UPDM – Unified Profile for DoDAF/MODAF

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UPDM DMM-AT & DM2 TWG

UPDM Group

Adaptive
Artisan Software
ASMG
BAE Systems
DoD
DND
embeddedPlus
Generic
General Dynamics
IBM
Lockheed Martin Co
Mega
Mitre
Northrop Grumman
L3 Comms
MOD
NoMagic
Raytheon
Rolls Royce
Sparx Systems
VisumPoint
Selex SI
Thales
Unisys

August, 2010

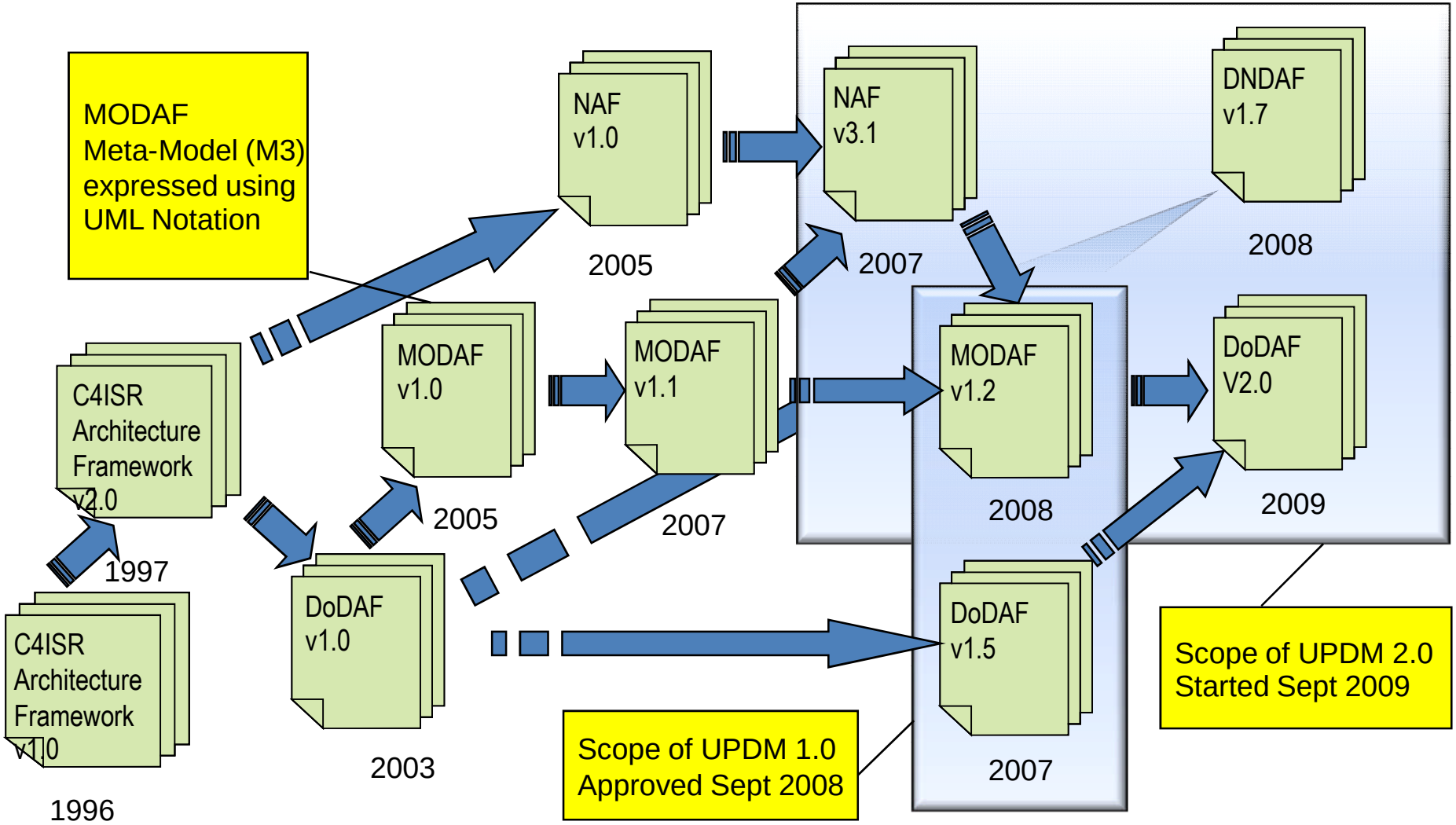
What is the Purpose of UPDM?

- UPDM
  - **Standardized** way of expressing DoDAF and MODAF artefacts using OMG UML, OMG SysML, OMG XMI, & associated specifications such as BPMN
  - "***Conforms***" with DoDAF & MODAF metamodels and products/views
  - Is ***NOT*** a new Architectural Framework
  - Nor is it is a new methodology or a process
  - Developed by members of the OMG with help from industry and government domain experts.
- Version 1.0: Implemented by multiple tool vendors with multiple tools available now. (DoDAF 1.5, MODAF 1.2)
- Version 2.0:
  - scheduled to address DoDAF 2.0, MODAF 1.2+, NAF 3.x, and DNDAF 1.7
  - "Final" draft to OMG in August 2010
  - "Finalization Task Force" in early CY 2011 to address issues/defects

Why? The need for UPDM.

- Motivation
  - US DoD and UK MOD interested in leveraging commercial standards for their Military Architecture Framework
  - Military Architecture Framework Tool Interoperability
  - Formal MetaModel basis for the Military Architecture Framework
    - Critical to Interoperability Objectives
    - Critical to Understanding Profile Requirements
- Proliferation of Military Architectural frameworks
  - DoDAF, MODAF, DNDAF, NAF, AGATE, ADOAF, MDAF, etc.
  - Defence organizations, contractors and tool vendors are hoping to find a way out of the alphabet soup.

Why and When: Historical Development of AF's.



How: UPDM Features

- Integrates with SoaML – The Service Oriented Architecture Modelling Language
- SysML Extensions with UPDM level 1
  - Facilitates integration of DoDAF and MODAF models for system of systems modeling with SysML models for systems modeling
  - Enables UPDM to fully leverage SysML features

How: UPDM 1.0 Requirements

- Mandatory Requirements
  - Domain Metamodel
  - Metamodel (abstract syntax and constraints)
  - Profile
  - Notation (concrete syntax)
  - DoDAF 1.5 and MODAF 1.2 artifacts
  - Support for custom views and viewpoints
  - Element taxonomy reference
  - Data interchange
- Optional Requirements
  - Extensibility to Other Architecture Frameworks
  - Representation of Architectural Patterns

When Will UPDM 2.0 Be Ready? (Roadmap)

DoDAF 2.0 - Signed and Released	May-2009	
RFP: Preparation July 09 & Issued Sept 09	Sep-2009	
Initial Submissions C4I TF Evaluation May & June 10	Jun-2010	
Revised Submission & Presentations Due to OMG 23 Aug 10, 20 Sep 10	Aug-2010	Sep-2010
Final evaluation and selection by OMG C4I Domain Task Force with Recommendation to OMG Architecture Board (AB) and Technical Committee; plus Approval by Architecture Board & Review by TC	Dec-2010	
TC votes to recommend specification & OMG Board of Directors votes to adopt specification	Feb-2011	
Revised Submission & presentation (address identified issues)	Dec-2011	

What is in UPDM 2.0?

- UPDM 2.0
  - DoDAF 2.0, support DoDAF MetaModel & Views
  - Continuing support for MODAF 1.2
  - Support for NAF 3
  - Support for DNDAF including the Information and Security views
  - Human Factors Views based on MODAF & DNDAF
  - Business Motivational Modeling/SBVR profile integration
  - Business process Modeling Notation
    - Provides alternative for modeling operational views.
  - Others? Only 2 weeks left before submission due to OMG. There's always UPDM 2.1, 3.0…

International Adoption of UPDM

- United States
  - DoD statements of support issued
  - Vendor presentations given to DoD, Industry, conferences
  - UPDM being used on both bids and projects
- Great Britain
  - MOD statements of support issued
  - Vendor presentations given to MOD, Industry, conferences
  - UPDM being used on both bids and projects
- France
  - DGA favoring NATO NAF over AGATE; investigating UPDM
  - Vendor presentations given to DGA, Industry, conferences

DoD at OMG

DoD and MOD Recommended the C4i TF to vote and recommend formal Issuance of the UPDM Request For Comment (RFC):

- **Critical Role for Enterprise Architecture**
- **Time is now for Baseline Requirements**
- **Sound Methodology - UPDM RFC**
- **DoD long standing policy on standards**
- **Strong Inter-Governmental Support**

DoD and MOD Position

- **Joint Statement (18 Sep 08)**
  - **Brian G. Wilczynski, Director, Enterprise Architecture & Standards, Office of the Department of Defense Deputy Chief Information Officer**
  - **John Keefe, United Kingdom Ministry of Defence**
  - **"UK MOD fully endorses and supports the position stated by the US DoD".**

International Adoption of UPDM cont'd

- Sweden
  - FMV statements of support issued
  - Swedish SwAF have now adopted MODAF as standard
  - Vendor presentations given to SwAF, Industry
- Canada
  - DND participation in UPDM effort at OMG
  - Evaluating its use to support DNDAF
  - Provided security views
  - Vendor presentations given to DND, Industry, conferences
  - Public safety looking to adopt (Homeland Security)
- Norway
  - Vendor presentations given to defence dept, industry

International Adoption of UPDM cont'd

- NATO
  - UPDM update presentation given at NATO C3A briefing
  - UPDM group coordinating with NATO C3A for UPDM 2.0 oversight and support
- Italy
  - Vendor presentations given to Italian Armed forces, Industry, conferences
  - UPDM being used on both bids and projects
- Holland
  - Vendor presentations given to Dutch Armed forces, Industry, conferences

International Adoption of UPDM cont'd

- Israel
  - Vendor presentations given to Israeli Armed forces, Industry, conferences
- Use of UPDM for non-military applications
  - Disaster planning, event planning, space missions: satellites, manned missions, non-military government departments, humanitarian relief operations, industry infrastructure planning, banking, etc.

- <u>All of the above cited standardization and interchange as essential reasons for considering UPDM</u>

What is the UPDM Specification?

A Document

A Domain Meta Model (UPDM DMM)

Plus

A "Profile"

OMG Unified Modeling Language Profile (UPDM Profile)

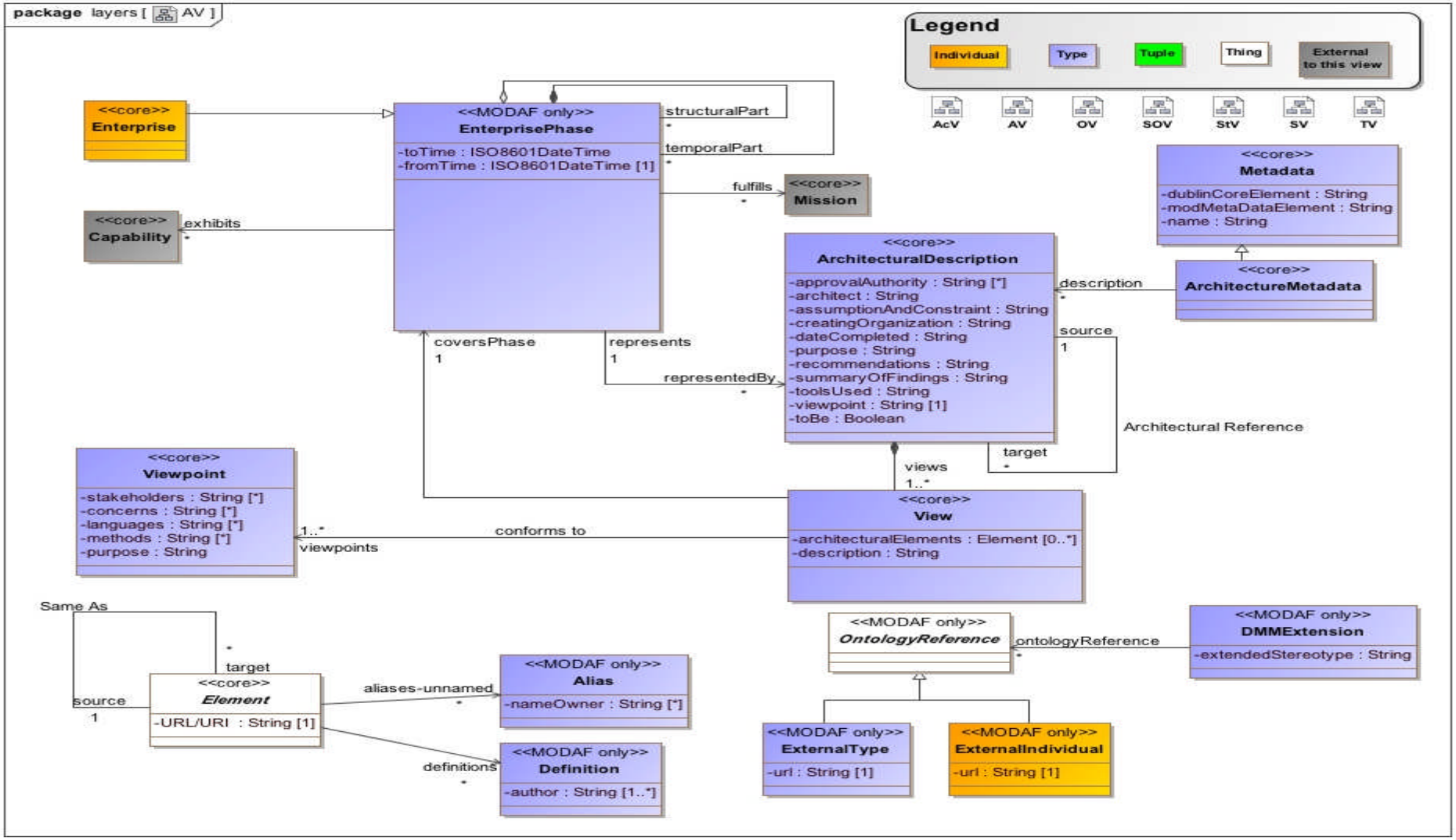
Plus

Example (UPDM SAR Example)

