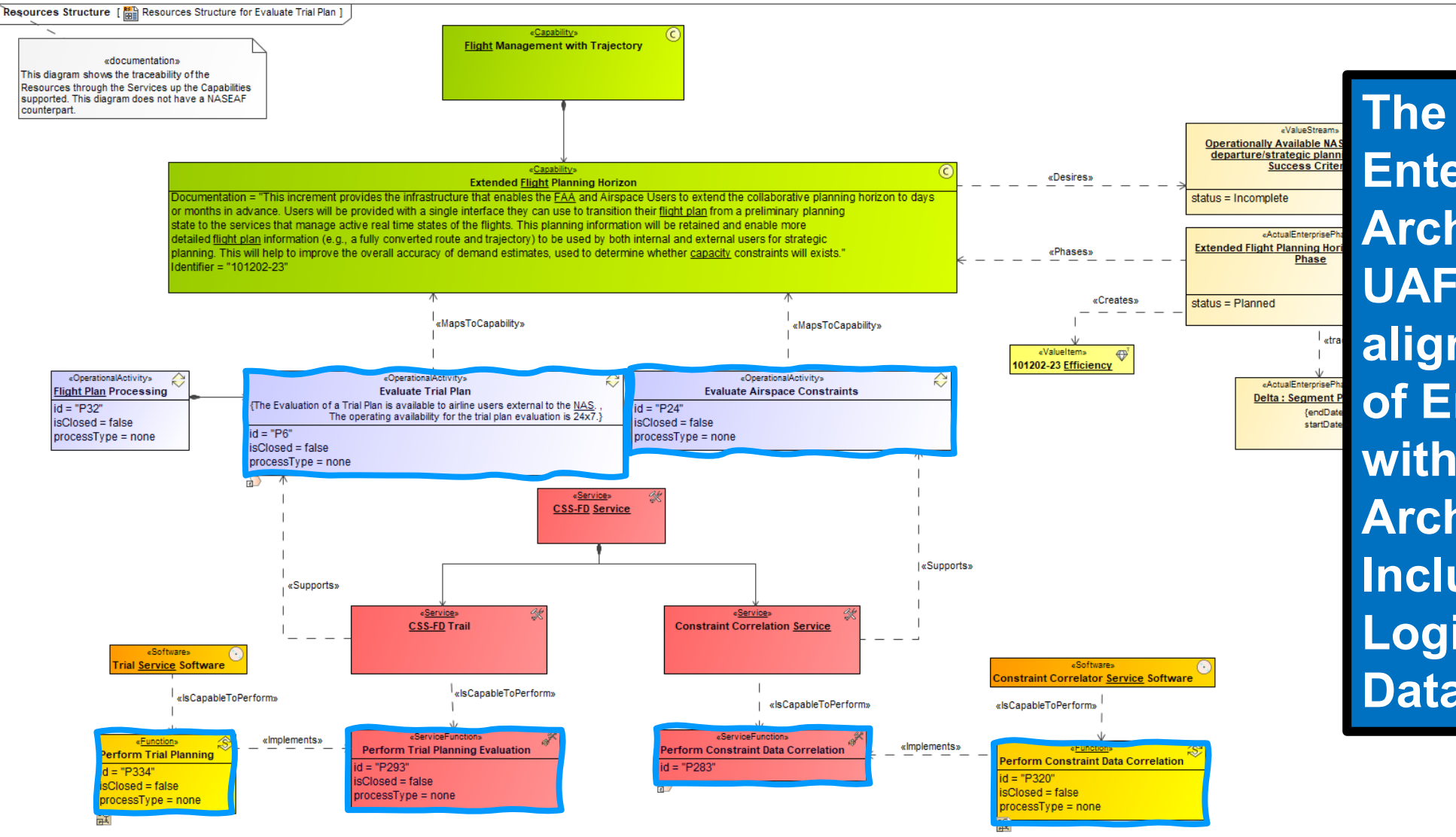
Product	Title	AMS Milestone			
		All	IARD	IID	FID
AV-1	Overview and Summary Information	R	U	U	U
AV-2	Integrated Dictionary	R	U	U	U
OV-1	High-Level Operational Concept Graphic		R	U	U
OV-5	Operational Activity Model		W		
OV-6c	Operation Event-Trace Description		R	U	U
SV-1	System Interface Description			R	U
SV-2	System Communication Description			R	U
SV-4	Functional Analysis Document		R	U	U
SV-6	System Data Exchange Matrix				R
SV-7	System Performance Parameters Matrix				W
SV-10c	System Event-Trace Description				W
SV-11	Physical Schema				W

