

UNIFIED ARCHITECTURE FRAMEWORK (UAF) HUMAN VIEWS

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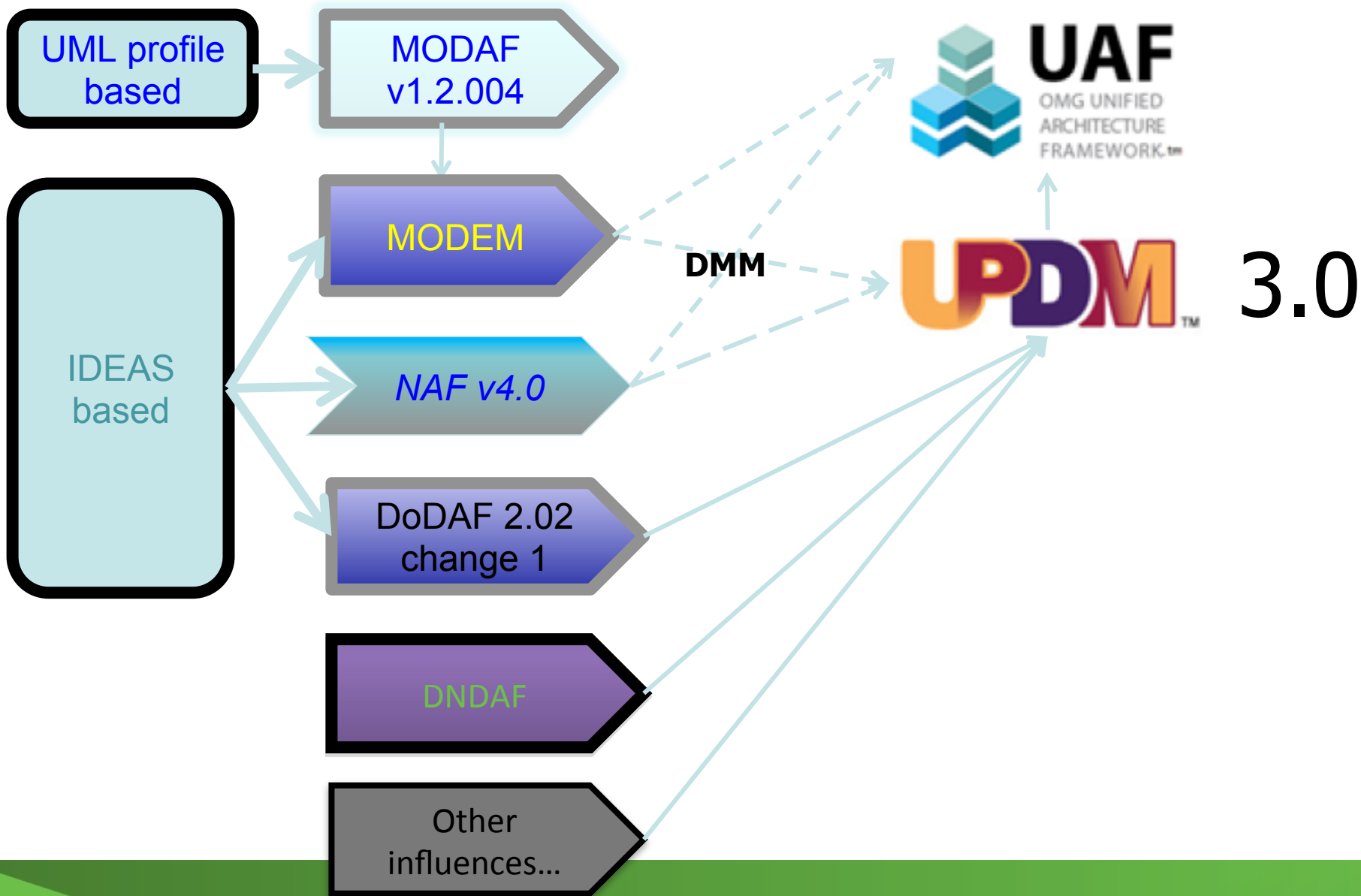


HUMAN FACTORS/PERSONNEL VIEWS - AGENDA

- Background
- Views
 - Taxonomy
 - Structure
 - Connectivity
 - Processes
 - States
 - Interaction
 - Constraints
 - Roadmap
 - Traceability
- Conclusion

- UPDM RFP requirement: " The UPDM V3.0 domain metamodel shall be derived from MODEM and DM2, both of which are based upon the International Defence Enterprise Architecture Specification Foundation [IDEAS]."
 - Mandatory requirements:
 - √ Provide Domain Metamodel derived from MODEM and DM2
 - √ An Architecture Framework Profile Using SysML
 - √ Supports BPMN 2.0
 - √ Use of SysML Requirements Elements and Diagrams
 - √ Use of SysML Parametrics Elements and Diagrams Mapped to Measurements
 - √ Traceability Matrix to Supported Frameworks
 - √ Support for data and information viewpoints
 - √ Traceability to UPDM 2.x for backward compatibility
 - √ An example architecture
 - √ A matrix for applicable elements for each presentation artifact
 - √ Support for XMI model interchange
 - √ Extensibility for custom views

UPDM 3.0->UAFP 1.0



THE UNIFIED ARCHITECTURE FRAMEWORK GRID



- Rows map to different levels of focus
- Columns relate to standard means of expression
- IIC RA and some sub views can be mapped onto it

	Taxonomy	Structure & Connectivity	Behavior	Information	Parameters	Constraints	Roadmap	Traceability	
Strategic	Business View,			Data in all forms	g, Monetizing,		As-Is To-Be	g	
Operational	Usage View, Unde				g the SoS from			onal	
Services	Functional View, Dis				Identifying Cogn			rvices	
Personnel & Resources	Implementation				oud, Analytics a			Planning	e
	Architec				rfaces, Behavior			Continuous	
Security	Cy				ity Analysis			Availability	
Projects									
Standards									
Requirements									