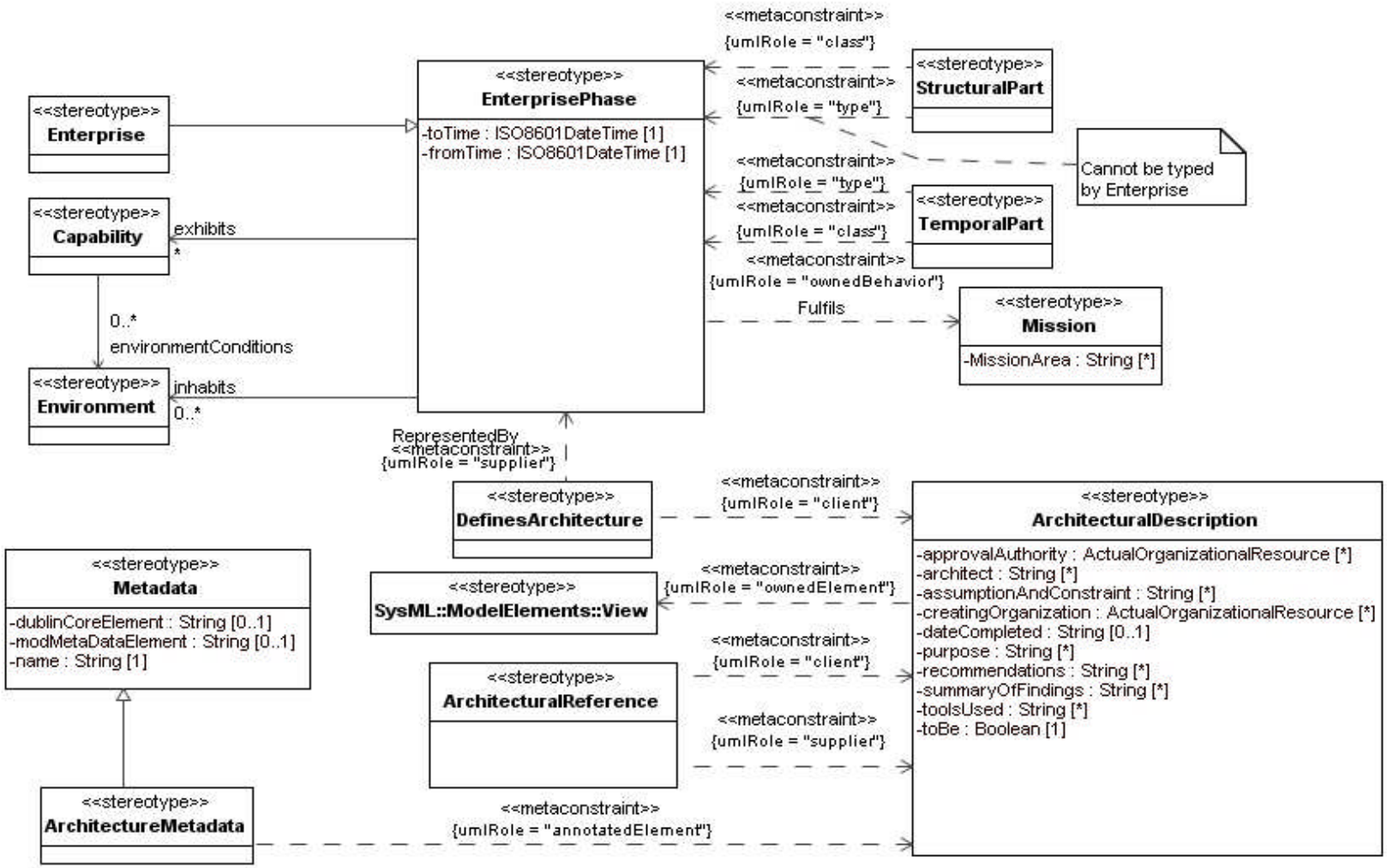
Plus

OMG XML Metadata Interchange (XMI)

UPDM Domain **Meta Model** Summary (AV)

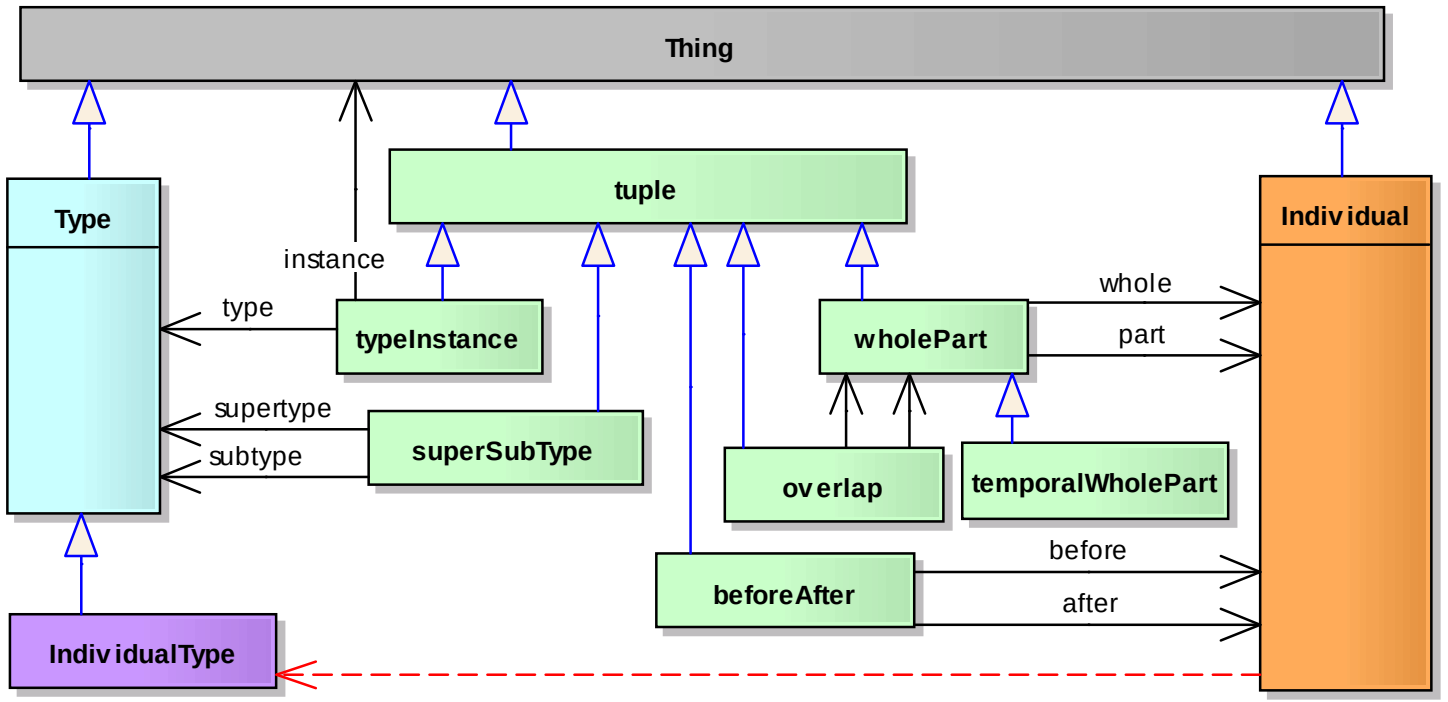


UPDM RFC - **Profile** Summary (AV-1)



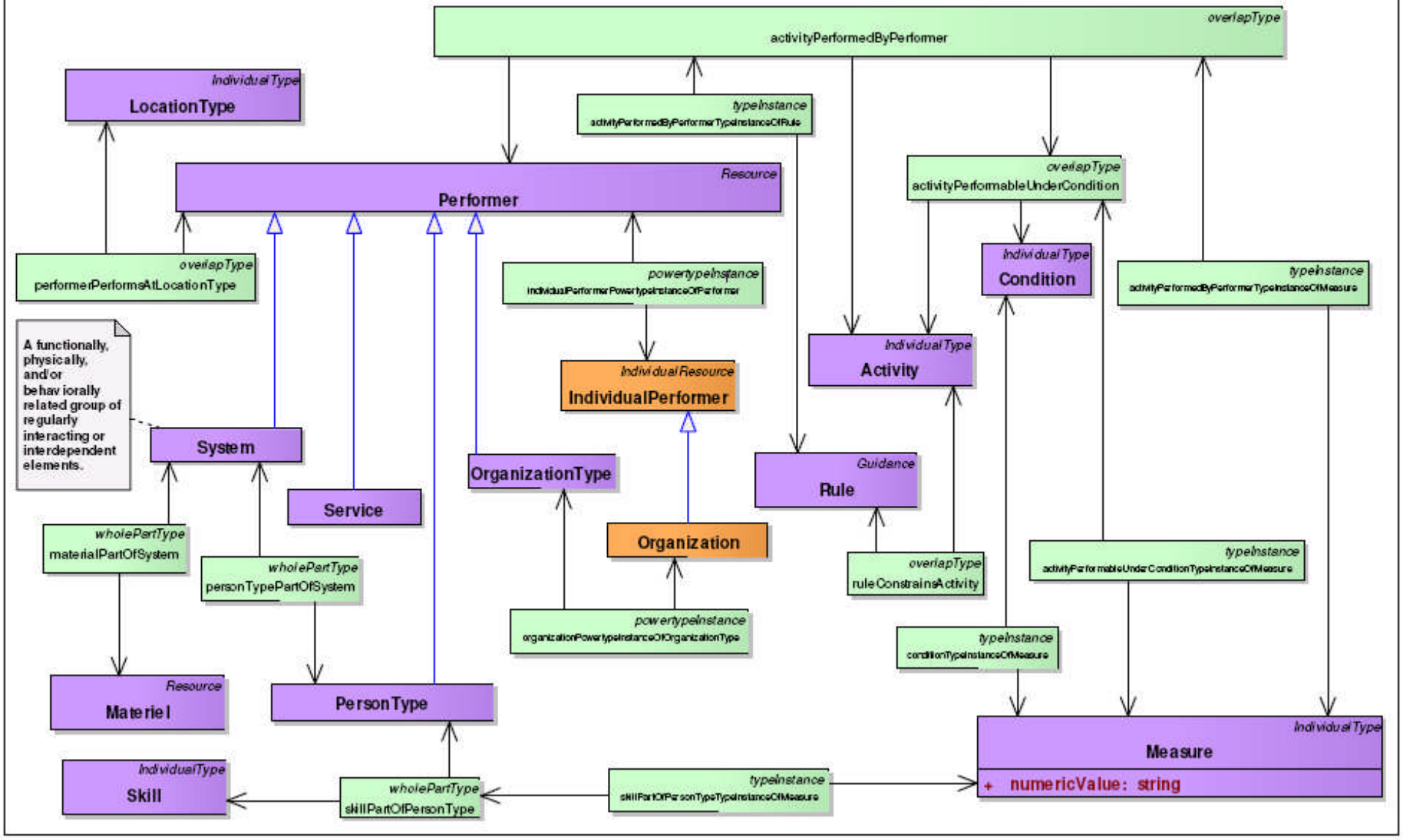
IDEAS Recap - Top-Level Foundation

- Developed by an international group of computer scientists, engineers, mathematicians, and philosophers under defense sponsorship.
- See http://www.ideasgroup.org or http://en.wikipedia.org/wiki/IDEAS_Group

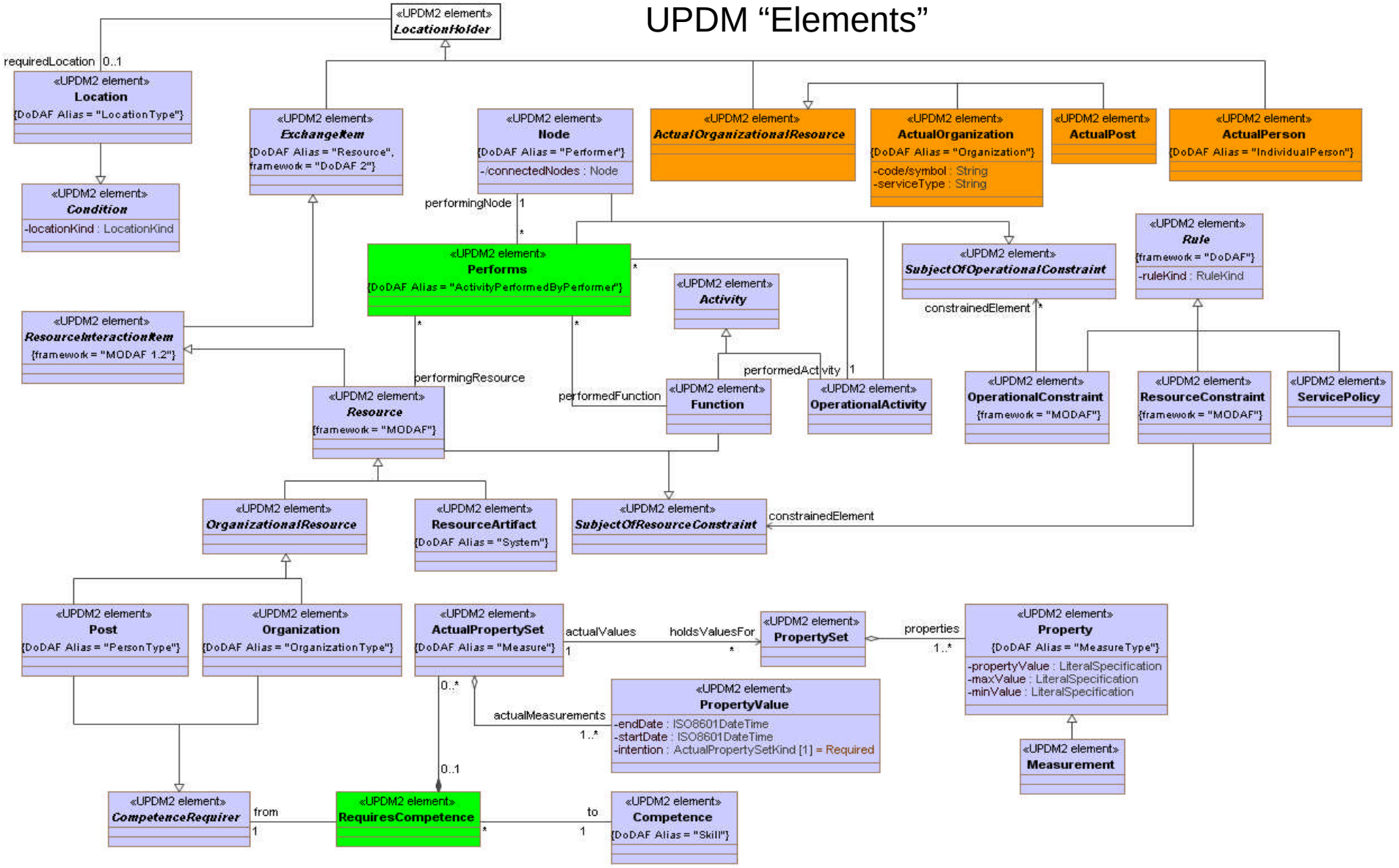


Performer

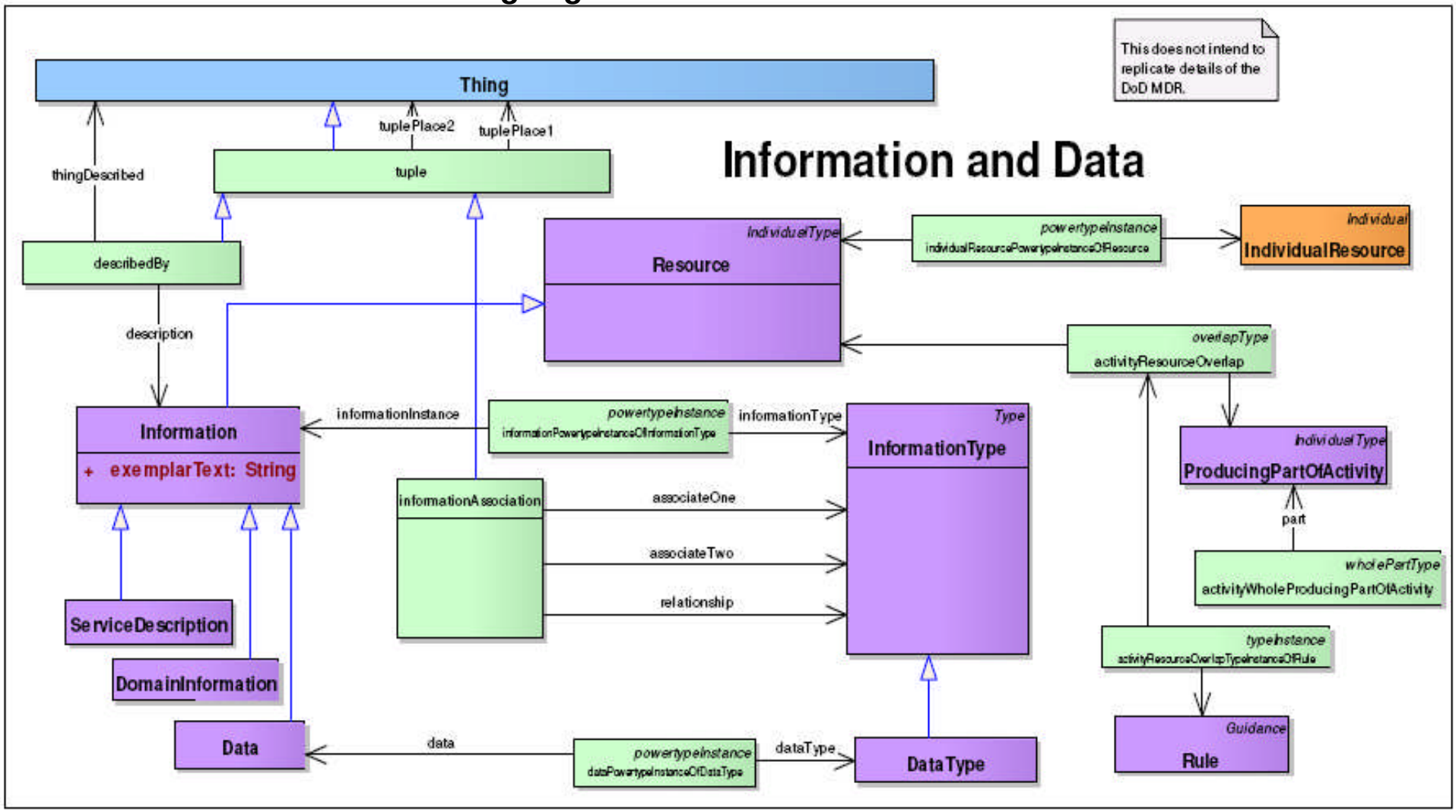
Note: Performer is one of DoDAF's 12 META-MODEL DATA GROUPS