Tailored FAA DoDAF Artifacts

UAF Grid FAA Required Specifications

UAF	Motivation Mv	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Sequences Sq	Information If	Parameters Pm	Constraints Ct	Roadmap Rm	Traceability Tr
Architecture Management Am	Architecture Principles Am-Mv	Architecture Extensions Am-Tx	Architecture Views Am-Sr	Architectural References Am-Cn	Architecture Development Method Am-Pr	-	-	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 and Measurements Me-Pm and Risks Rk-Pm	Strategic Constraints St-Ct	Strategic Roadmaps: Deployment, Phasing St-Rm-D, -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 Model 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 Information Model Sv-If		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	Personnel Information Model Ps-If		Competence, Drivers, Performance Ps-Ct-C, -D, -P	Availability, Evolution, Forecast PS-Rm-A, E, 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 Information Model Rs-If		Resources Constraints Rs-Ct	Resources Roadmaps: Evolution, Forecast Rs-Rm-E, 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 Information Model Sc-If	Environment En-Pm and Measurements Me-Pm and Risks Rk-Pm	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		-		Parametric Execution/Evaluation	-	-

FAA UAF Enterprise Architecture



The FAA defined its Enterprise Architecture using UAF. This includes the alignment and usage of Enterprise Data with the 'Flows' of the Architecture, Including Conceptual, Logical and Canonical Data.

The FAA's Data Model

Conceptual

DoDAF 1.5 - OV-7

High-Level Information Elements used in Operational Scenarios

I Need Flight Plan Data

Logical

DoDAF 1.5 – OV-7

Enterprise-Level Data Describing FAA Data Within and Across Domains (Entities, attributes, and relationships)

Flight Plan Data Includes A/C-ID, Departure, Arrival, etc.

Canonical

DoDAF 1.5 - SV-11

Enterprise-Level Data Describing the FAA Exchange Structures (FAA uses many international structures provided by Standards Bodies)

Flight Plan Data Exchanged Between Systems Like ...

Physical

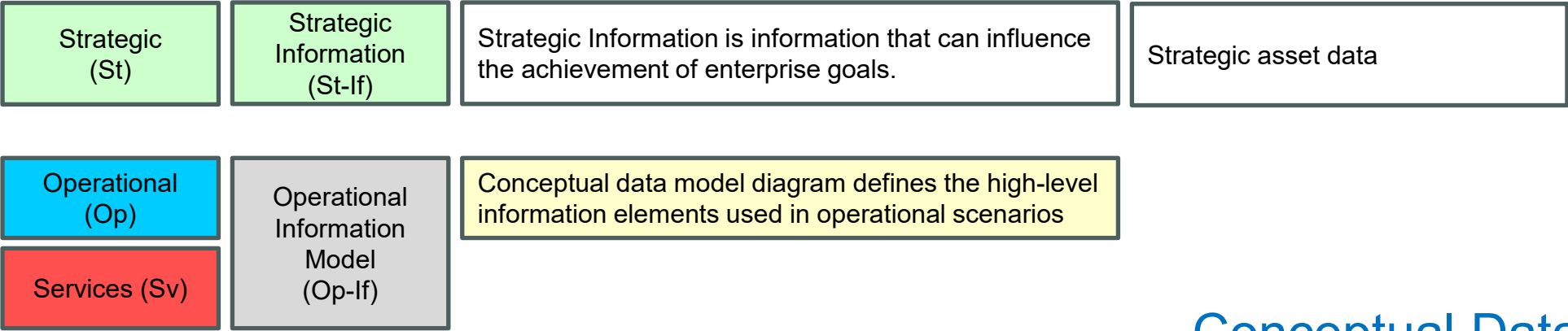
DDL Schema

Data structures used to store data and used by systems and services

Flight Plan Data Implemented and Stored by a System as Flight Object, ...