GRID OVERVIEW



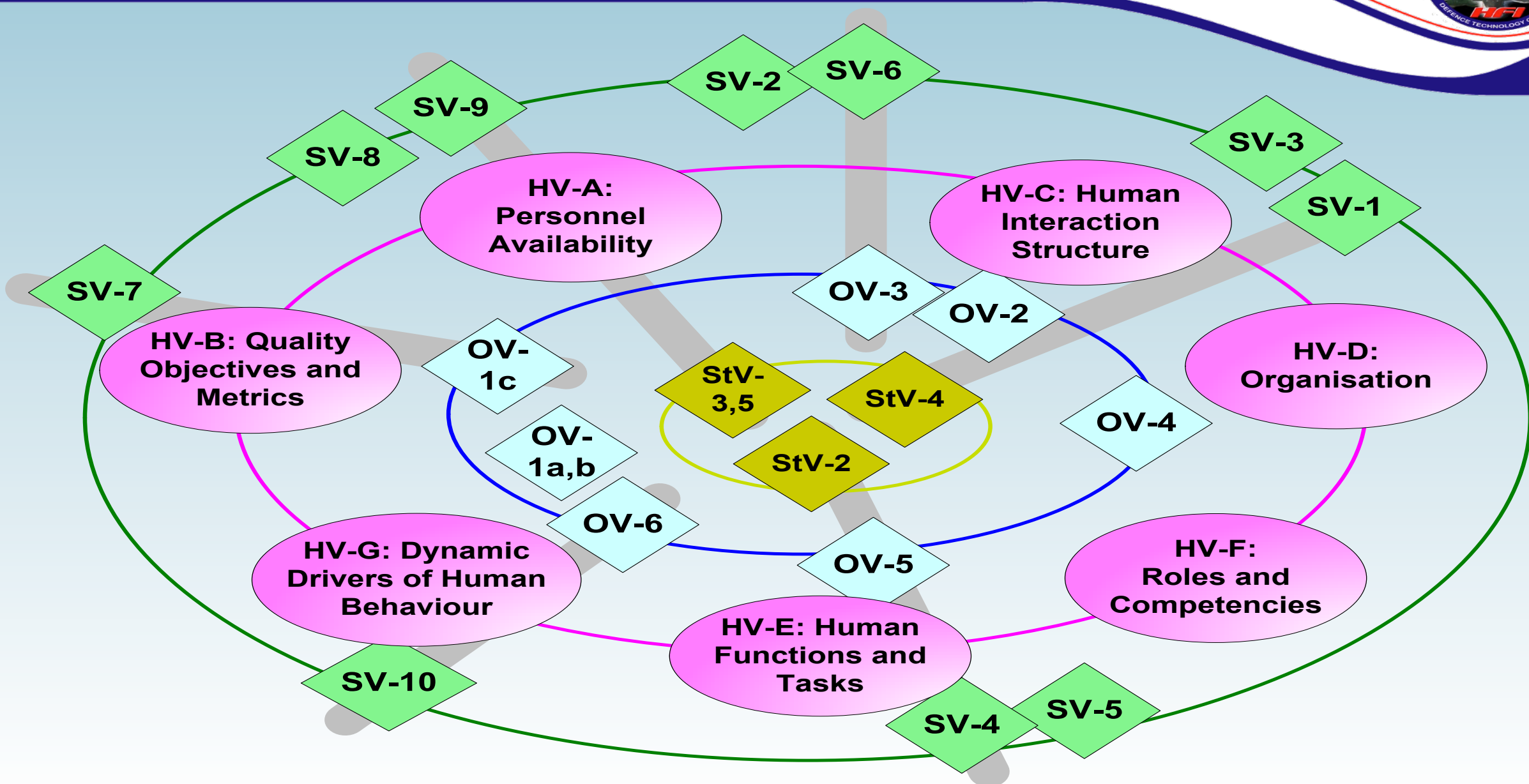
- Perspectives (Rows)
 - Metadata (Md)
 - Strategic (St)
 - Operational (Op)
 - Services(Sv)
 - Personnel(Pr)
 - Resources(Rs)
 - Security(Sc)
 - Projects(Pj)
 - Standards(Sd)
 - Actual Resources(Ar)
 - Dictionary (Dc)
 - Summary and Overview (SmOv)
 - Requirements (Rq)
- View Specifications exist at the intersections
- Representation (Columns)
 - Taxonomy (Tx)
 - Structure(Sr)
 - Connectivity(Cn)
 - Processes (Pr)
 - States(St)
 - Interactions Scenarios (Is)
 - Constraints (Ct)
 - Traceability (Tr)
 - Roadmap (Rm)
- Cross cutting concerns
 - Information (If)
 - Parameters (Pm)

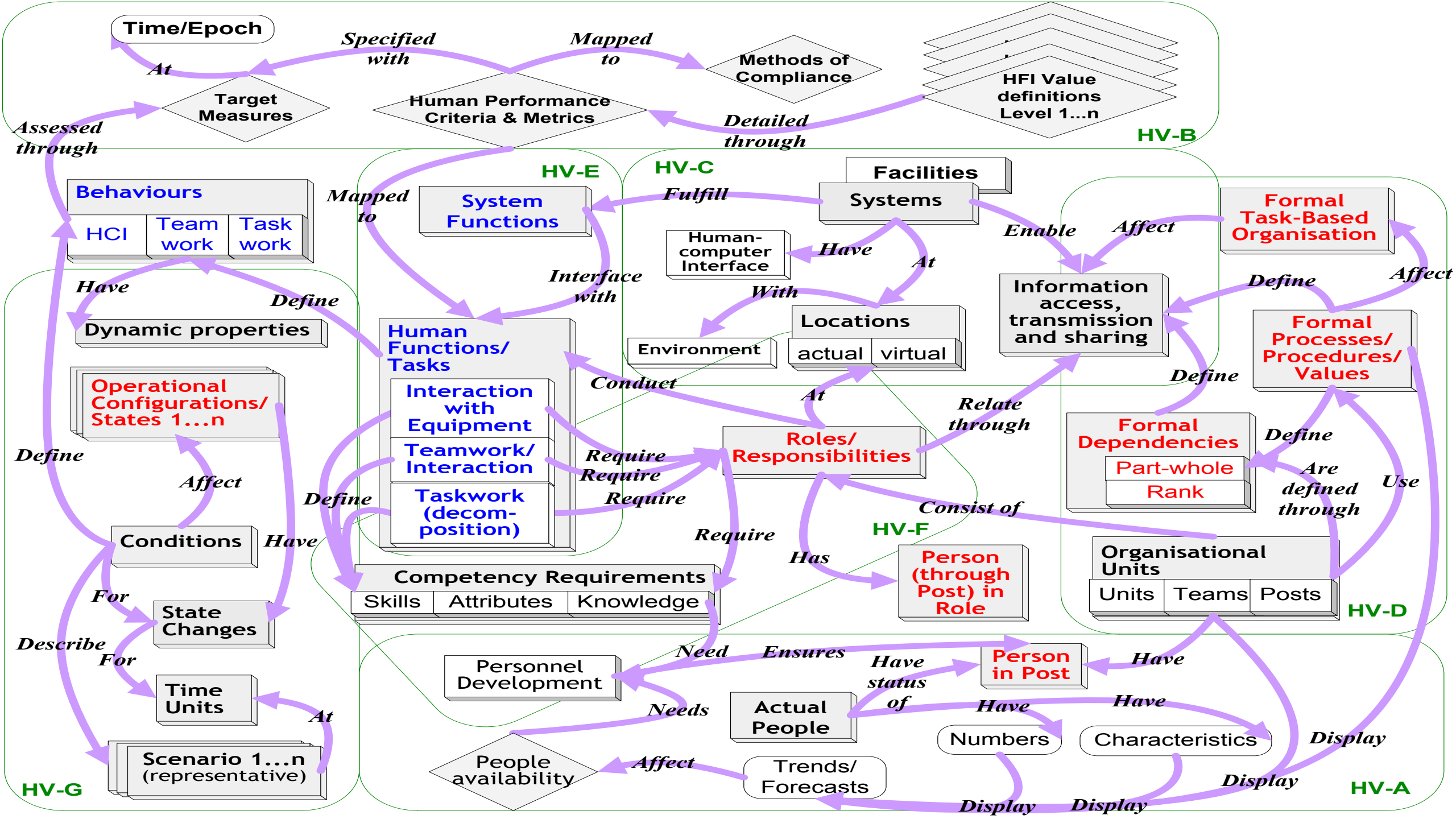
	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Interaction Scenarios Is	Information If	Parameters Pm	Constraints Ct	Roadmap Rm	Traceability Tr
Metadata Md	Metadata Taxonomy Md-Tx	Architecture Viewpoints ^a Md-Sr	Metadata Connectivity Md-Cn	Metadata Processes ^a Md-Pr	-	-	Conceptual Data Model,	Environment Pm-En	Metadata Constraints ^a Md-Ct		Metadata Traceability Md-Tr
Strategic St	Strategic Taxonomy St-Tx	Strategic Structure St-Sr	Strategic Connectivity St-Cn	-	Strategic States St-St	-			Strategic Constraints St-Ct	Strategic Deployment, St-Rm Strategic Phasing St-Rm	Strategic Traceability St-Tr
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			Operational Constraints Op-Ct	-	-
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			Service Constraints Sv-Ct	Service Roadmap Sv-Rm	Service Traceability Sv-Tr
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,	Measurements Pm-Me	Competence, Drivers, Performance Pr-Ct	Personnel Availability, Personnel Evolution, Personnel Forecast Pr-Rm	Personnel Traceability Pr-Tr
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		Resource Constraints Rs-Ct	Resource evolution, Resource forecast Rs-Rm	Resource Traceability Rs-Tr
Security Sc	Security Taxonomy Sc-Tx	Security Structure Sc-Sr	Security Connectivity Sc-Cn	Security Processes Sc-Pr	-	-			Security Constraints Sc-Ct	-	-
Projects Pj	Project Taxonomy Pj-Tx	Project Structure Pj-Sr	Project Connectivity Pj-Cn	-	-	-			-	Project Roadmap Pj-Rm	Project Traceability Pj-Tr
Standards Sd	Standard Taxonomy Sd-Tx	Standards Structure Sd-Sr	-	-	-	-			-	Standards Roadmap Sr-Rm	Standards Traceability Sr-Tr
Actuals Resources Ar		Actual Resources Structure, Ar-Sr	Actual Resources Connectivity, Ar-Cn	Simulation ^b					Parametric Execution/Evaluation _b	-	-
Dictionary * Dc											
Summary & Overview SmOv											
Requirements Rq											