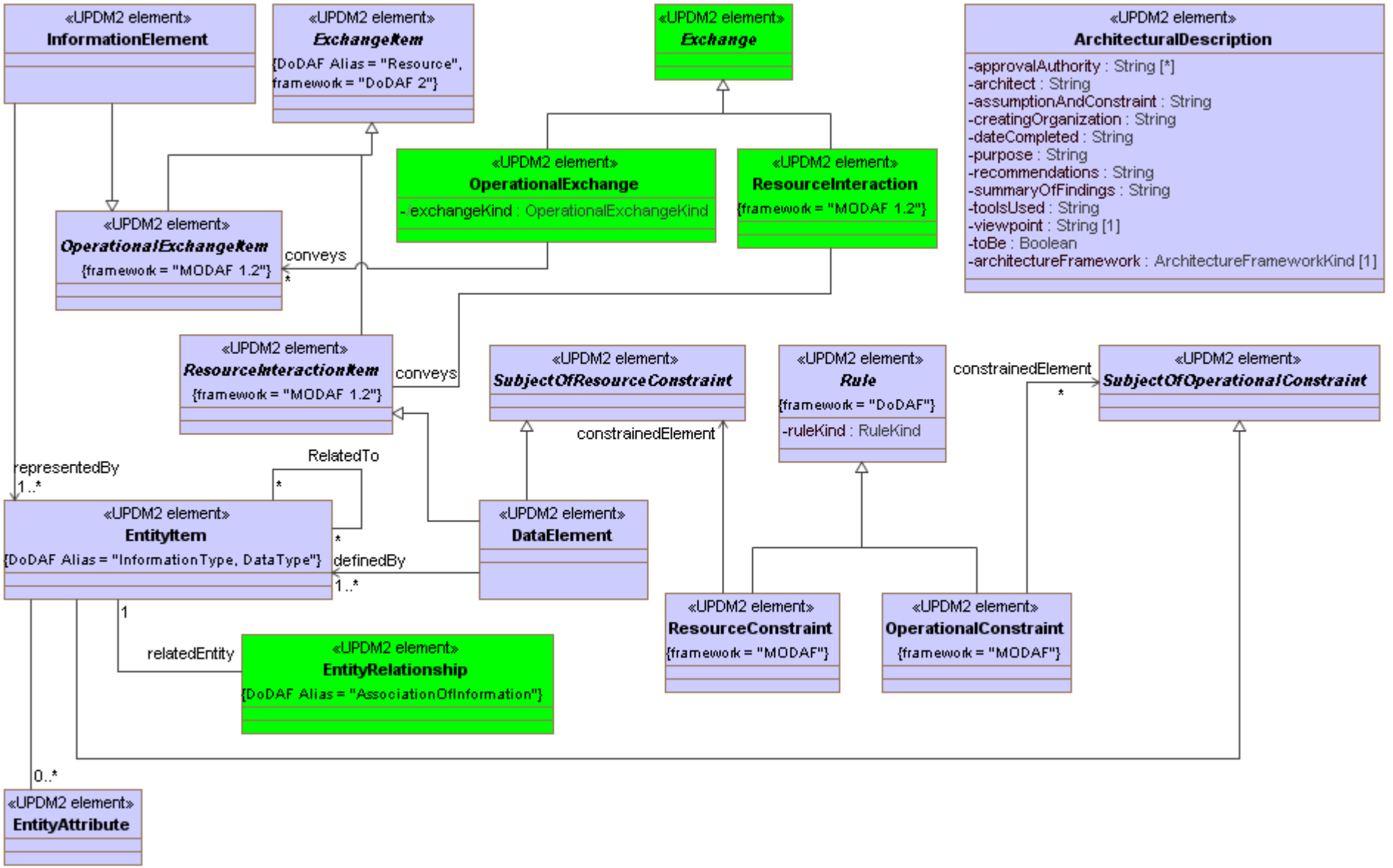
UPDM "Elements"



Note: "Thing" again – Recall IDEAS



UPDM – Unified Profile for DoDAF and MODAF

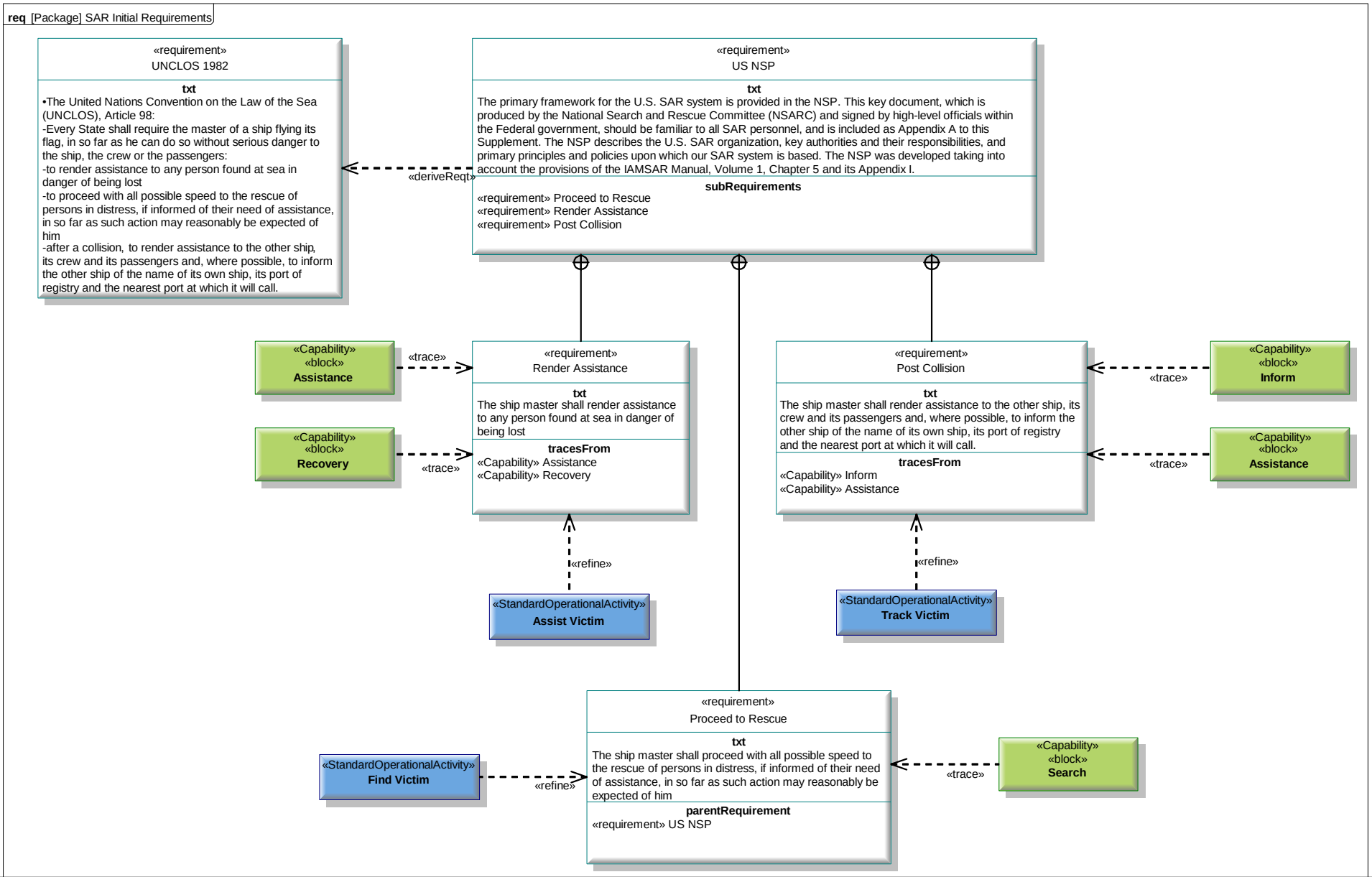


Search and Rescue (SAR) Example

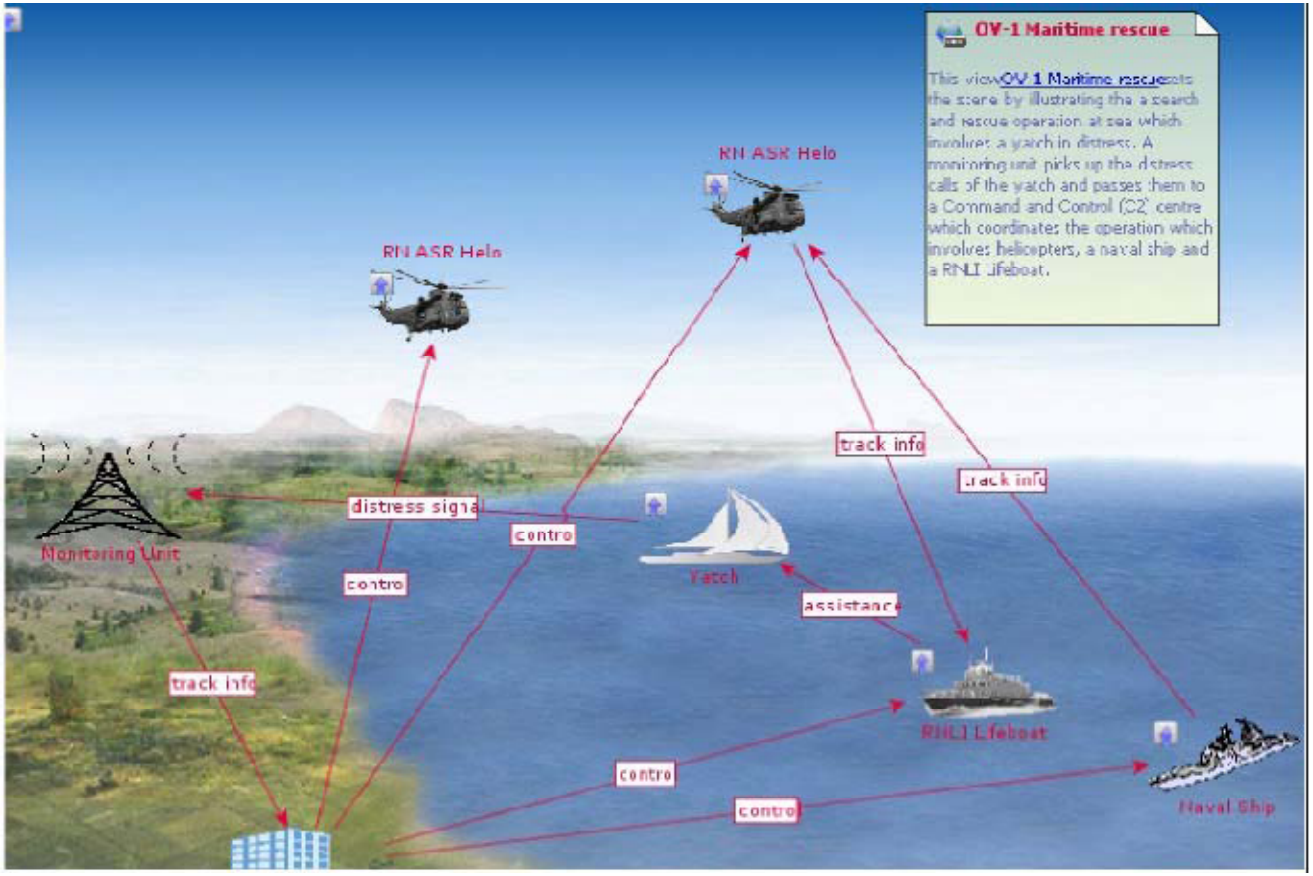
- The UPDM 2.0 Standard Will Have Approximately 50 Diagrams drawn from DoDAF 2.x, MODAF as well as several User Defined Diagrams
- We will take a quick look at the SAR Scenario and
- a selection of about ½ dozen diagrams
- Requirements Block Diagram (alternative to matrix) (user defined)
- OV-1 : High Level Operational Context; Mission Definition – Use Case
- OV-2 : Operational Node Connectivity (Flow Ports)
- OV-4: Organizations - Actual
- OV-5: Operational Activity
- OV-6: Event Trace / Rules
- SOV: Services: Mapping to Capability; & Service State Model
- AcV: Acquisition: Programs/Projects/Timelines
- StV: Strategic View: Enterprise, Phases, Capabilities
- SV: System View: Functionality Description - Activity Diagram; Systems Evolution; State Transition
- AV: Measurements (Parametrics)
- TV: Standards