Need to Bring the Data Model to the Enterprise Framework

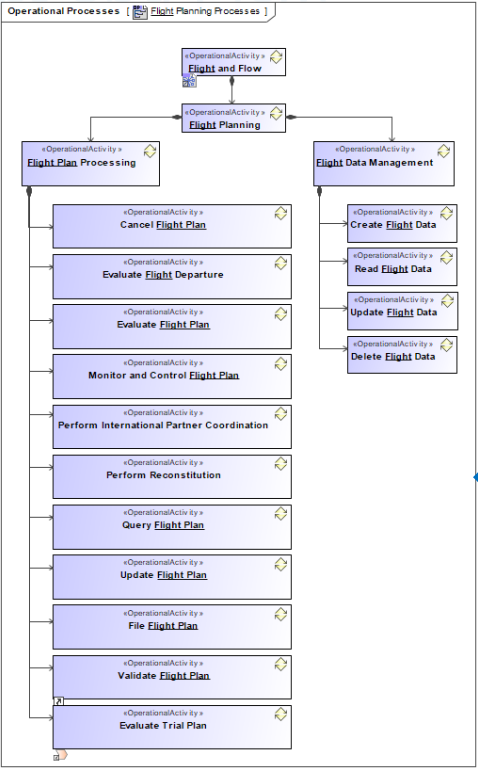
Operational Information Overview



DoDAF 1.5 – need lines

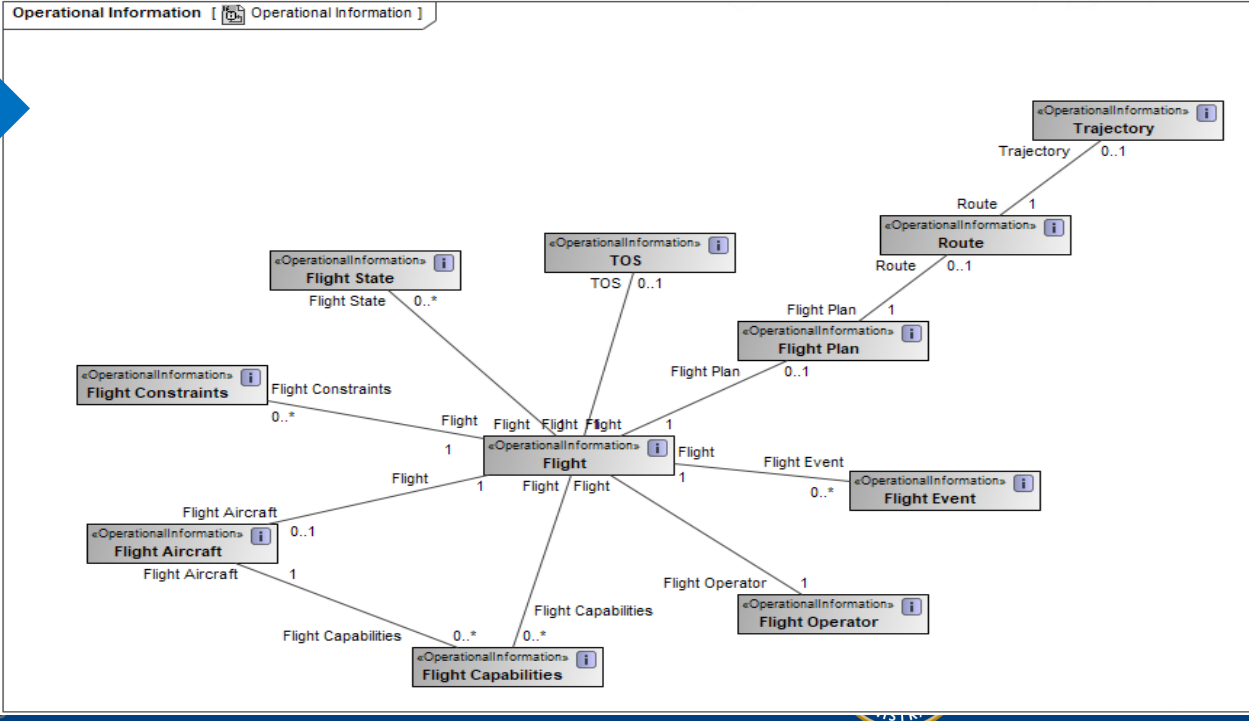
Flight and Flow

Conceptual Data

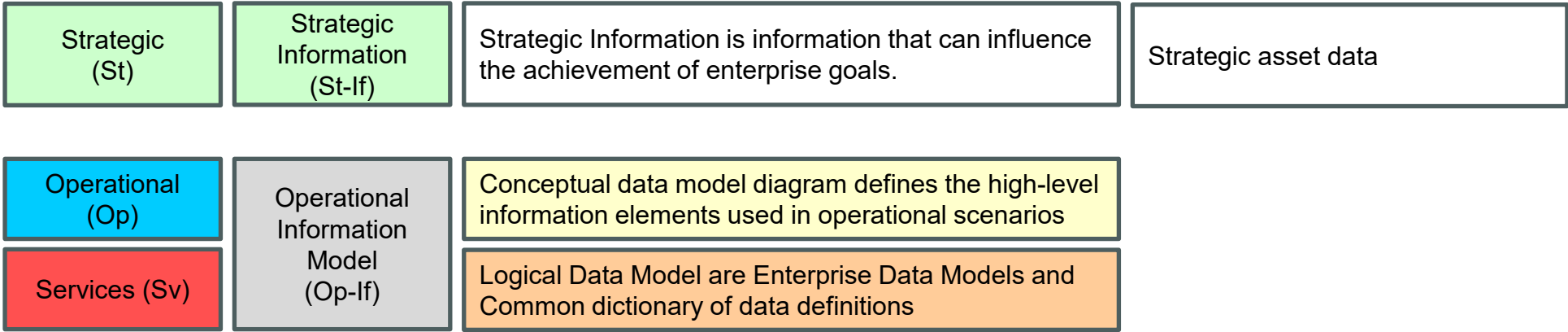