- Demilitarizes UPDM
 - Still the same underlying metamodel and view constructs that support:
 - DoDAF
 - MODAF
 - NAF
 - Different presentation layers
- Very hard to manage the views with so many contributing frameworks
 - Lead to very complex mapping tables
 - Unwieldy descriptions
- Possible to map many other frameworks onto the MM
 - HSI views and SoS views

- **Stakeholders:** Human resources, Solution Providers, PMs.
- **Concerns:** human factors.
- **Definition:** aims to clarify the role of Human Factors (HF) when creating architectures in order to facilitate both Human Factors Integration (HFI) and systems engineering (SE).
- Based on Human Factors work done at the MOD/NATO
- Dr Anne Bruseberg was one of the principal authors
- Informed by a MODAF/Human Factors gap analysis that found that 95% of human factors views elements were already in MODAF

HVs between OV and SV level



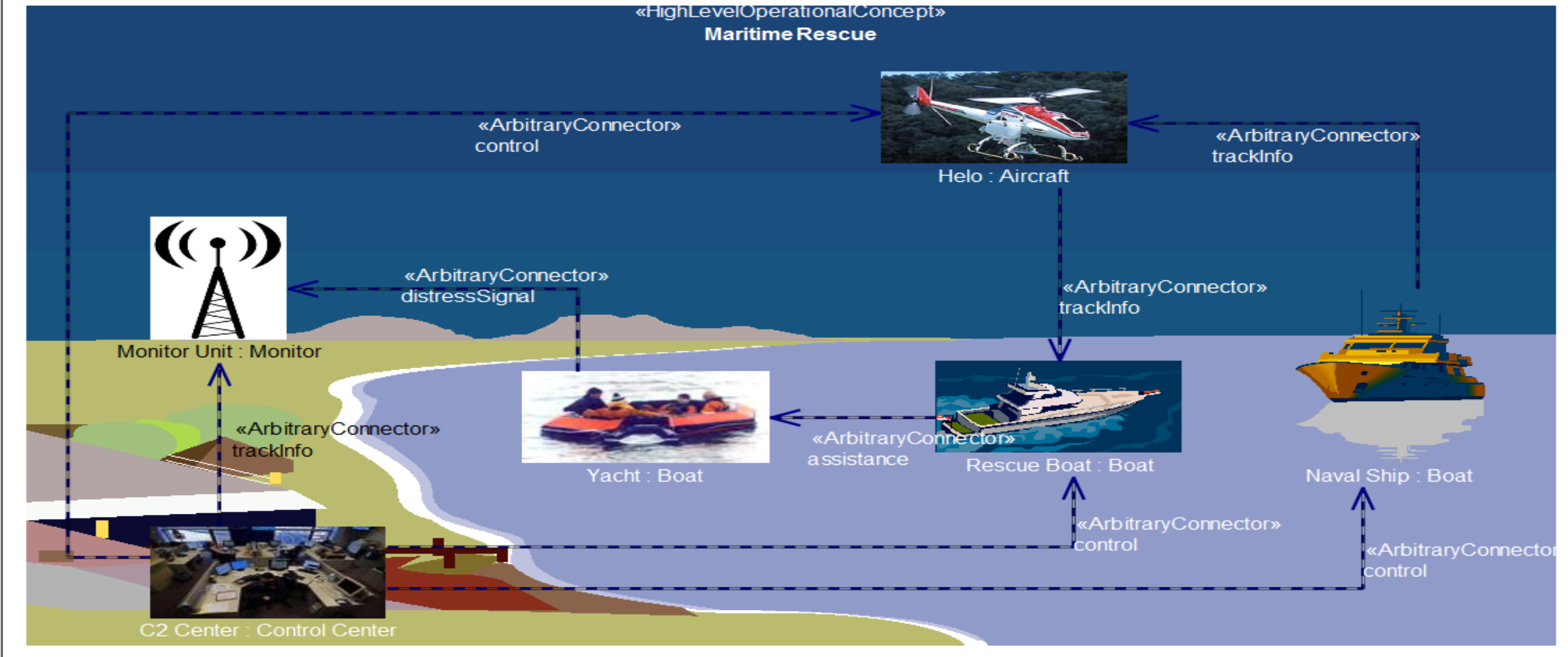


THE “YACHT IN DISTRESS” SCENARIO

- The Sample Problem applies UPDM to a common scenario in civilian maritime Search and Rescue (SAR) operations -- a Yacht in distress. A Monitor 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 the Rescue Helicopter, a Naval Ship and a Rescue Boat.
- This model is based on a UK MOD example model.