UPDM Annex C: The "Yacht in Distress" Scenario

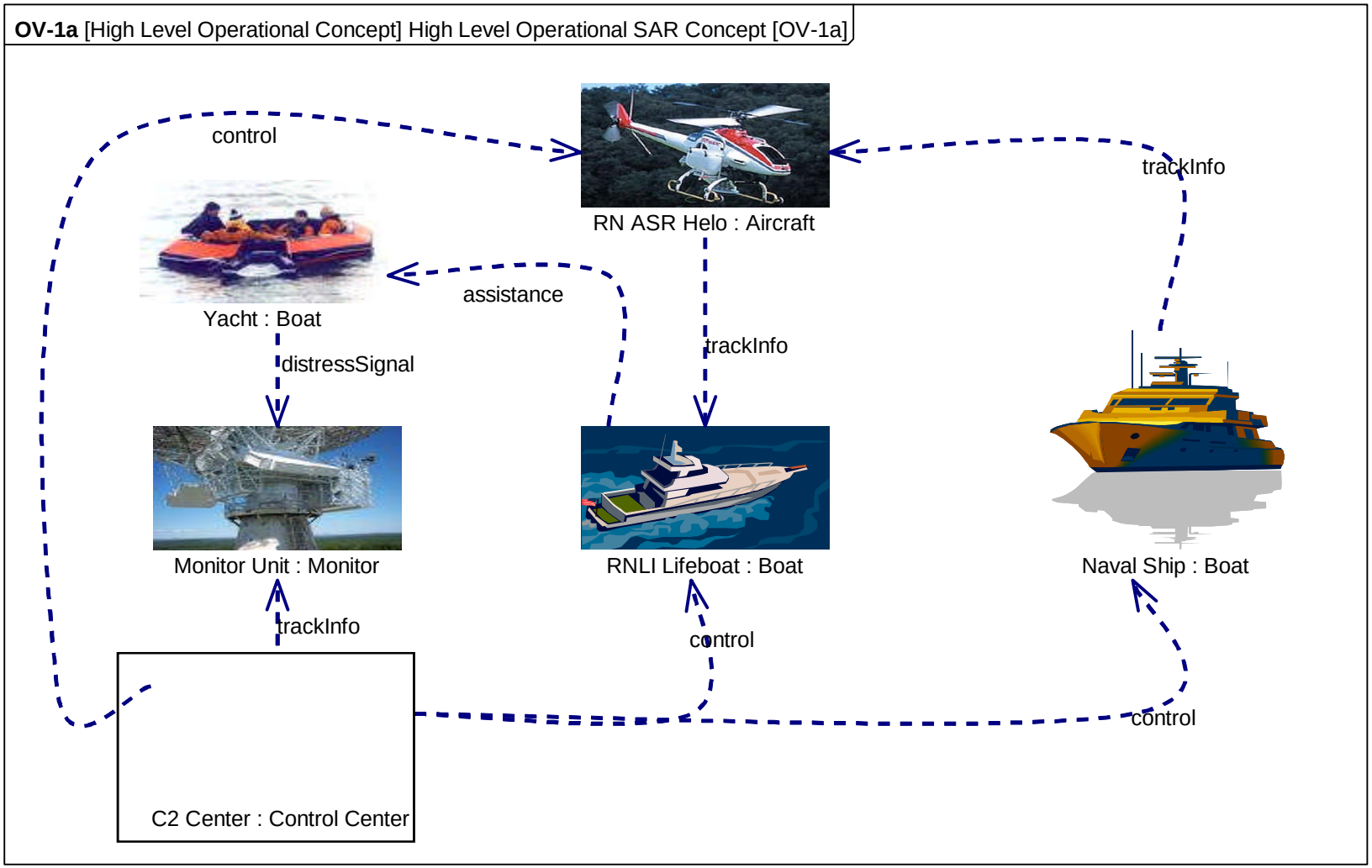
- Applies UPDM to a common scenario in civilian maritime Search and Rescue (SAR) operations -- a yacht in distress.
- A monitoring unit picks up the distress signal from the yacht and passes it on to the Command and Control (C2) Center.
- The C2 Center coordinates the search and rescue operation among helicopters, a naval ship, and a either Royal National Lifeboat Institution (RNLI) Lifeboat (UK) or the US Coast Guard (US).


req [Package] SAR Initial Requirements
«requirement»
UNCLOS 1982
txt
•The United Nations Convention on the Law of the Sea (UNCLOS), Article 98:
-Every State shall require the master of a ship flying its flag, in so far as he can do so without serious danger to the ship, the crew or the passengers:
-to render assistance to any person found at sea in danger of being lost
-to proceed with all possible speed to the rescue of persons in distress, if informed of their need of assistance, in so far as such action may reasonably be expected of him
-after a collision, to render assistance to the other ship, its crew and its passengers and, where possible, to inform the other ship of the name of its own ship, its port of registry and the nearest port at which it will call.
«deriveReqt»
«requirement»
US NSP
txt
The primary framework for the U.S. SAR system is provided in the NSP. This key document, which is produced by the National Search and Rescue Committee (NSARC) and signed by high-level officials within the Federal government, should be familiar to all SAR personnel, and is included as Appendix A to this Supplement. The NSP describes the U.S. SAR organization, key authorities and their responsibilities, and primary principles and policies upon which our SAR system is based. The NSP was developed taking into account the provisions of the IAMSAR Manual, Volume 1, Chapter 5 and its Appendix I.
subRequirements
«requirement» Proceed to Rescue
«requirement» Render Assistance
«requirement» Post Collision
«Capability»
«block»
Assistance
«trace»
«requirement»
Render Assistance
txt
The ship master shall render assistance to any person found at sea in danger of being lost
tracesFrom
«Capability» Assistance
«Capability» Recovery
«Capability»
«block»
Recovery
«trace»
«refine»
«StandardOperationalActivity»
Assist Victim
«requirement»
Post Collision
txt
The ship master shall render assistance to the other ship, its crew and its passengers and, where possible, to inform the other ship of the name of its own ship, its port of registry and the nearest port at which it will call.
tracesFrom
«Capability» Inform
«Capability» Assistance
«trace»
«Capability»
«block»
Inform
«trace»
«Capability»
«block»
Assistance
«refine»
«StandardOperationalActivity»
Track Victim
«requirement»
Proceed to Rescue
txt
The ship master shall proceed with all possible speed to the rescue of persons in distress, if informed of their need of assistance, in so far as such action may reasonably be expected of him
parentRequirement
«requirement» US NSP
«StandardOperationalActivity»
Find Victim
«refine»
«trace»
«Capability»
«block»
Search

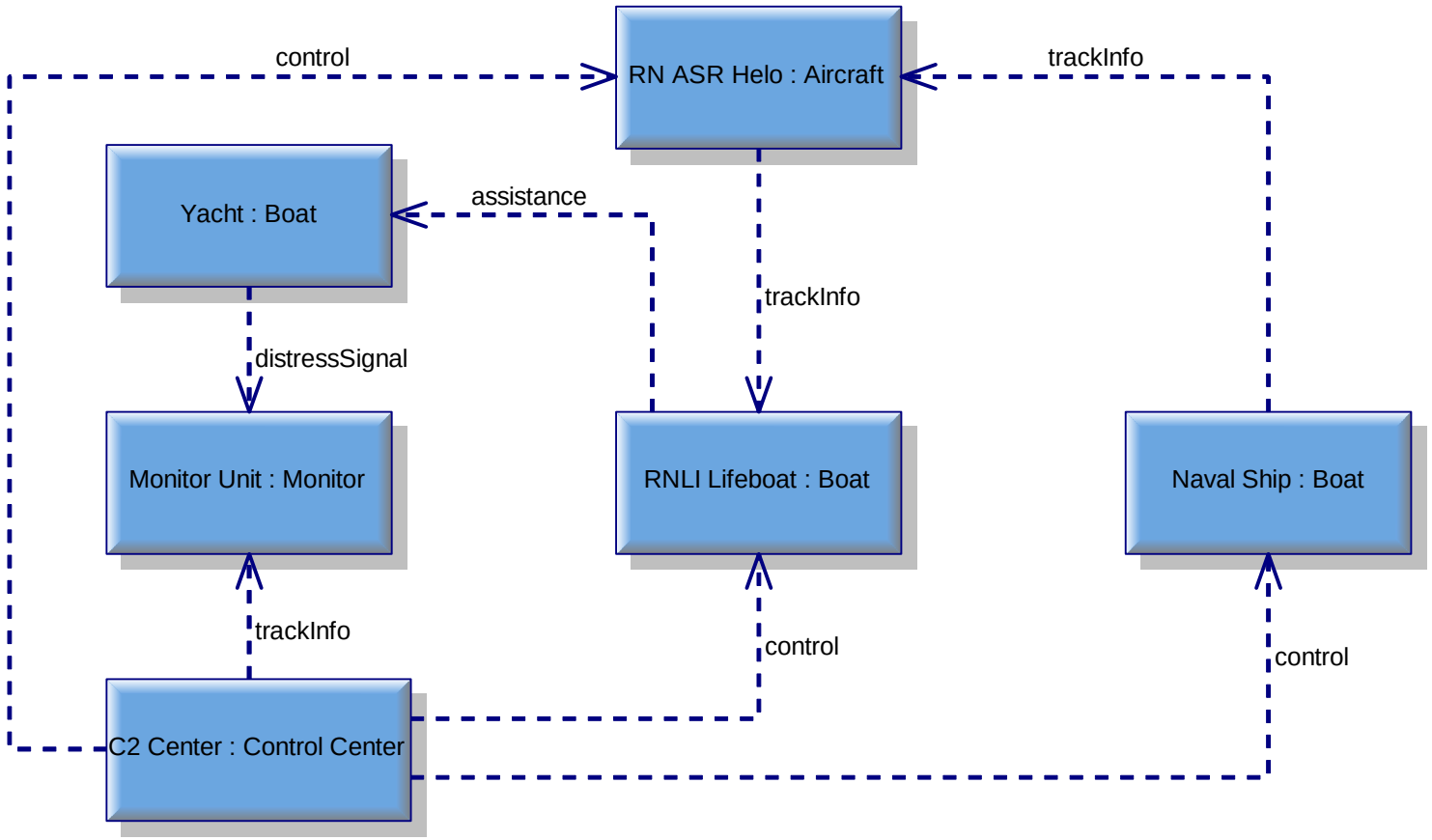
Alternate OV-1 (from UPDM 1.0)