Defined As Conceptual Data

Operational Viewpoint Op-Pr



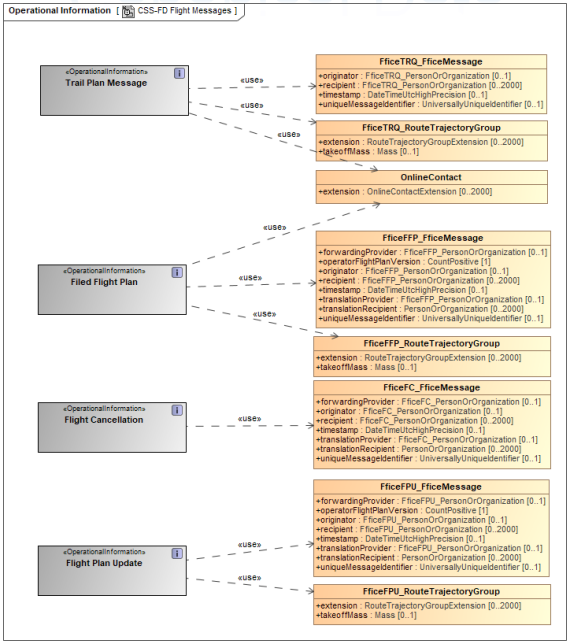
Operational Information Overview



DoDAF 1.5 – need lines

DoDAF 1.5 – OV-7

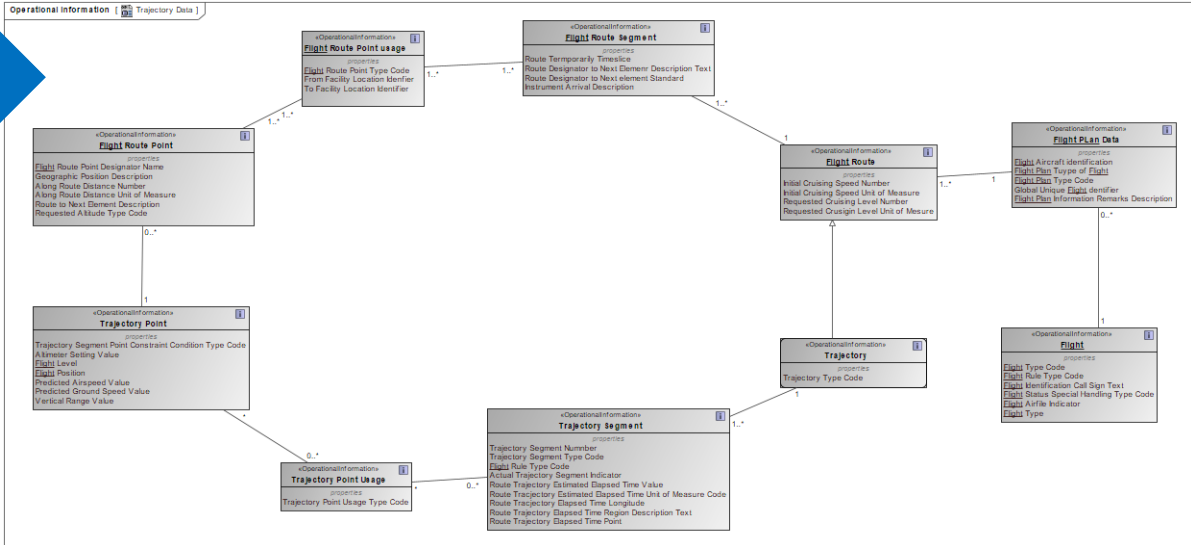
Canonical Data



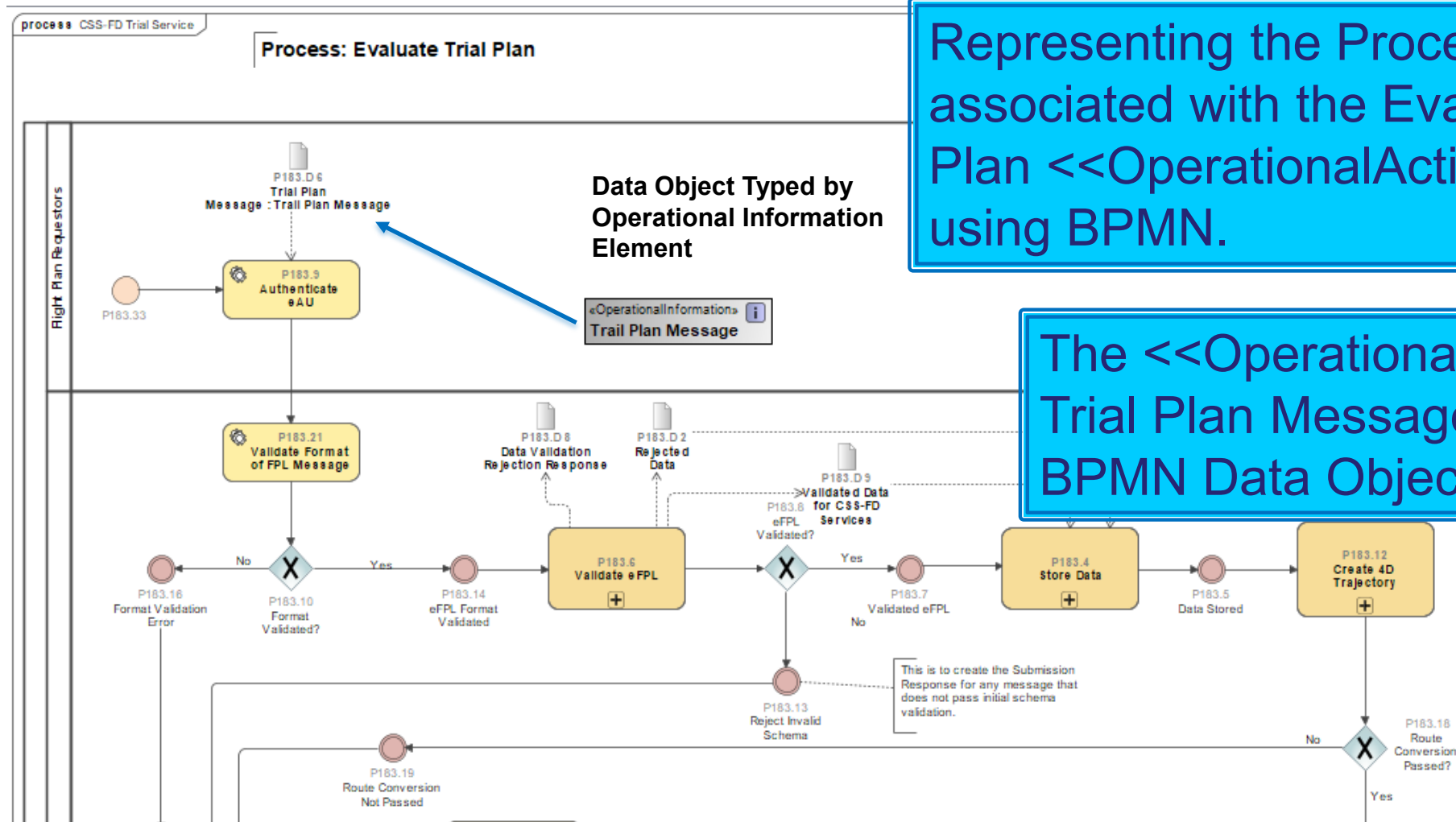
Defined As Logical Data

Defined Using Exchange Data

Logical Data



Application of Operational Information



Representing the Process Flow associated with the Evaluate Trial Plan <<OperationalActivity>> using BPMN.

The <<OperationalInformation>> Trial Plan Message 'types' the BPMN Data Objects.