OV-1: OPERATIONAL CONTEXT GRAPHIC

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

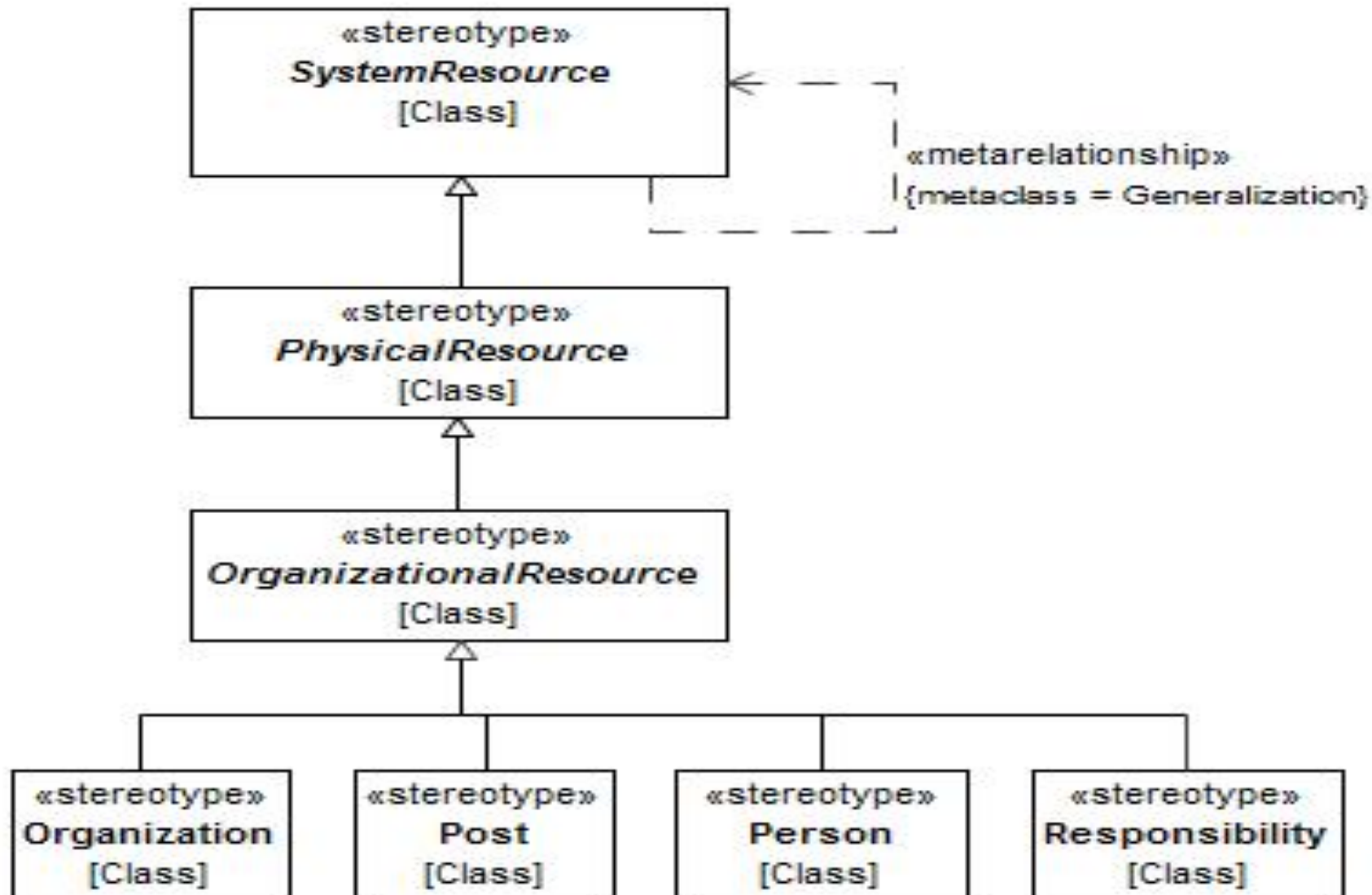


Pr-Tx Personnel Taxonomy

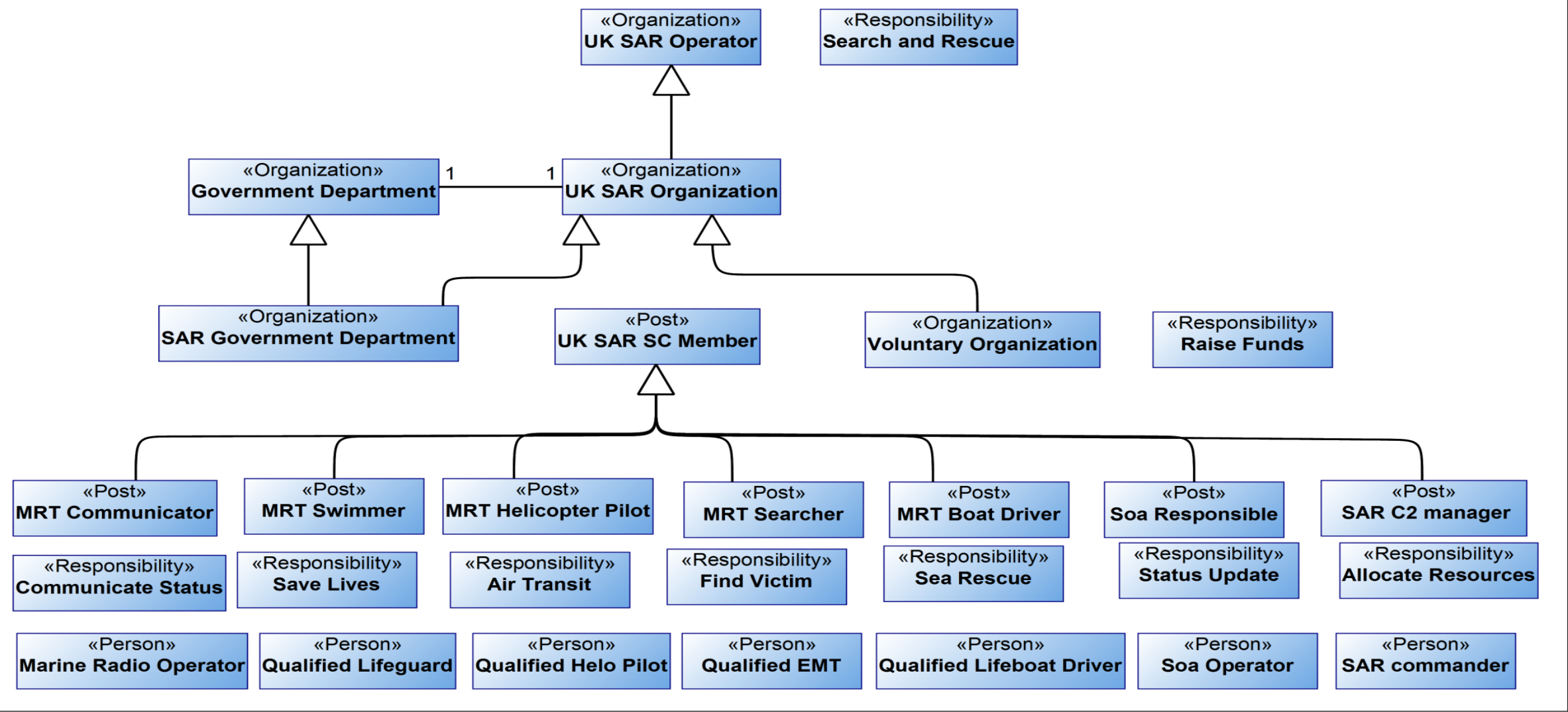
The Pr-Tx view specifies the taxonomy of types of organizational resources.