OV-1b: Operational Context Graphic

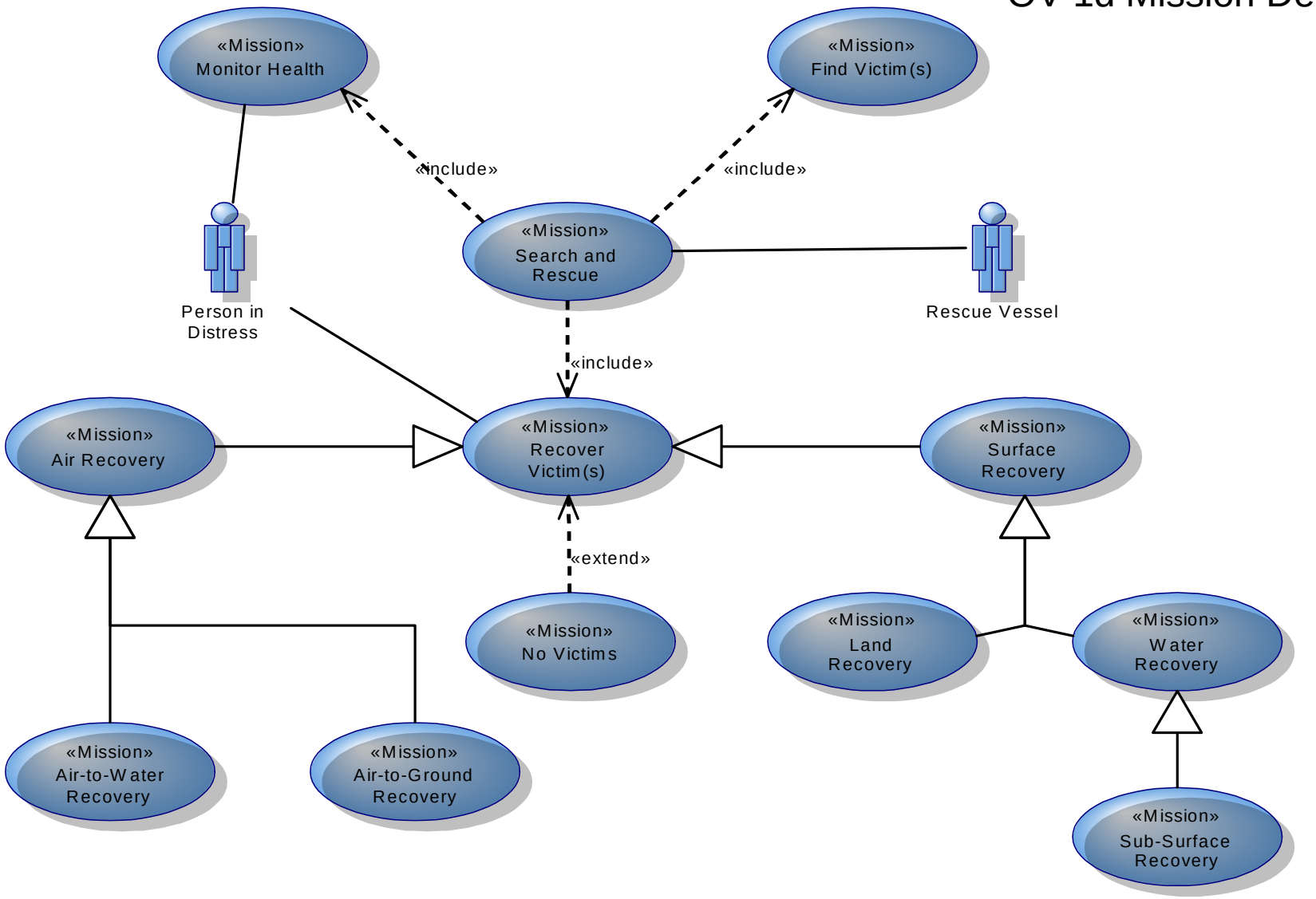


OV-1a [High Level Operational Concept] Maritime Rescue

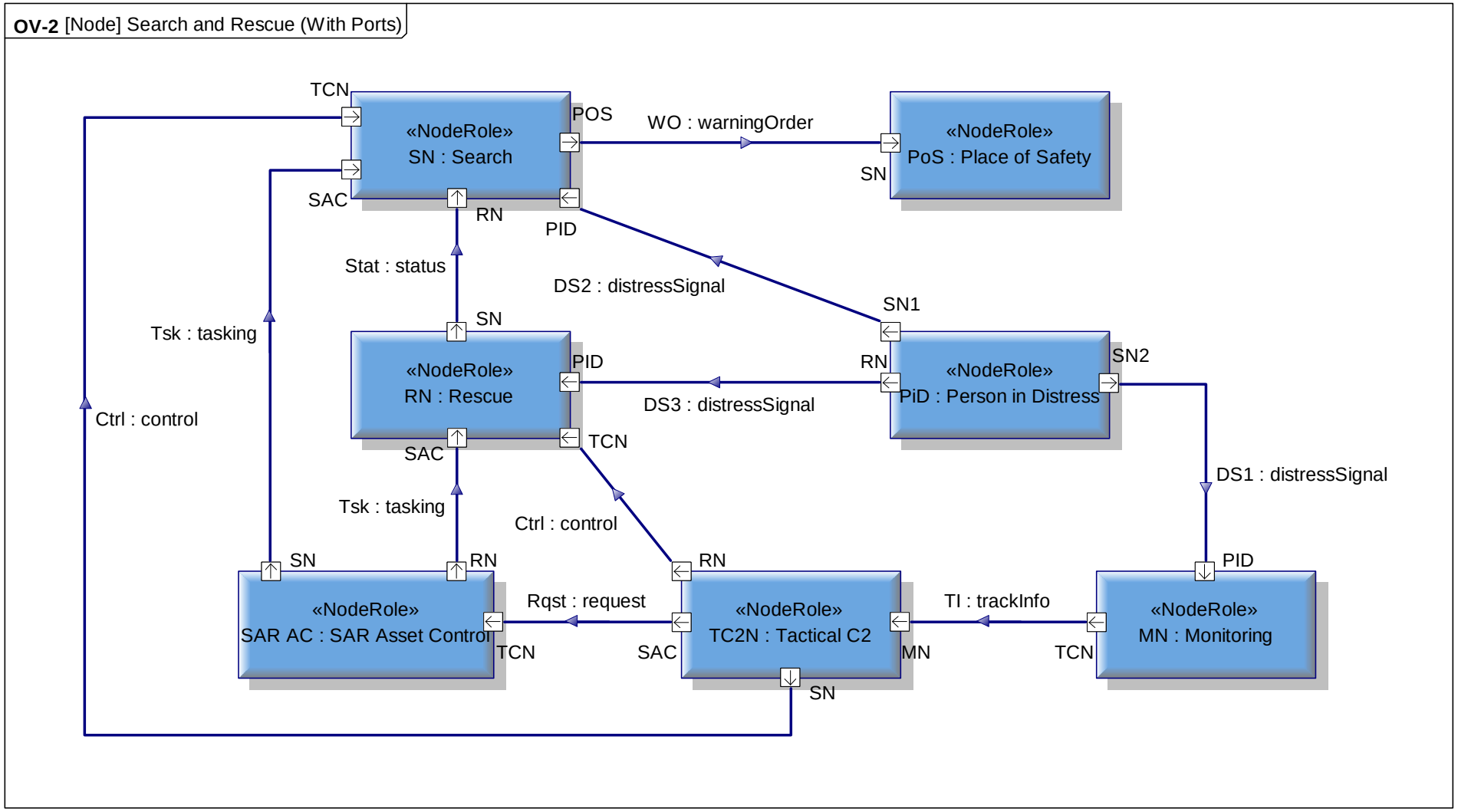


OV-1d [Enterprise Phase] Phase 1

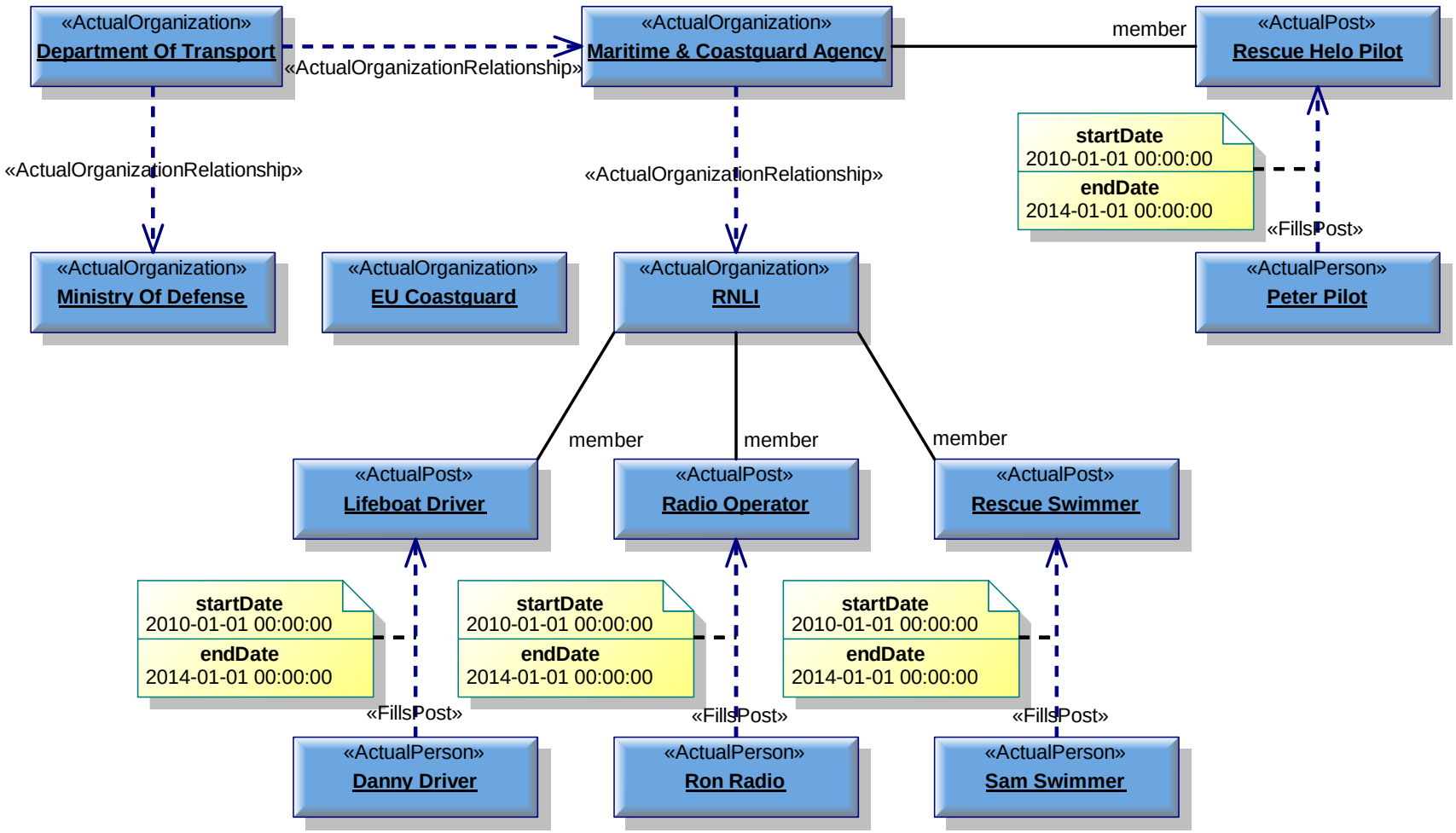
OV-1d Mission Definition

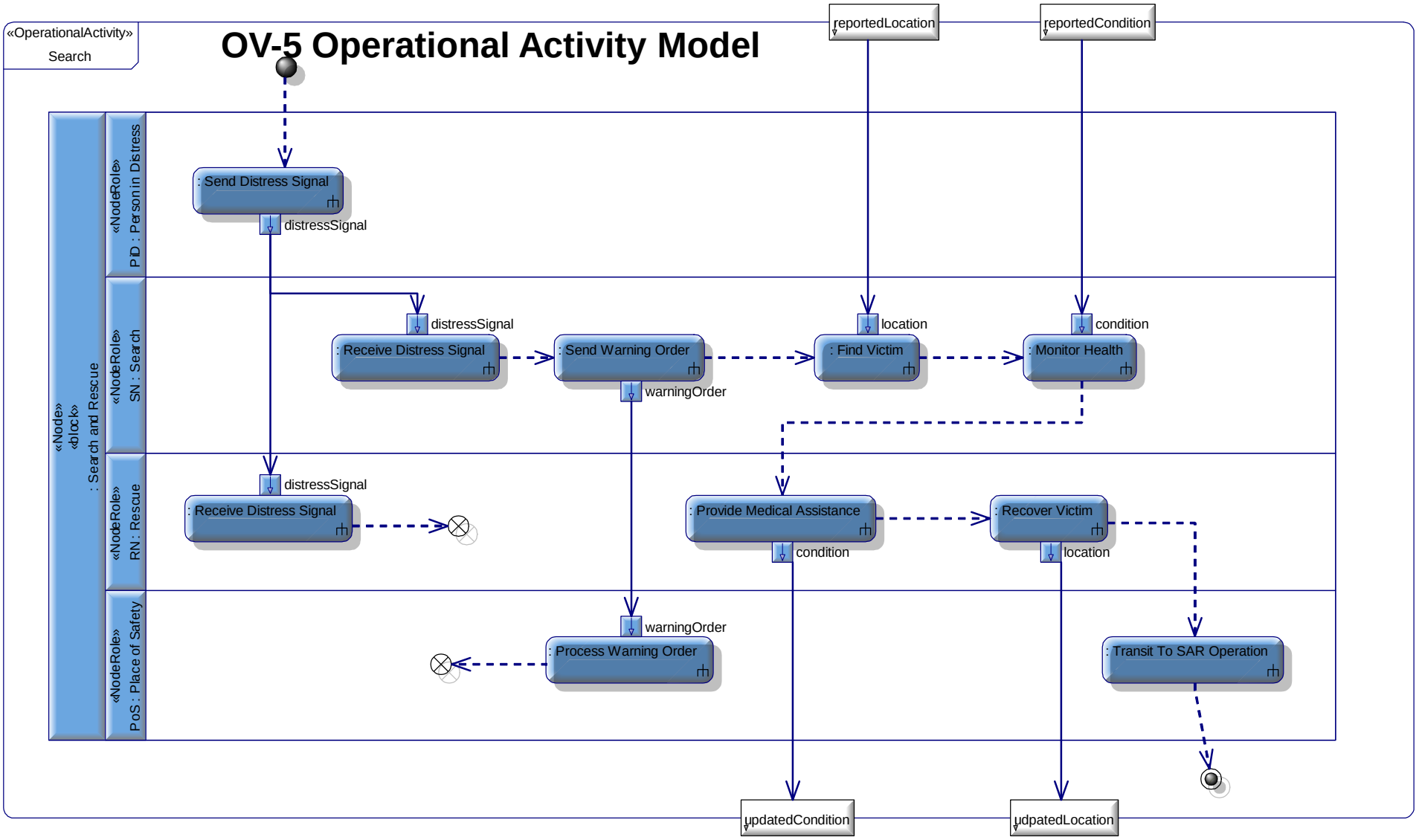


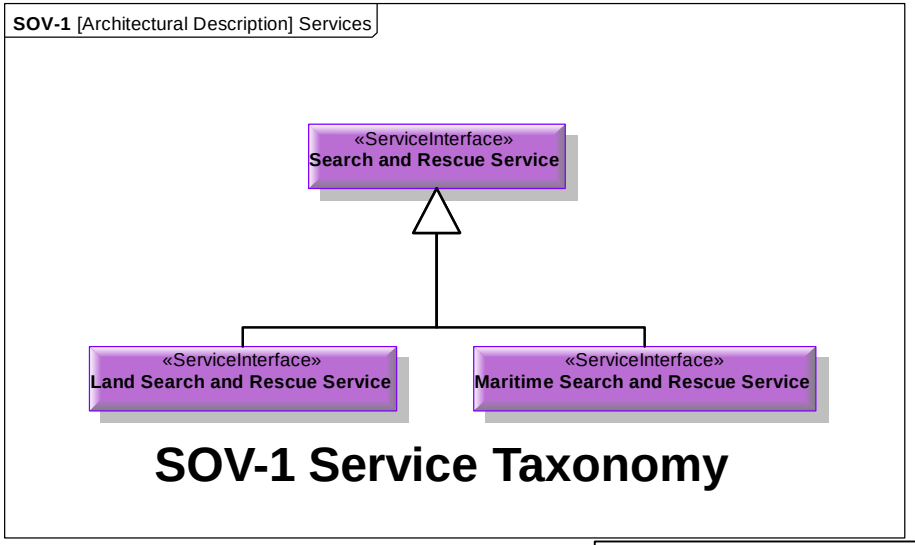
OV-2 Operational Nodes - Detail



OV-4 [Architectural Description] Actual Organizations

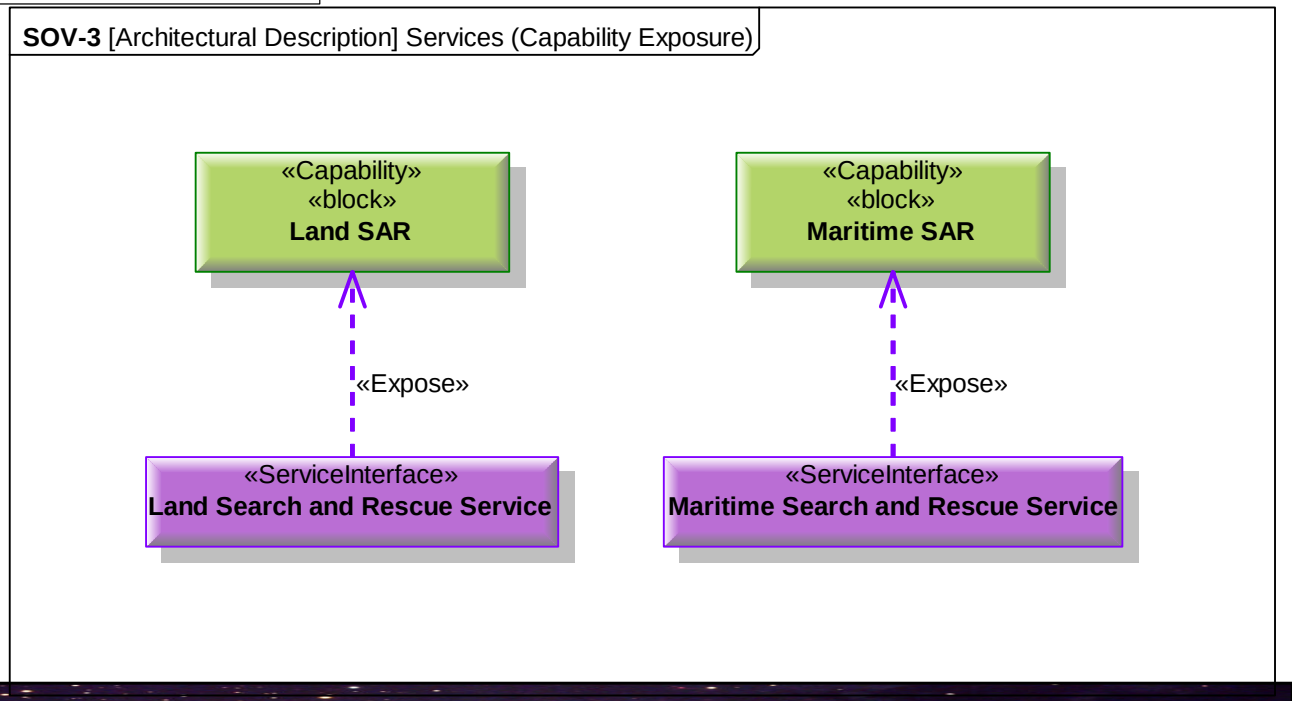



«OperationalActivity»
Search
OV-5 Operational Activity Model
reportedLocation
reportedCondition
«Node»
«Block»
: Search and Rescue
«NodeRole»
PiD : Person in Distress
«NodeRole»
SN : Search
«NodeRole»
RN : Rescue
«NodeRole»
PoS : Place of Safety
: Send Distress Signal
distressSignal
distressSignal
: Receive Distress Signal
: Send Warning Order
warningOrder
location
: Find Victim
condition
: Monitor Health
distressSignal
: Receive Distress Signal
: Provide Medical Assistance
condition
: Recover Victim
location
warningOrder
: Process Warning Order
: Transit To SAR Operation
updatedCondition
udpatedLocation