Operational Information Analysis

Criteria
Element Type: Message,Entity,Operational Information Scope (optional): Operational Information

#	Name	Client Dependency	Data Source
1	Trail Plan Message	Usage[Operational::Oper Usage[Operational::Oper Usage[Operational::Oper	FficeTRQ_FficeMessage FficeTRQ_RouteTrajectory OnlineContact FficeFFP_FficeMessage
2	Filed		
3	Flight		
4	Flight		

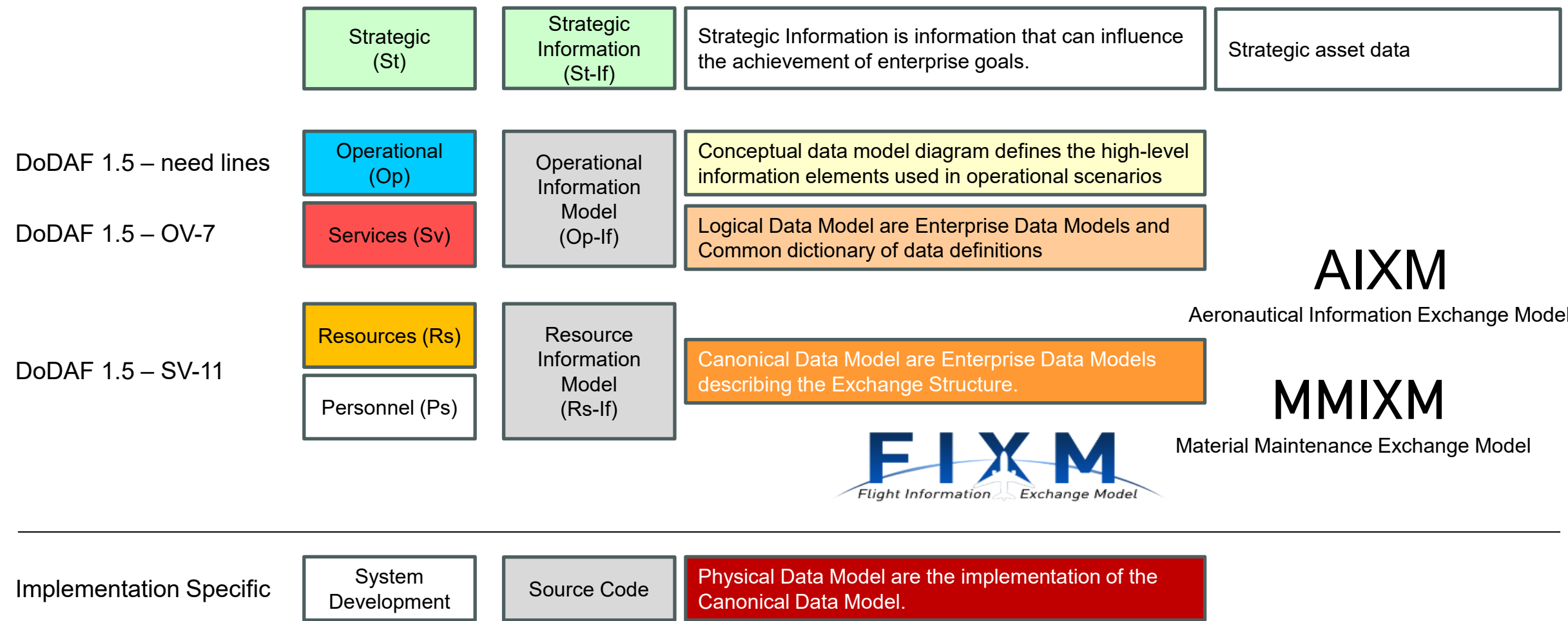
The <<OperationalInformation>>
Analysis on Logical Data Model
Usage (Known Format)

Criteria
Element Type: Data Object Scope (optional): CSS-FD Trial Service Filter:

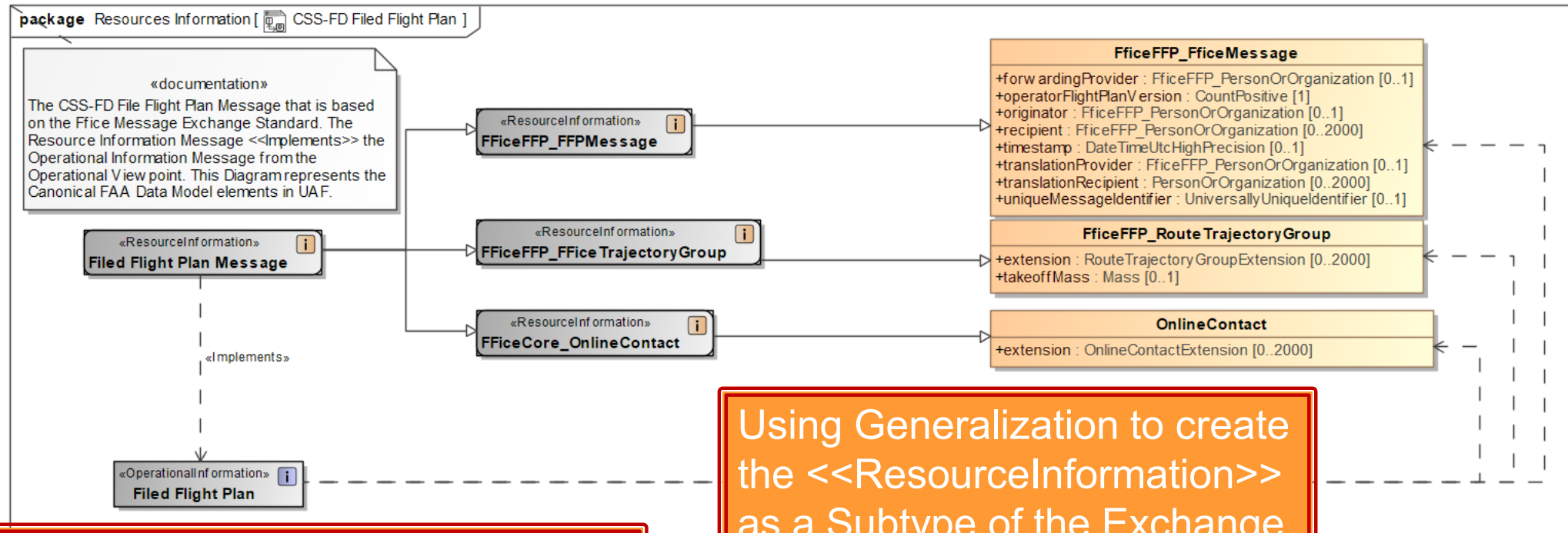
#	Owner	Name	Id	Source	Destination	Type
1	P183 CSS-FD Trial Service	Trial Plan Message	P183.D 6		P183.9 Authenticate eAU	OI39 Trail Plan Message
2	P183 CSS-FD Trial Service	Trial Plan	P183.D 1	P183.24 Send Planning Status Response to NEMS/IMS		
3	P183 CSS-FD Trial Service	Rejected Data	P183.D 2	P183.		
4	P183 CSS-FD Trial Service	CONCUR Message	P183.D 3	P183. P183. P183.		
5	P183 CSS-FD Trial Service	NEGOTIATE Message	P183.D 4	P183. P183. P183.		
6	P183 CSS-FD Trial Service	NON-CONCUR Message	P183.D 5	P183.27 Generate NON-CONCUR Message With Constraints P183.24 Send Planning Status Response to NEMS/IMS P183.26 Send Planning Status and Constraints to eAU	P183.24 Send Planning Status Response to NEMS/IMS P183.26 Send Planning Status and Constraints to eAU	
7	P183 CSS-FD Trial Service	Refined Constraints	P183.D 7	P183.30 :Obtain Constraints		
8	P183 CSS-FD Trial Service	Data Validation Rejection Response	P183.D 8	P183.6 Validate eFPL		
9	P183 CSS-FD Trial Service	Validated Data for CSS-FD Services	P183.D 9	P183.6 Validate eFPL	P183.4 Store Data	

The <<OperationalInformation>>
Analysis to <<OperationalActivity>>
and Data Objects