- **Stakeholders:** Human resources, Solution Providers, PMs.
- **Concerns:** organizational resource types.
- **Definition:** shows the taxonomy of types of organizational resources.
- **Recommended Implementation:** SysML Block Definition Diagram.

PR-TX PERSONNEL TAXONOMY

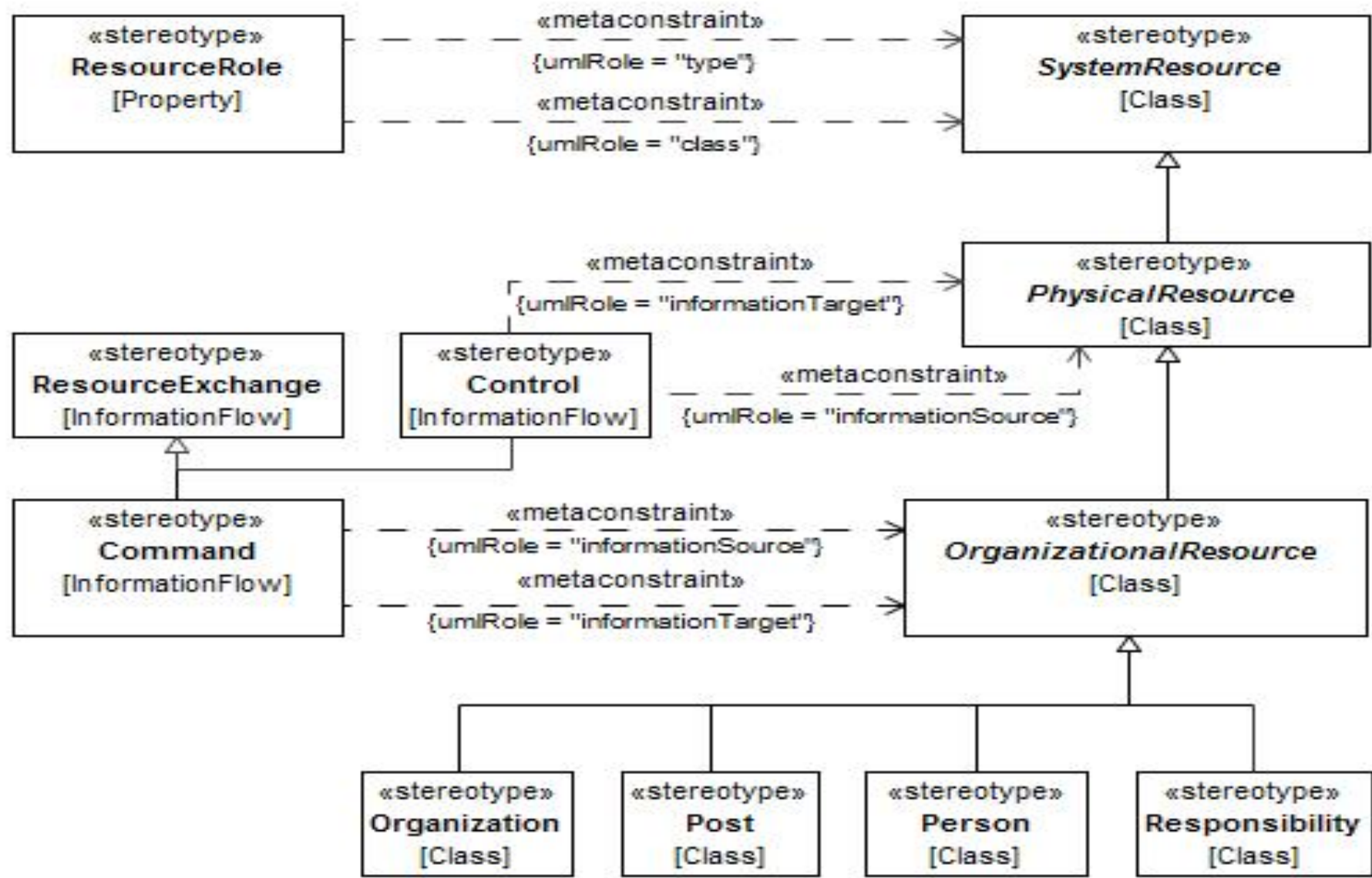


Pr-Tx [Architectural Description] Typical Organizations Taxonomy

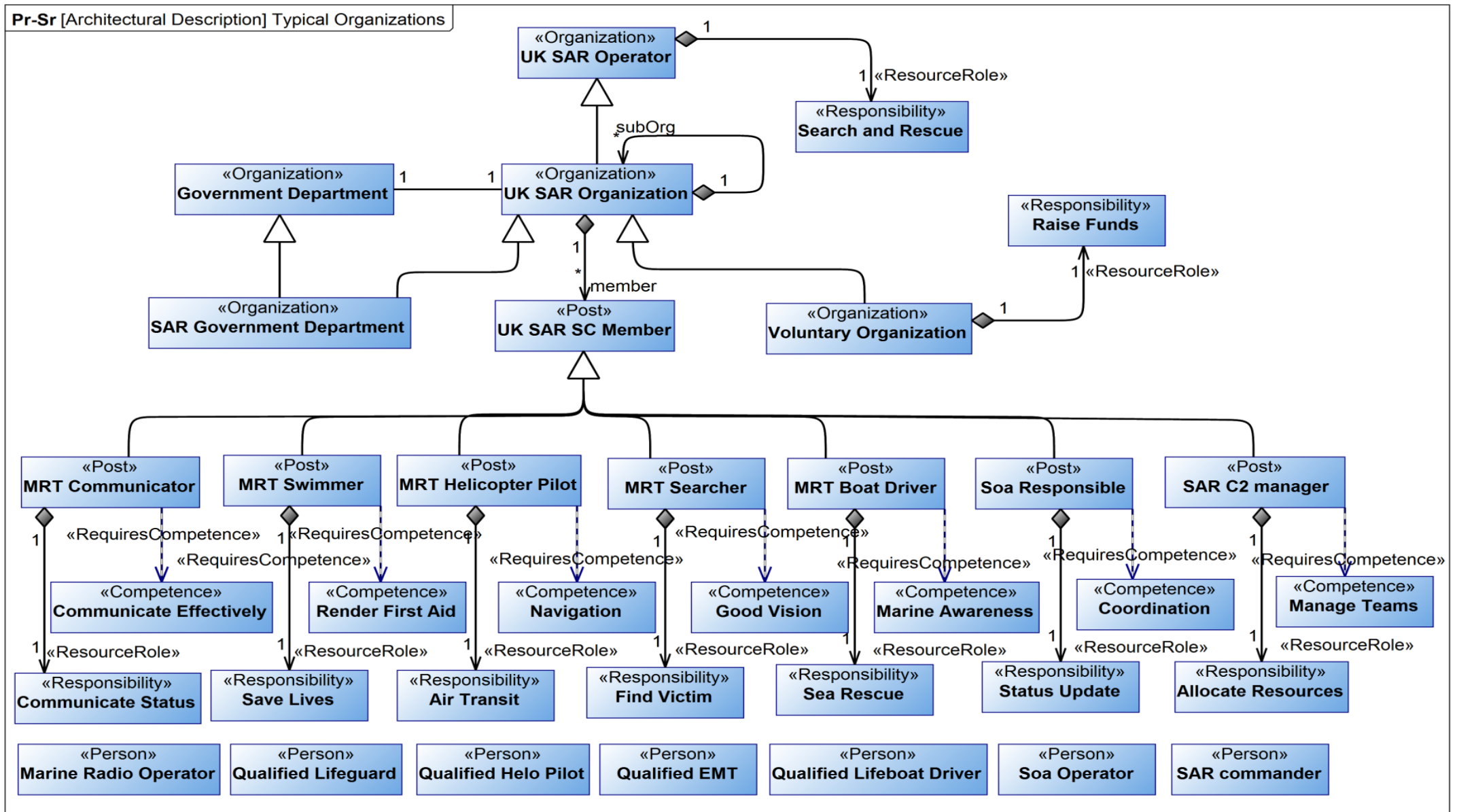


- **Stakeholders:** Human resources, Solution Providers, PMs.
- **Concerns:** typical organizational structure used to support a capability(ies).
- **Definition:** shows organizational structures and possible interactions between organizational resources.
- **Recommended Implementation:** SysML Block Definition Diagram, SysML Internal Block Diagram.