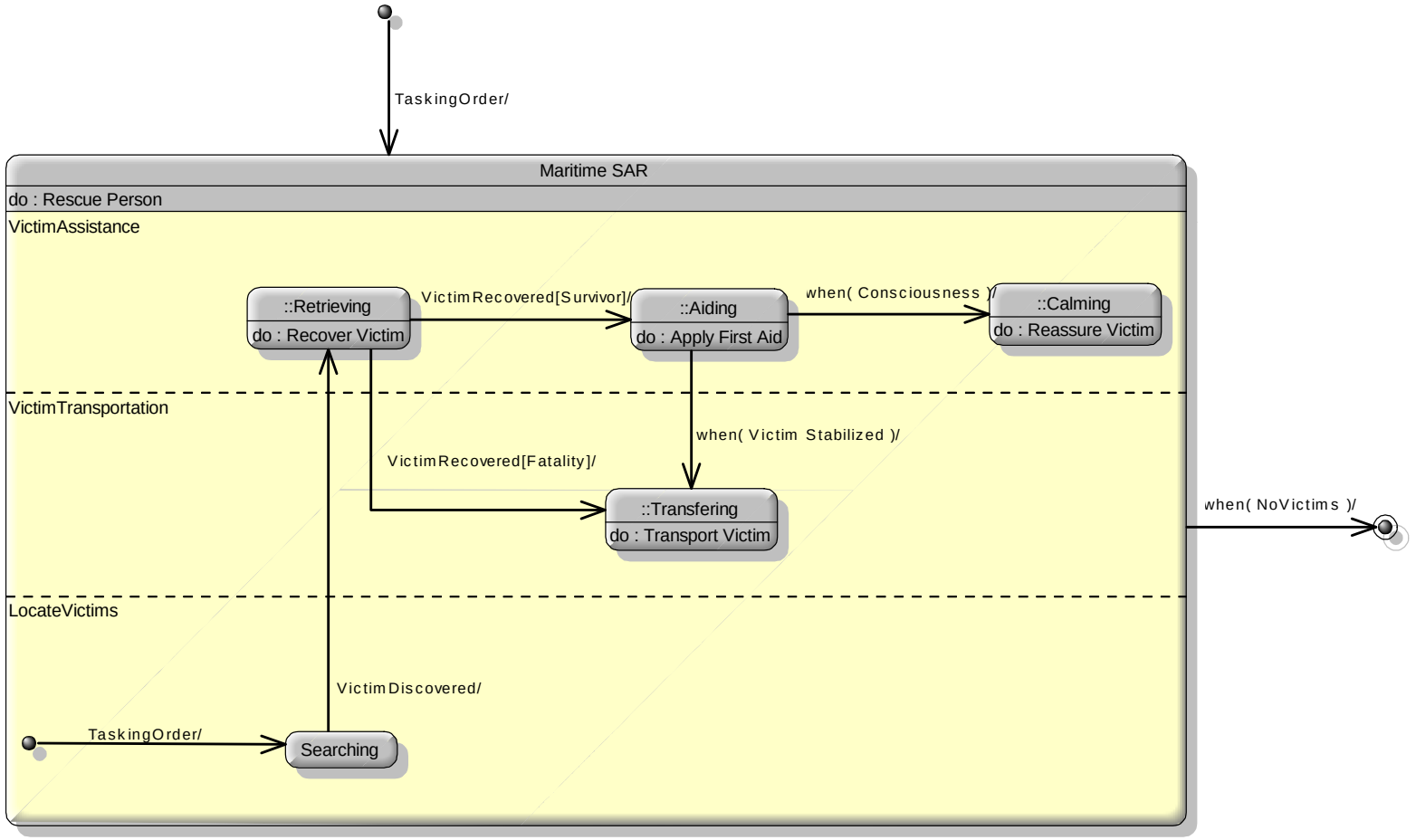
SOV-1 Service Taxonomy

SOV-3 Capability to Service Mapping



SOV-4b Service State Model

Maritime Search and Rescue Service

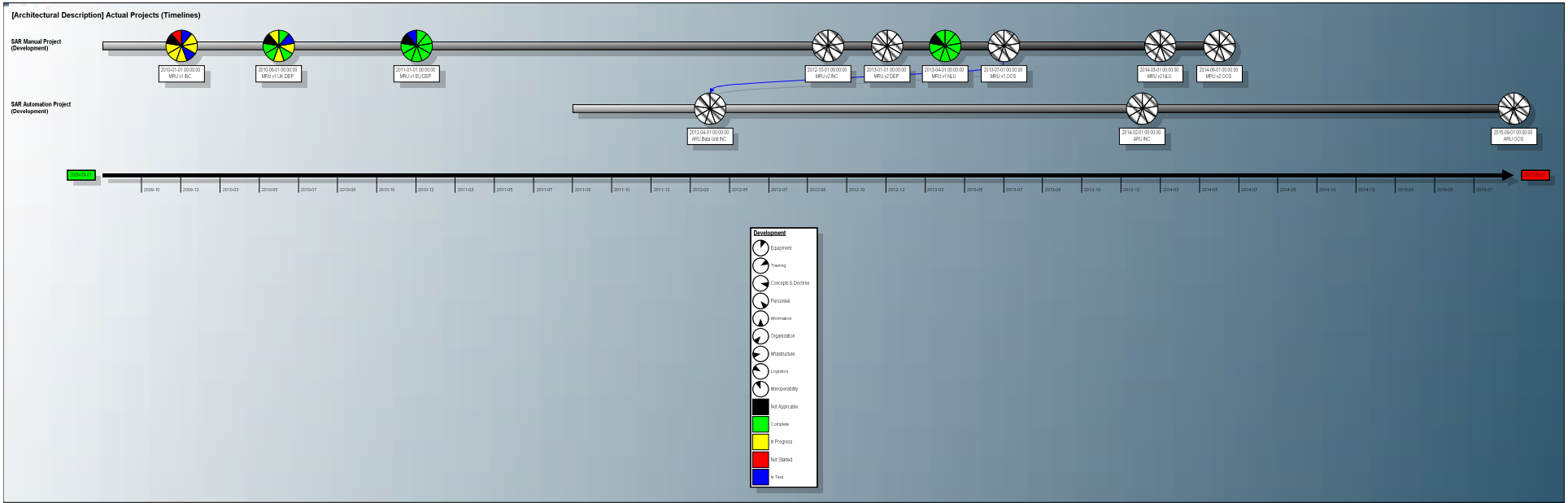


AcV-1 Acquisition Clusters

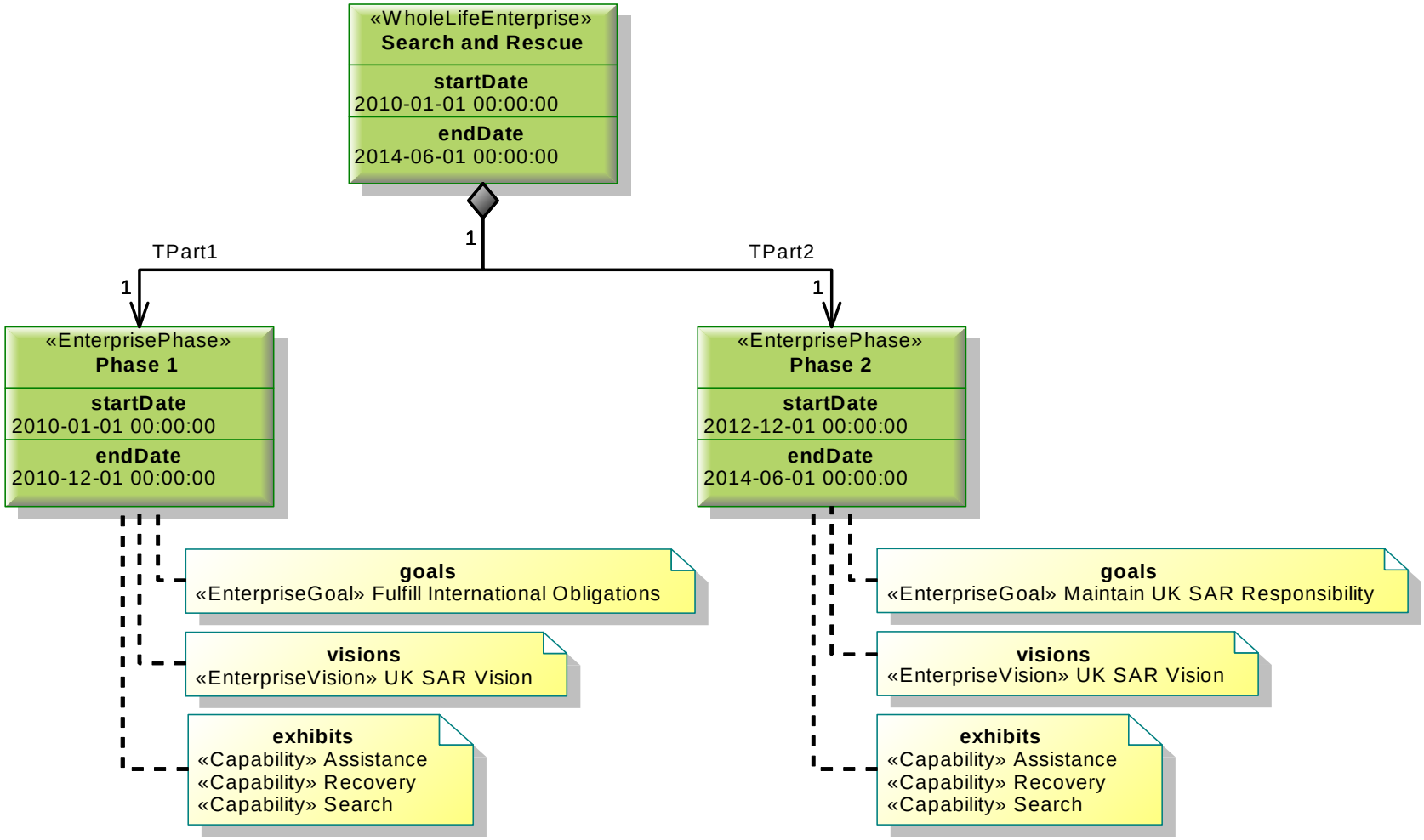
[Architectural Description] Actual P

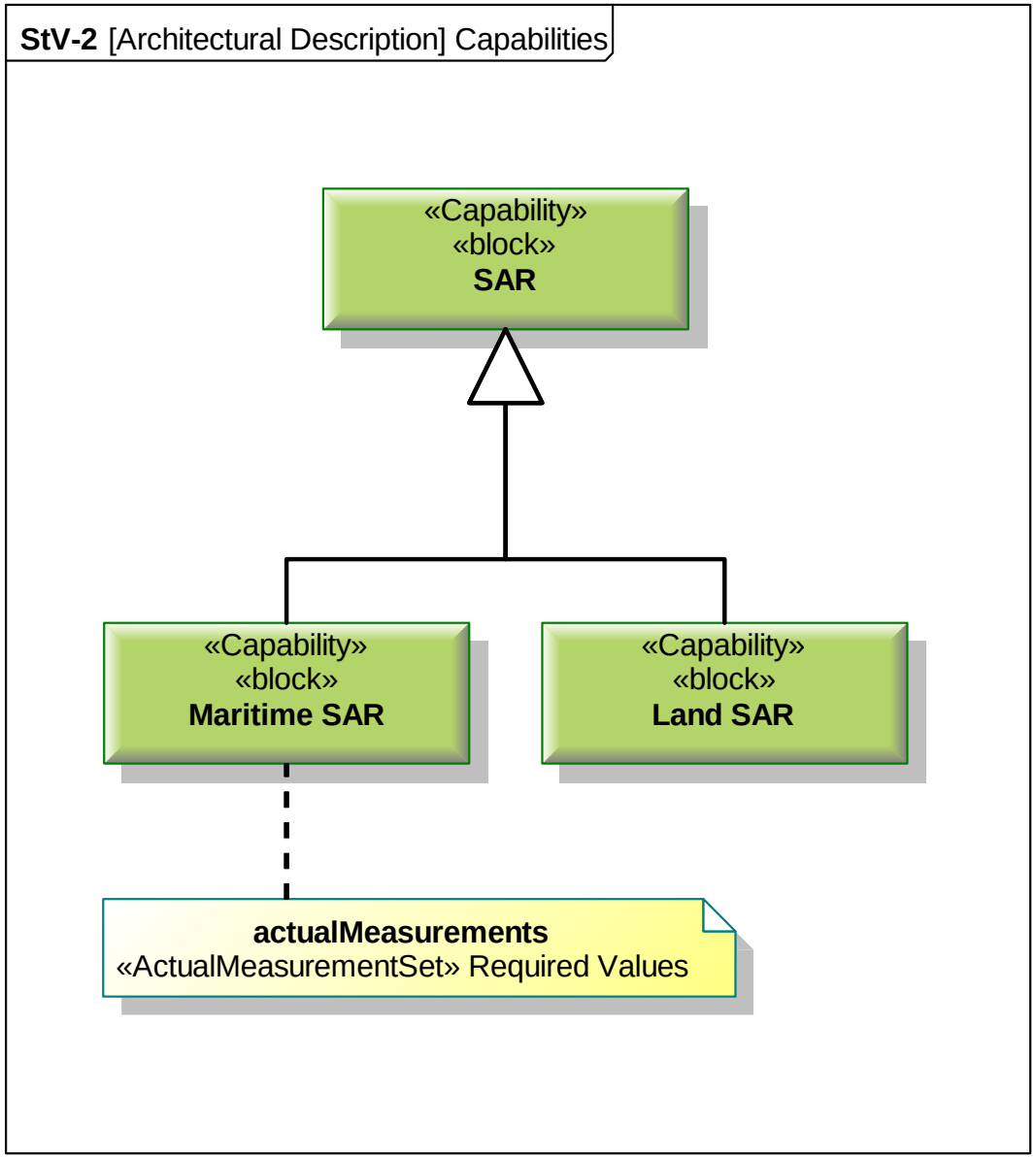
Project Owner	Actual Project
Department Of Transport	SAR Manual Project
	SAR Automation Project

AcV-2 Program/Project Timelines



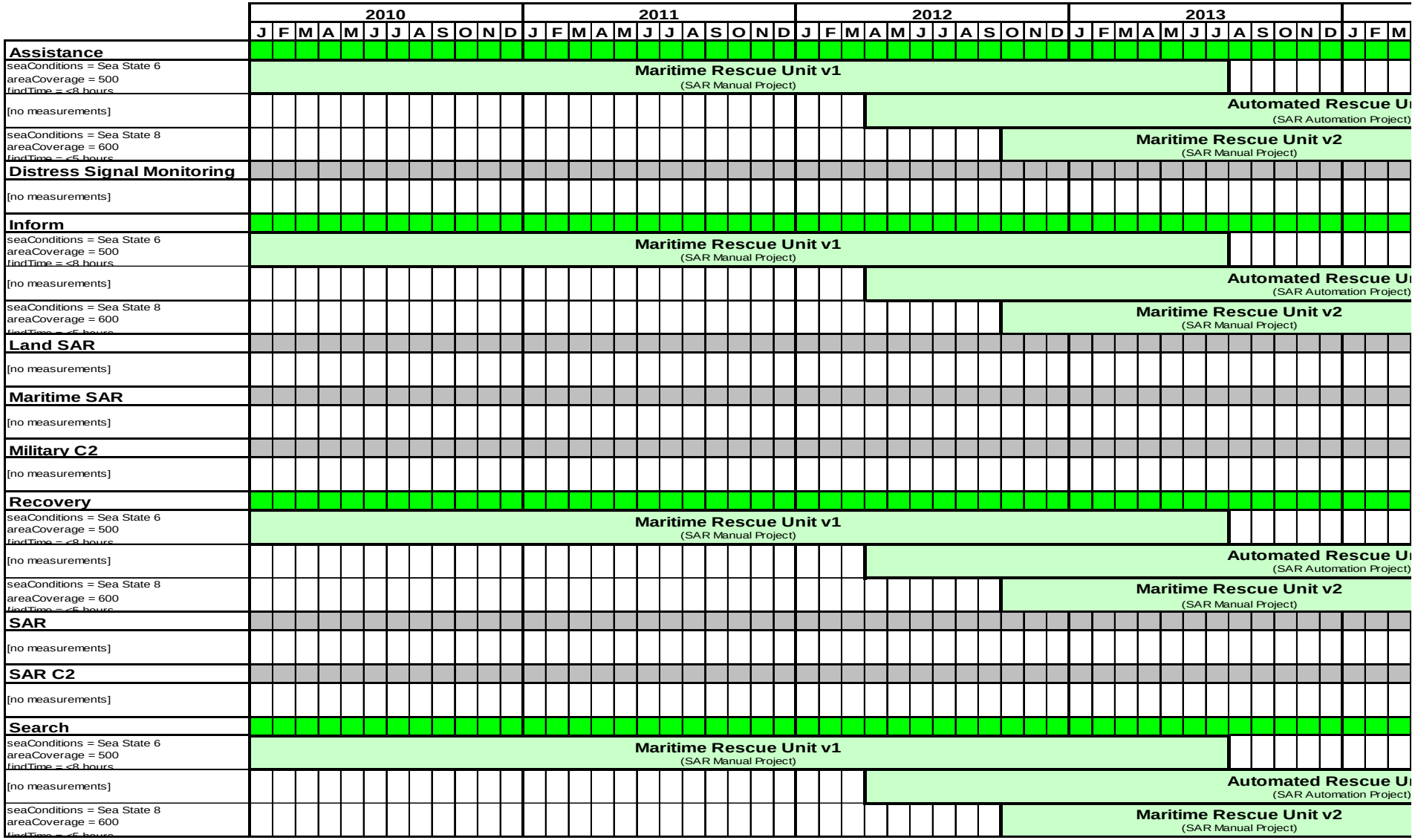
StV-1 [Architectural Description] Enterprise