Resource Information Overview



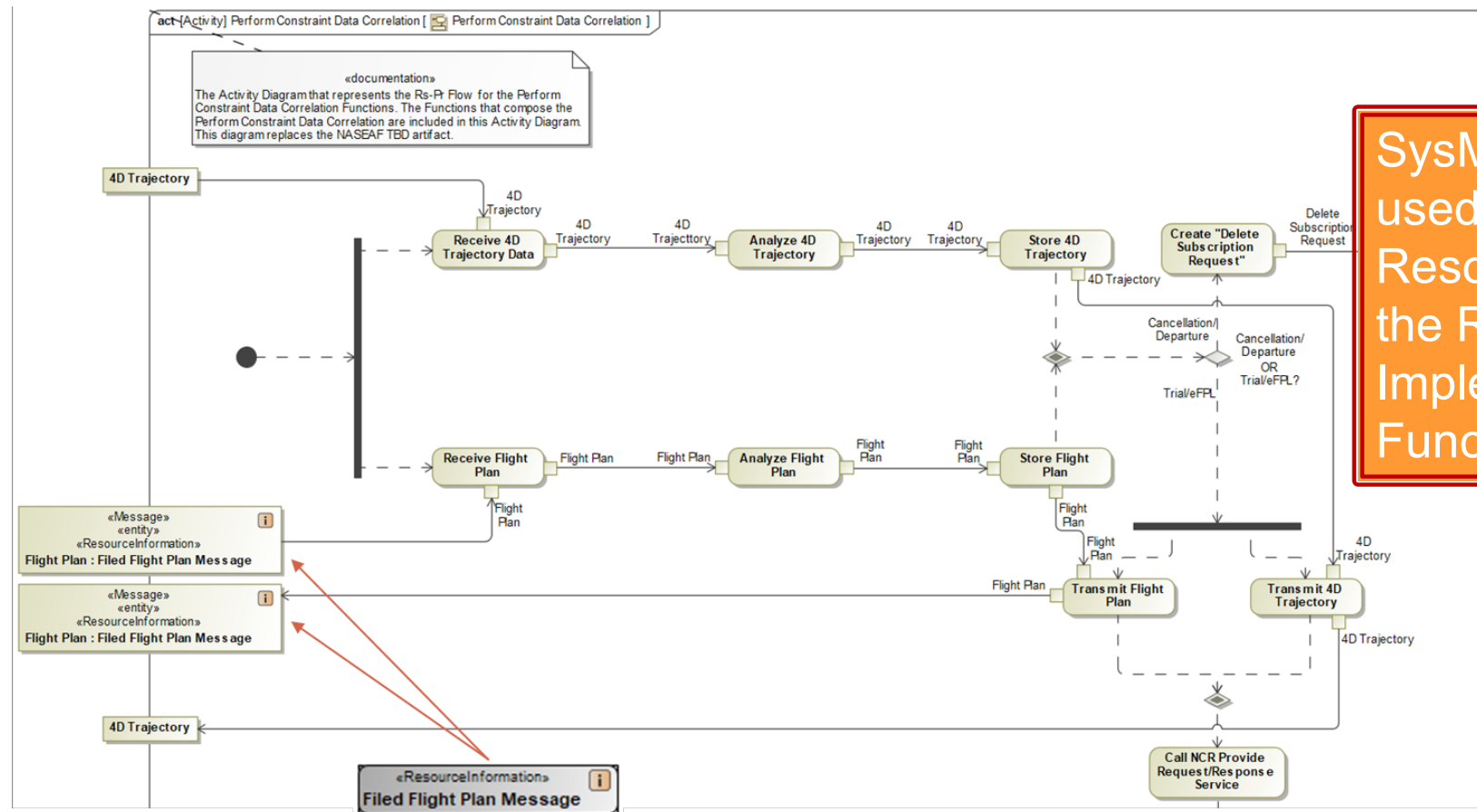
Resource Information Overview



Using the Implements Relationship between the <<ResourceInformation>> and <<OperationalInformation>> Elements.

Using Generalization to create the <<ResourceInformation>> as a Subtype of the Exchange Structure.

Application of Resource Information



SysML Activity Diagrams are used to illustrate the Flow for Resource Functions. Where the Resource Functions Implement Service Functions.

The Parameter Nodes and Pins on Behavior Actions are Typed by the ResourceInformation Elements FAA Data Model Canonical Elements.



Resource Information Analysis

Criteria			
Element Type: Message,Entity,Operational Information		Scope (optional): Resources Information	Filter:
#	Name	Inheritance Element	
1	FficeTRQ_Message	FficeTRQ_FficeMessage	
2	FficeTRQ_RouteTrajectoryGroup	FficeTRQ_RouteTrajectoryGroup	
3	FficeCore_OnlineContact	OnlineContact	
4	FficeFFP_FFPMessage	FficeFFP_FficeMessage	
5	FficeFFP_FficeTrajectoryGroup	FficeFFP_RouteTrajectoryGroup	
6	Filed Flight Plan Message	RI31 FficeFFP_FFPMessage RI32 FficeFFP_FficeTrajectoryGroup RI28 FficeCore_OnlineContact	Implements[Resources: OI42 Filed Flight Plan
7	Trial Plan Message	RI25 FficeTRQ_Message RI28 FficeCore_OnlineContact RI26 FficeTRQ_RouteTrajectoryGroup	Implements[Resources: OI39 Trail Plan Message

The Inheritance goes to the Canonical Model.

Analysis Shows the Inheritance for the <<ResourceInformation>> Elements used in the Activity Diagram

The Implemented <<OperationalInformation>> Elements are also Captured.

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