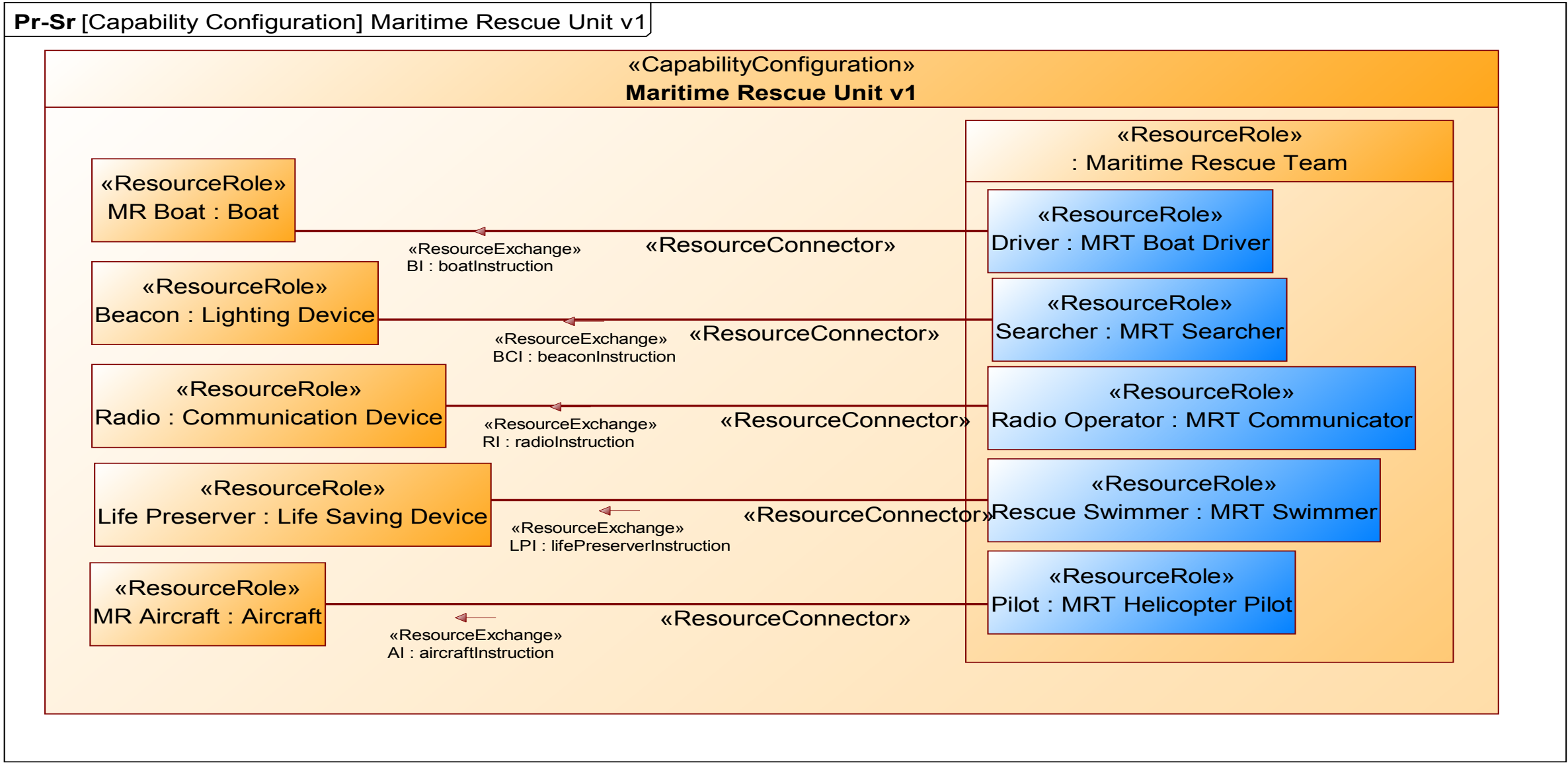
PR-SR PERSONNEL STRUCTURE SPECIFICATION



PR-SR PERSONNEL STRUCTURE SPECIFICATION

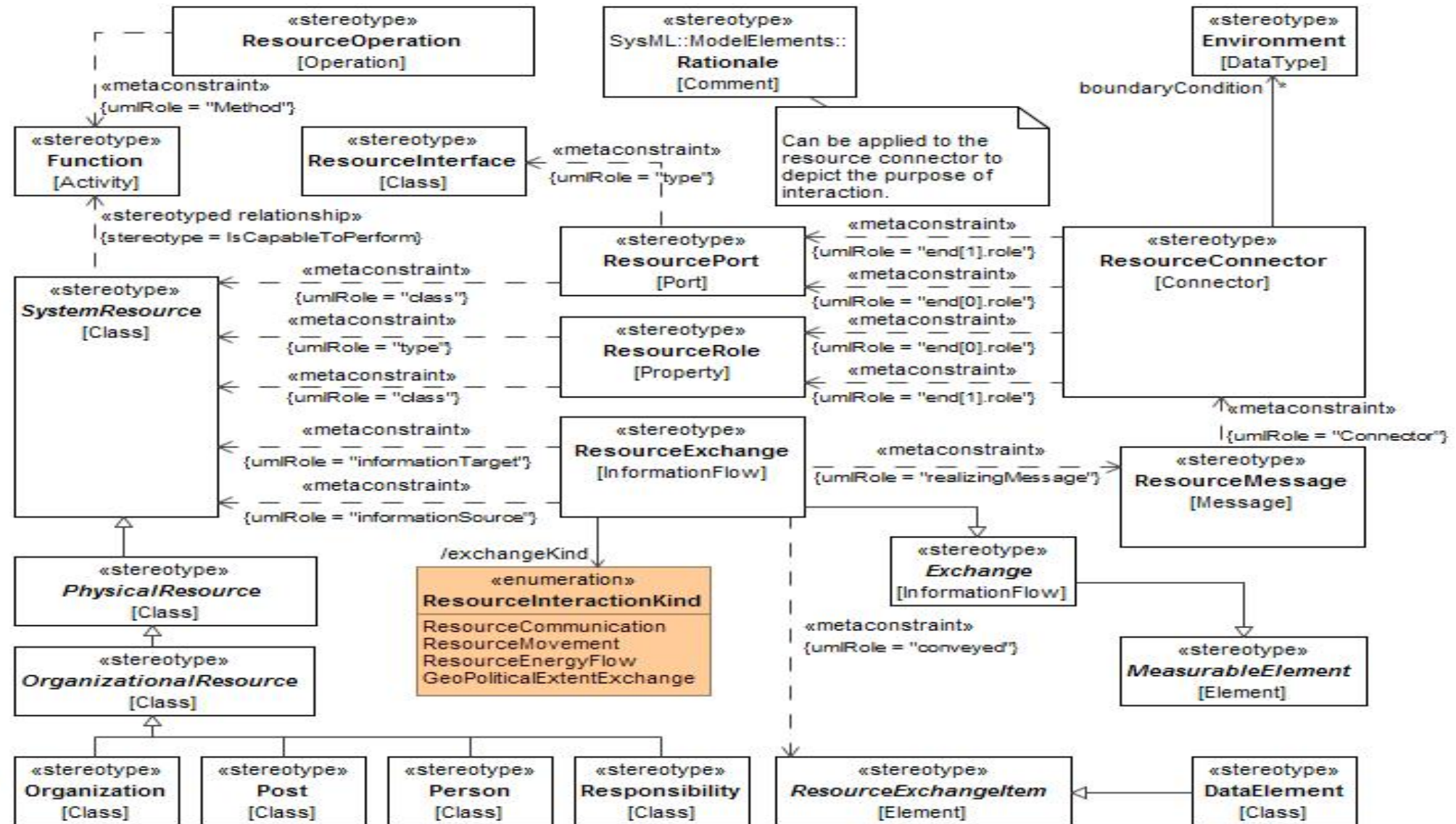


PR-SR PERSONNEL STRUCTURE SPECIFICATION



- **Stakeholders:** Solution providers.
- **Concerns:** interaction of organizational resources.