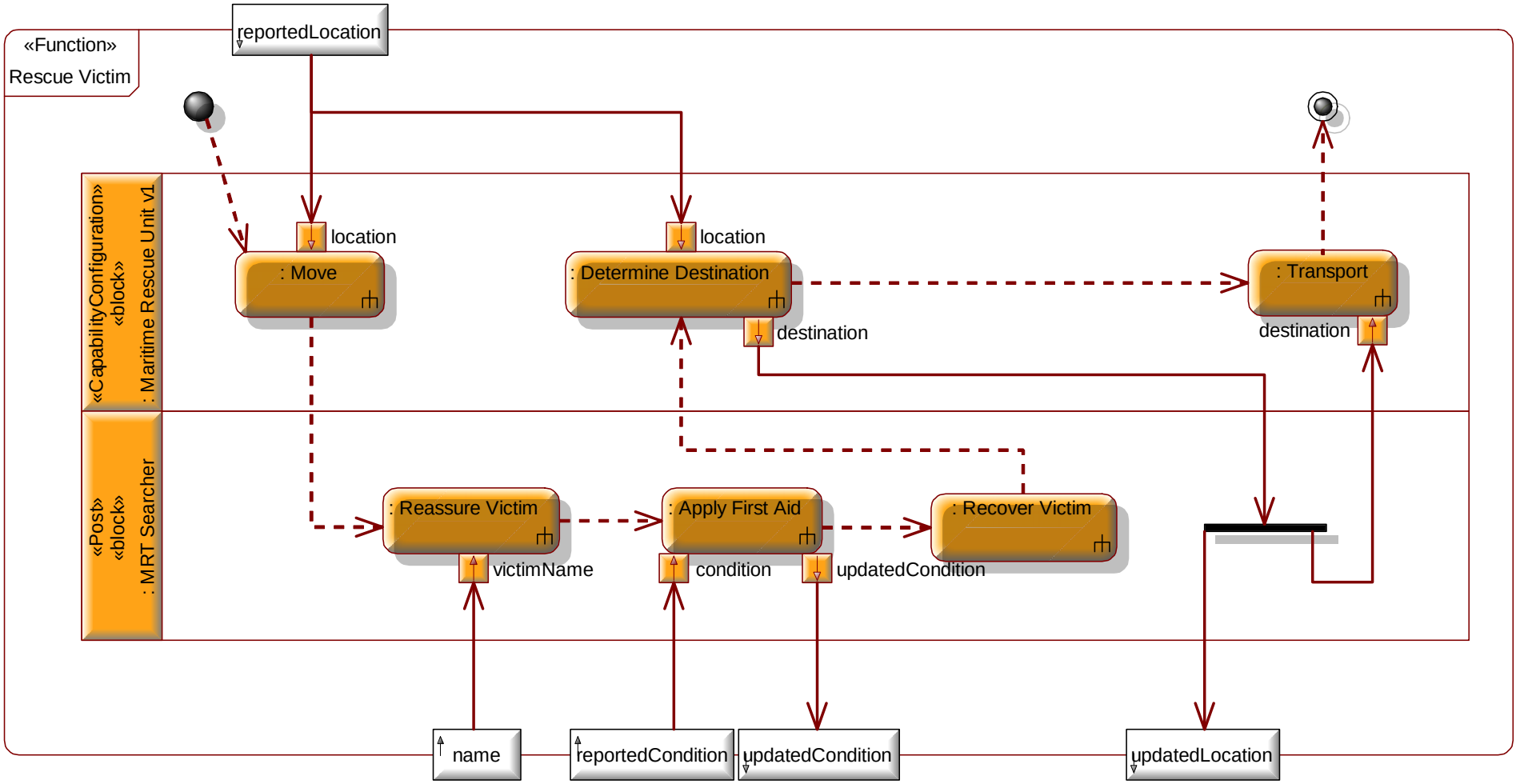

StV-2 [Architectural Description] Capabilities
«Capability»
«block»
SAR
«Capability»
«block»
Maritime SAR
«Capability»
«block»
Land SAR
actualMeasurements
«ActualMeasurementSet» Required Values

[Architectural Description] Capabilities (Coverage)

StV-3 Capability Phasing



SV-4 Functionality Description - Activity Diagram



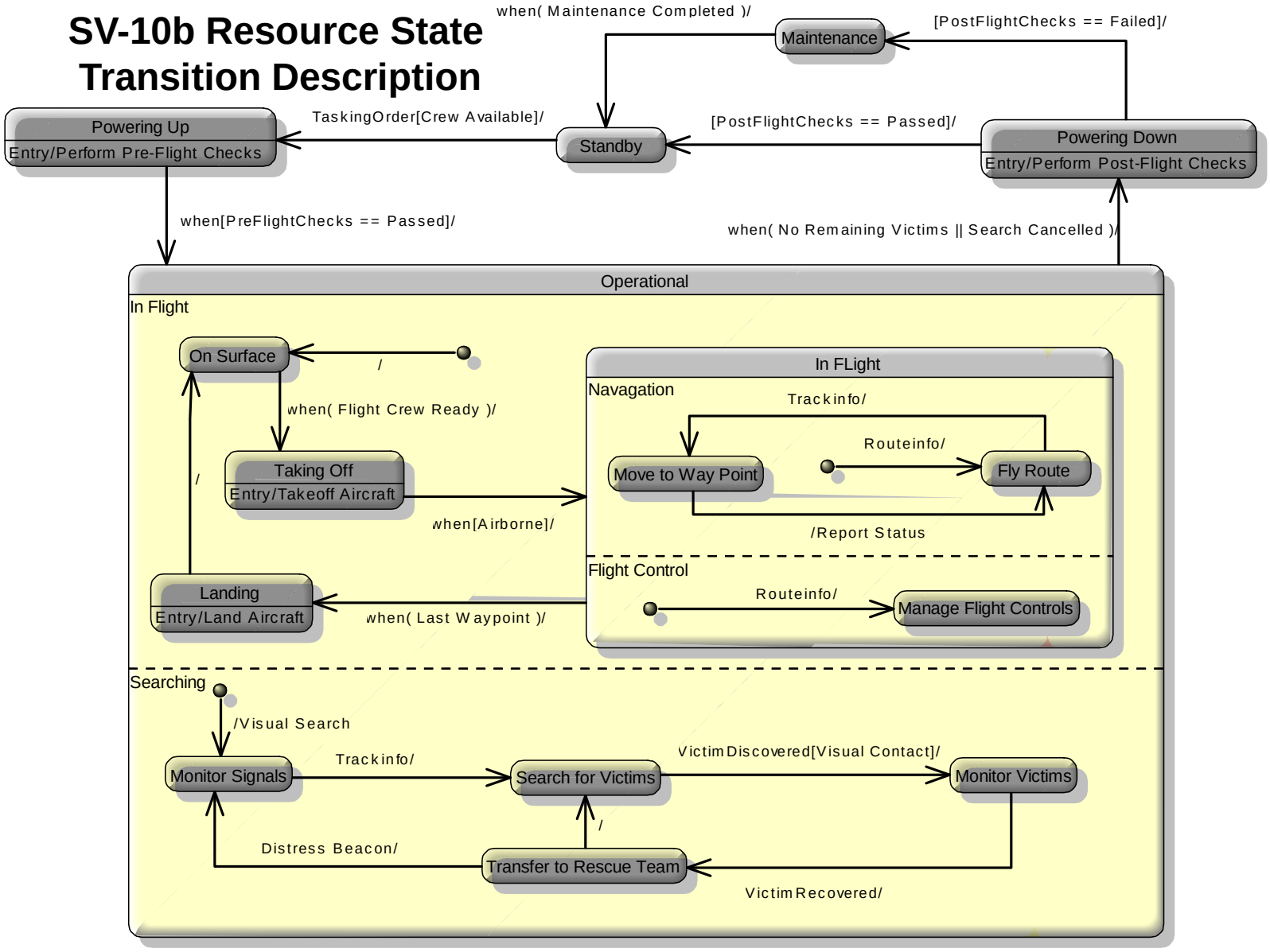
[Architectural Description] Capabilities [1]

SV-8 Systems Evolution Description

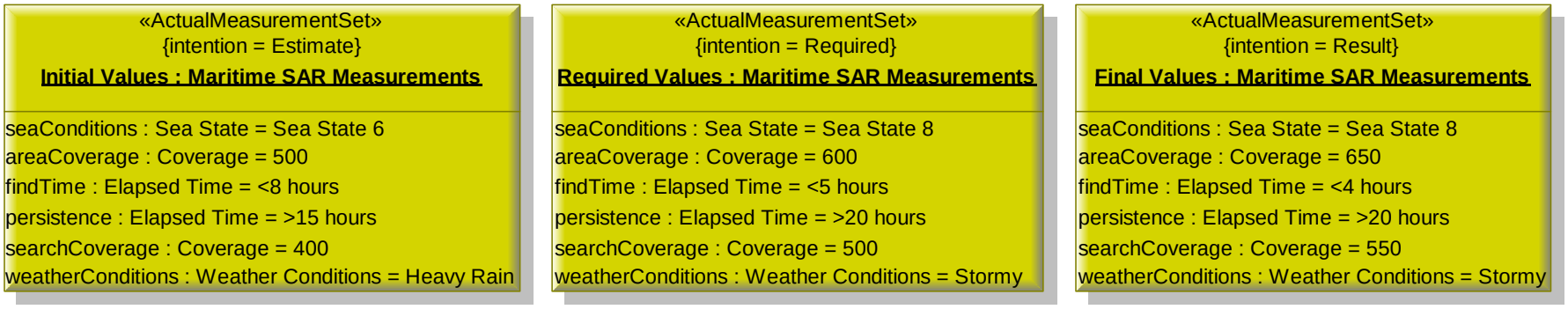
Capability	Realizing Resource		Milestone Dates						
Name	Name	Components	2010-01-01	2012-04-01	2012-10-01	2013-07-01	2014-02-01	2014-06-01	2015-09-01
Assistance	«Capability Configuration» Maritime Rescue Unit v1	«Resource Artifact» Lighting Device «Resource Artifact» Life Saving Device «Resource Artifact» Aircraft «Resource Artifact» Boat «Organization» Maritime Rescue Team «Resource Artifact» Communication Device	Increment			Out Of Service			
	«Capability Configuration» Maritime Rescue Unit v2				Increment			Out Of Service	
	«Capability Configuration» Automated Rescue Unit v1			Increment			Increment		Out Of Service
Distress Signal Monitoring									
Inform	«Capability Configuration» Maritime Rescue Unit v1	«Resource Artifact» Lighting Device «Resource Artifact» Life Saving Device «Resource Artifact» Aircraft «Resource Artifact» Boat «Organization» Maritime Rescue Team «Resource Artifact» Communication Device	Increment			Out Of Service			
	«Capability Configuration» Maritime Rescue Unit v2				Increment			Out Of Service	
	«Capability Configuration» Automated Rescue Unit v1			Increment			Increment		Out Of Service
Land SAR									
Maritime SAR									
Military C2									
Recovery	«Capability Configuration» Maritime Rescue Unit v1	«Resource Artifact» Lighting Device «Resource Artifact» Life Saving Device «Resource Artifact» Aircraft «Resource Artifact» Boat «Organization» Maritime Rescue Team «Resource Artifact» Communication Device	Increment			Out Of Service			
	«Capability Configuration» Maritime Rescue Unit v2				Increment			Out Of Service	
	«Capability Configuration» Automated Rescue Unit v1			Increment			Increment		Out Of Service
SAR									
SAR C2									
Search	«Capability Configuration» Maritime Rescue Unit v1	«Resource Artifact» Lighting Device «Resource Artifact» Life Saving Device «Resource Artifact» Aircraft «Resource Artifact» Boat «Organization» Maritime Rescue Team «Resource Artifact» Communication Device	Increment			Out Of Service			
	«Capability Configuration» Maritime Rescue Unit v2				Increment			Out Of Service	
	«Capability Configuration» Automated Rescue Unit v1			Increment			Increment		Out Of Service