- **Definition:** captures the possible interactions between organizational resources, including command relationships. Interactions typically illustrate the fundamental roles and management responsibilities.
- **Recommended Implementation:** tabular format.

PR-CN PERSONNEL CONNECTIVITY SPECIFICATION

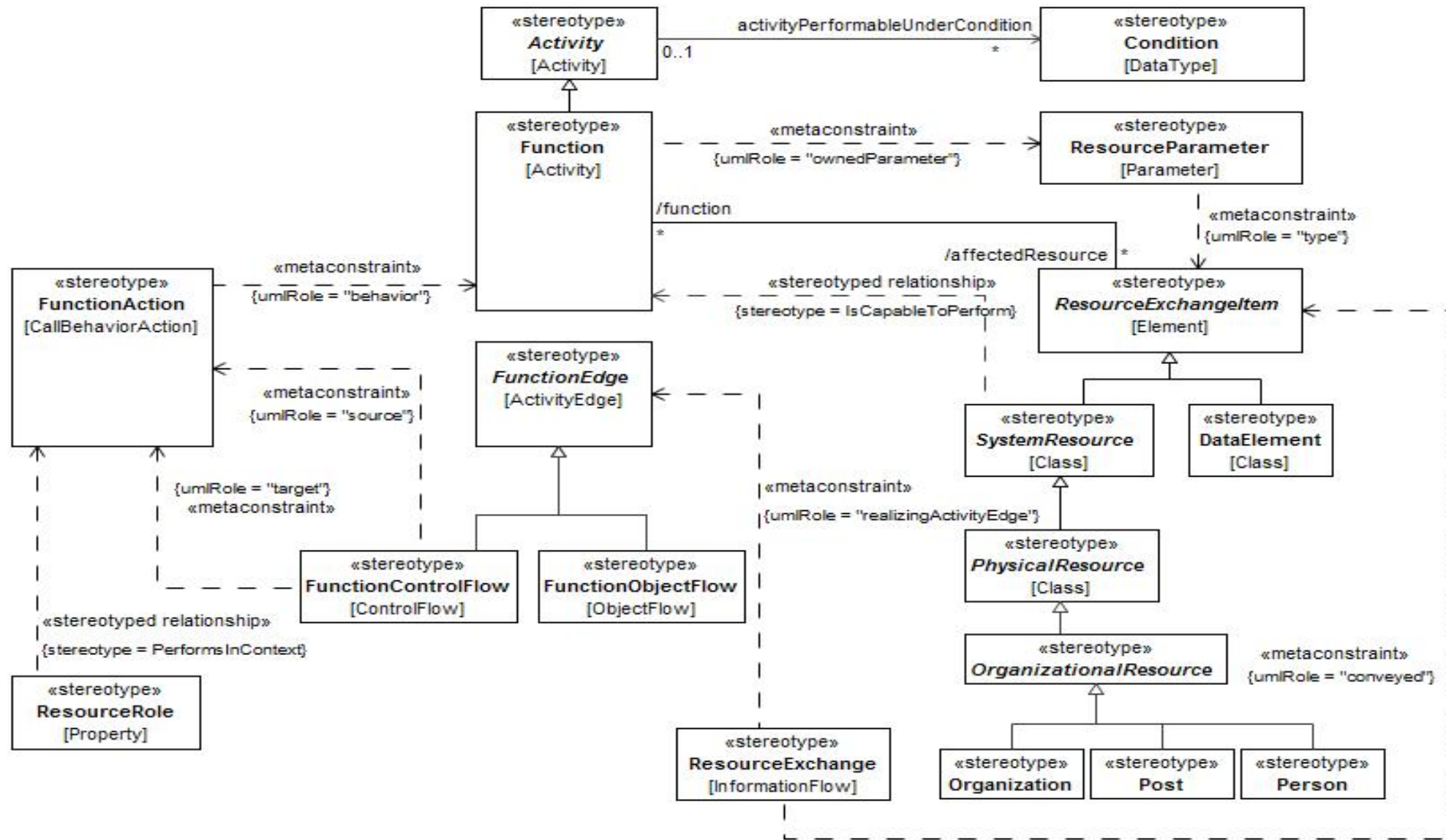


[Capability Configuration] Maritime Rescue Unit v1 [Pr-Cn]