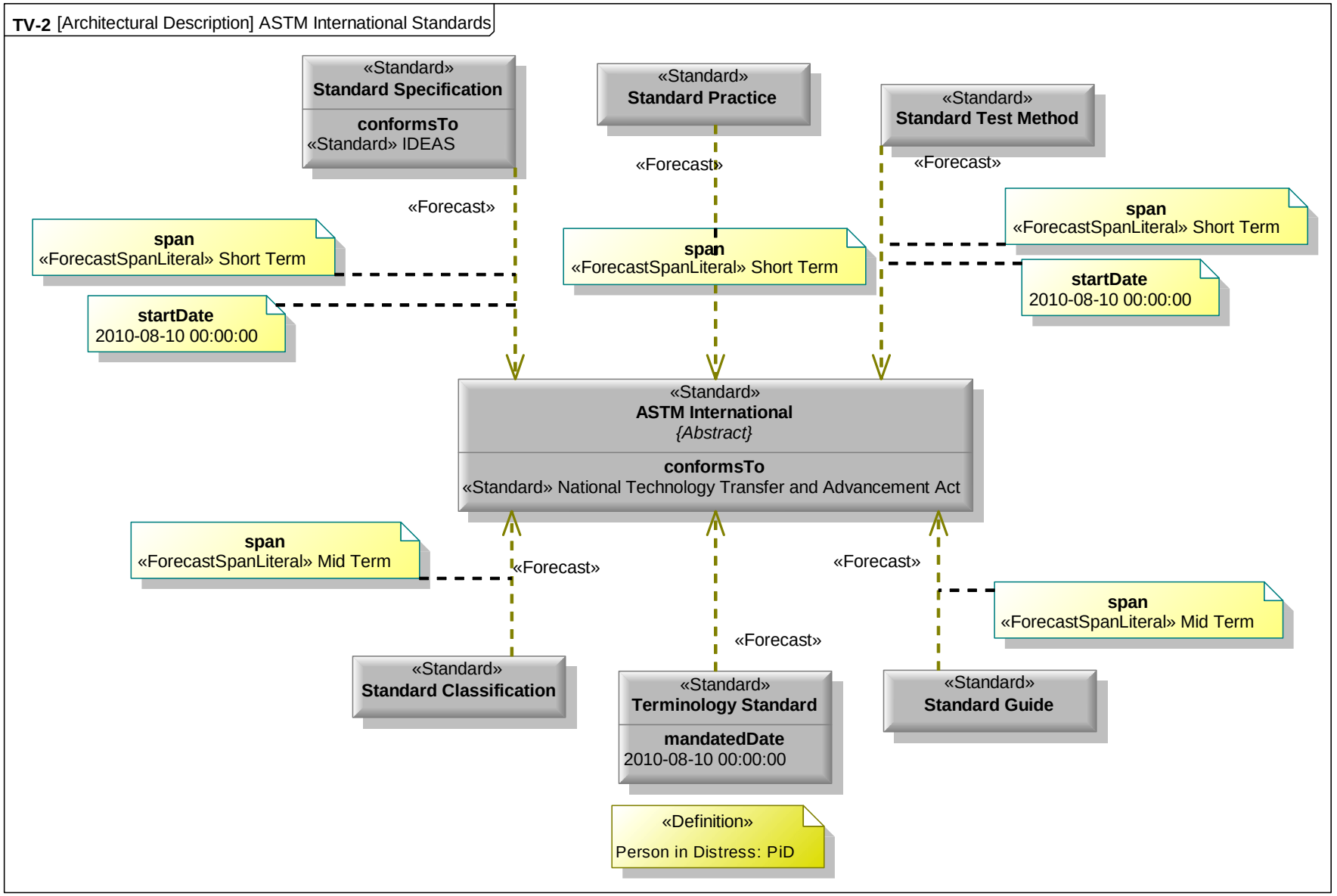
Aircraft

SV-10b Resource State Transition Description



AV-3 [Architectural Description] Measurements (Actual)




TV-2 [Architectural Description] ASTM International Standards
«Standard»
Standard Specification
conformsTo
«Standard» IDEAS
«Standard»
Standard Practice
«Standard»
Standard Test Method
«Forecast»
«Forecast»
«Forecast»
span
«ForecastSpanLiteral» Short Term
startDate
2010-08-10 00:00:00
span
«ForecastSpanLiteral» Short Term
span
«ForecastSpanLiteral» Short Term
startDate
2010-08-10 00:00:00
«Standard»
ASTM International
{Abstract}
conformsTo
«Standard» National Technology Transfer and Advancement Act
span
«ForecastSpanLiteral» Mid Term
«Forecast»
«Forecast»
span
«ForecastSpanLiteral» Mid Term
«Forecast»
«Standard»
Standard Classification
«Standard»
Terminology Standard
mandatedDate
2010-08-10 00:00:00
«Standard»
Standard Guide
«Definition»
Person in Distress: PiD

Please Hold Questions
Until End of Next
Short Briefing on
OMG XMI

Backup

- UPDM Level 1 is SysML compliant
- Who and Where: UPDM Team Members
- More on Domain Meta Model

Outline

- Why?
  - The need for UPDM.
- When?
  - The history and projected timetable for UPDM.
- Who and Where?
  - Who is in the UPDM RFC Group?
- How?
  - How was the specification created?
- What?
  - What is UPDM in general?
  - A detailed look at a few things.
- Questions and answers?

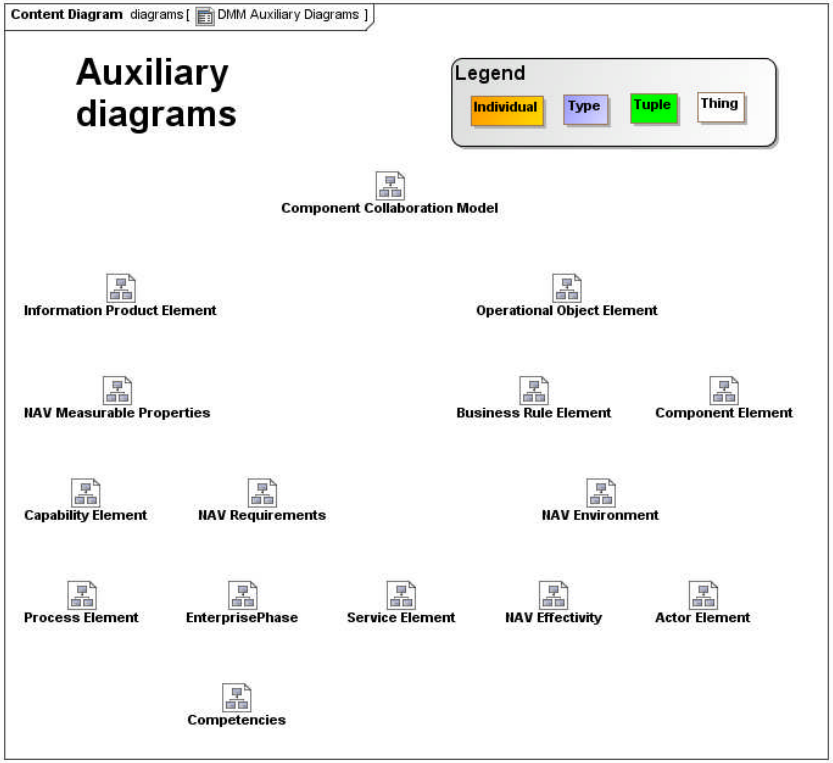
UPDM Level 1 Compliance SysML Extensions

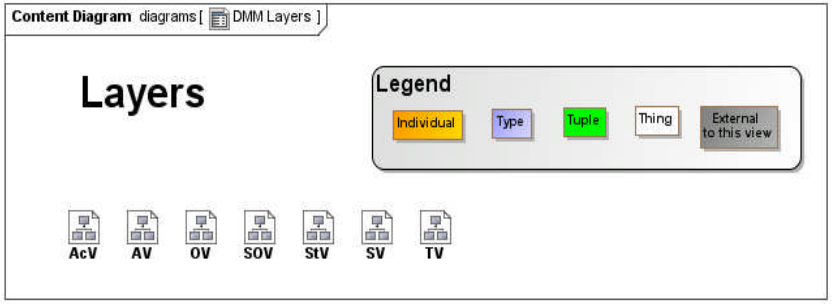
- Enables UPDM to leverage SysML features
  - SysML blocks to represent structural elements such as operational nodes, artifacts (systems), capability configurations, which enable the use of flow ports, item flows, and value properties with units and distributions
  - SysML activities to support continuous flow modeling, activity hierarchies, and support for enhanced functional flow block diagrams
  - SysML **parametrics** to enable the integration of engineering analysis with the architecture models (e.g., performance parameters in an SV-7 can be captured in parametric equations)
  - SysML **allocations** to support various types of mappings such as an SV-5 that maps system functions to operational activities
- Other SysML Features
  - SysML requirements enable text based requirements to be captured and traced to other model elements using the satisfy, derive, verify and refine relationships
  - SysML view and viewpoint enable provide for multiple perspectives of the model, and to manage, control, and organize information.
  - Callout notation

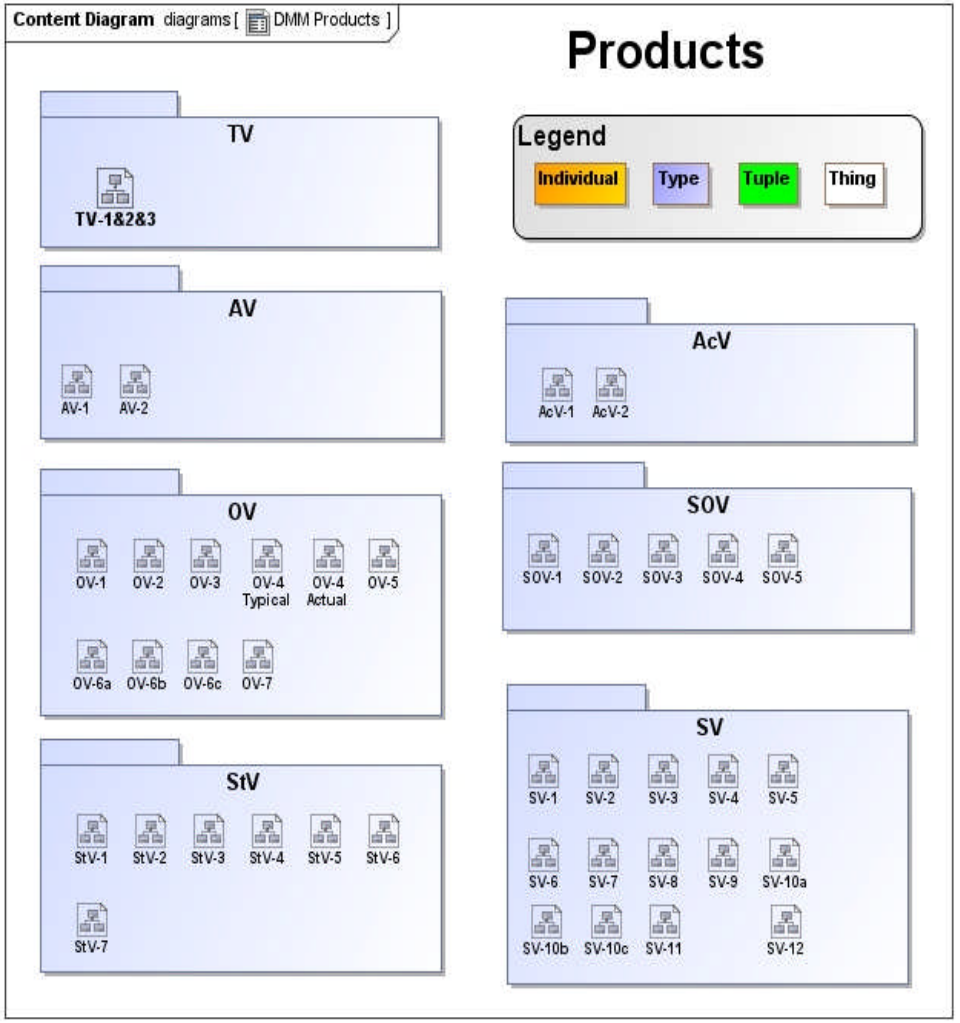
Who and Where: UPDM Team Members

- US DoD Liaison - DoD/DISA, OSD CIO, Mitre, Silver Bullet
- UK MOD Liaison - UK MOD, ModelFutures
- Canada DND Liaison – DND and ASMG Ltd
- NATO – Generic AB on behalf of SwAF and on contract by FMV
- Tool Vendors – Adaptive, Atego (Co-Chair), EmbeddedPlus, IBM (Co-Chair), Mega, NoMagic (Co-Chair), Sparx Systems, Visumpoint
- Aerospace – BAE Systems, General Dynamics, L3 Communications, Lockheed Martin, Northrop Grumman, Raytheon, Rolls-Royce, Selex SI, Thales, Unisys
- Advisors – Decisive Analytics
- Distributed multi national team (US, UK, France, Sweden, Lithuania, Australia, Canada, Thailand, Italy)

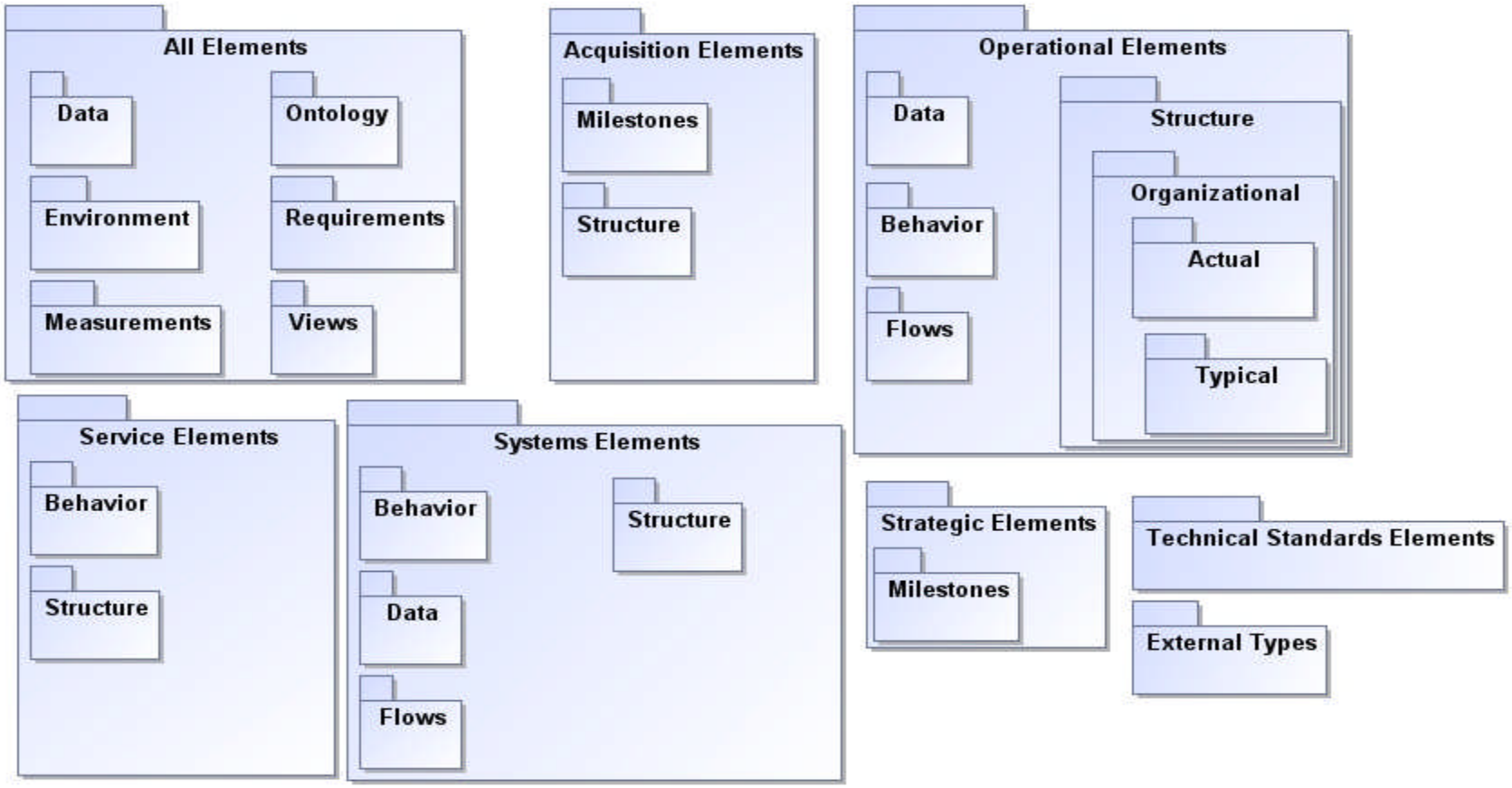
UPDM RFC - Domain Meta Model Summary







UPDM RFC - Domain Meta Model Summary (Packages.)



- Package structure organizes stereotypes by viewpoint
- Multiple viewpoints manage model complexity