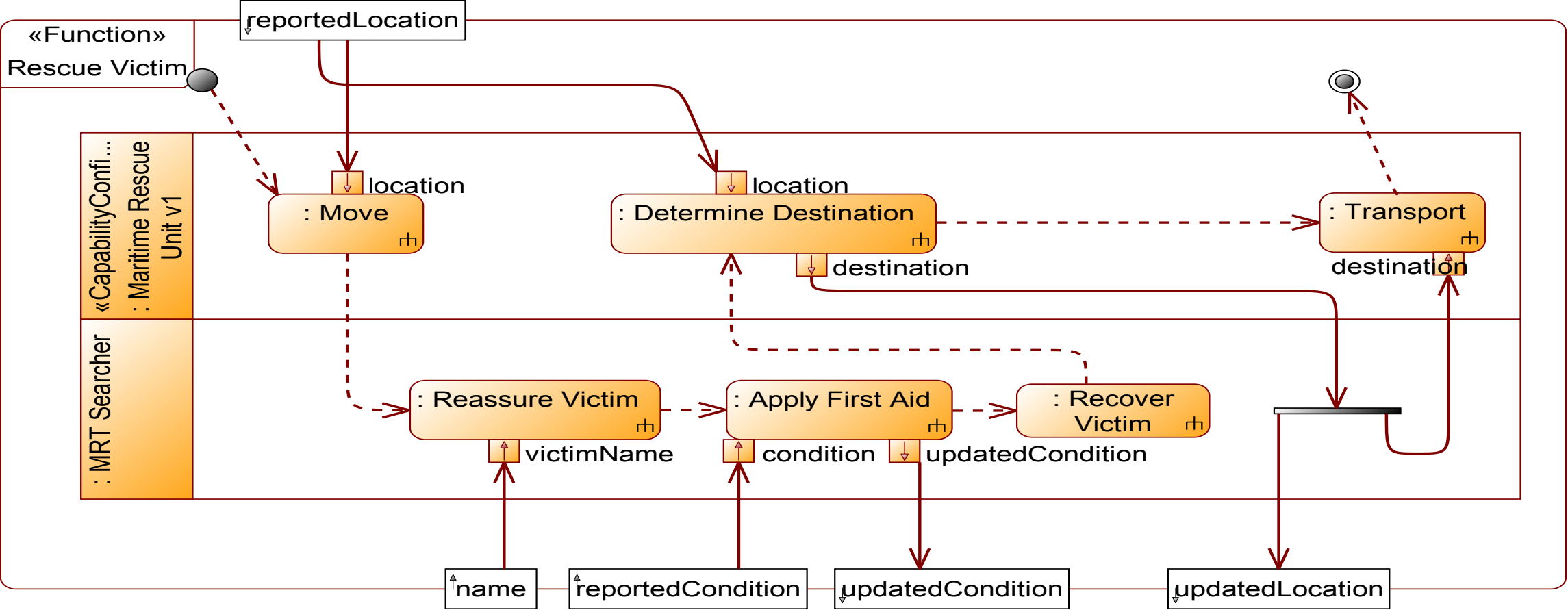
Resource		Producer		Connector /		Consumer	
Name	Conveyed	Resource	Function	Name	Protocol	Resource	Function
BI	«Exchange Element» boatInstruction	«Post» MRT Boat Driver		Resource Connector		«Resource Artifact» Boat	
AI	«Exchange Element» aircraftInstruction	«Post» MRT Helicopter Pilot		Resource Connector		«Resource Artifact» Aircraft	
RI	«Exchange Element» radioInstruction	«Post» MRT Communicator		Resource Connector		«Resource Artifact» Communication Device	
LPI	«Exchange Element» lifePreserverInstruction	«Post» MRT Swimmer		Resource Connector		«Resource Artifact» Life Saving Device	
BCI	«Exchange Element» beaconInstruction	«Post» MRT Searcher		Resource Connector		«Resource Artifact» Lighting Device	

- **Stakeholders:** Systems engineers, Solution providers.
- **Concerns:** functions that have to be carried out by organizational resources.
- **Definition:** specifies organizational resource functions in relation to resource definitions.
- **Recommended Implementation:** SysML Activity Diagram, SysML Block Definition Diagram, BPMN Process Diagram

PR-PR PERSONNEL PROCESSES SPECIFICATION

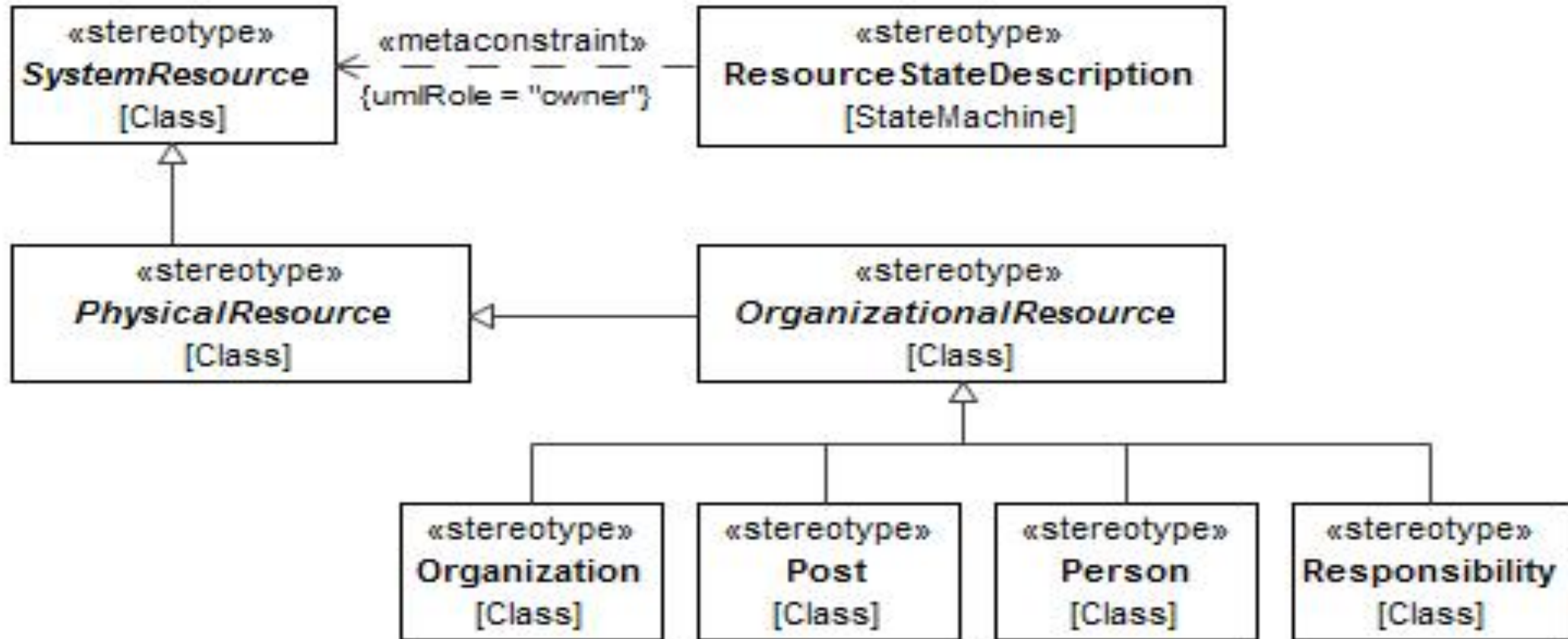


PR-PR PERSONNEL PROCESSES SPECIFICATION

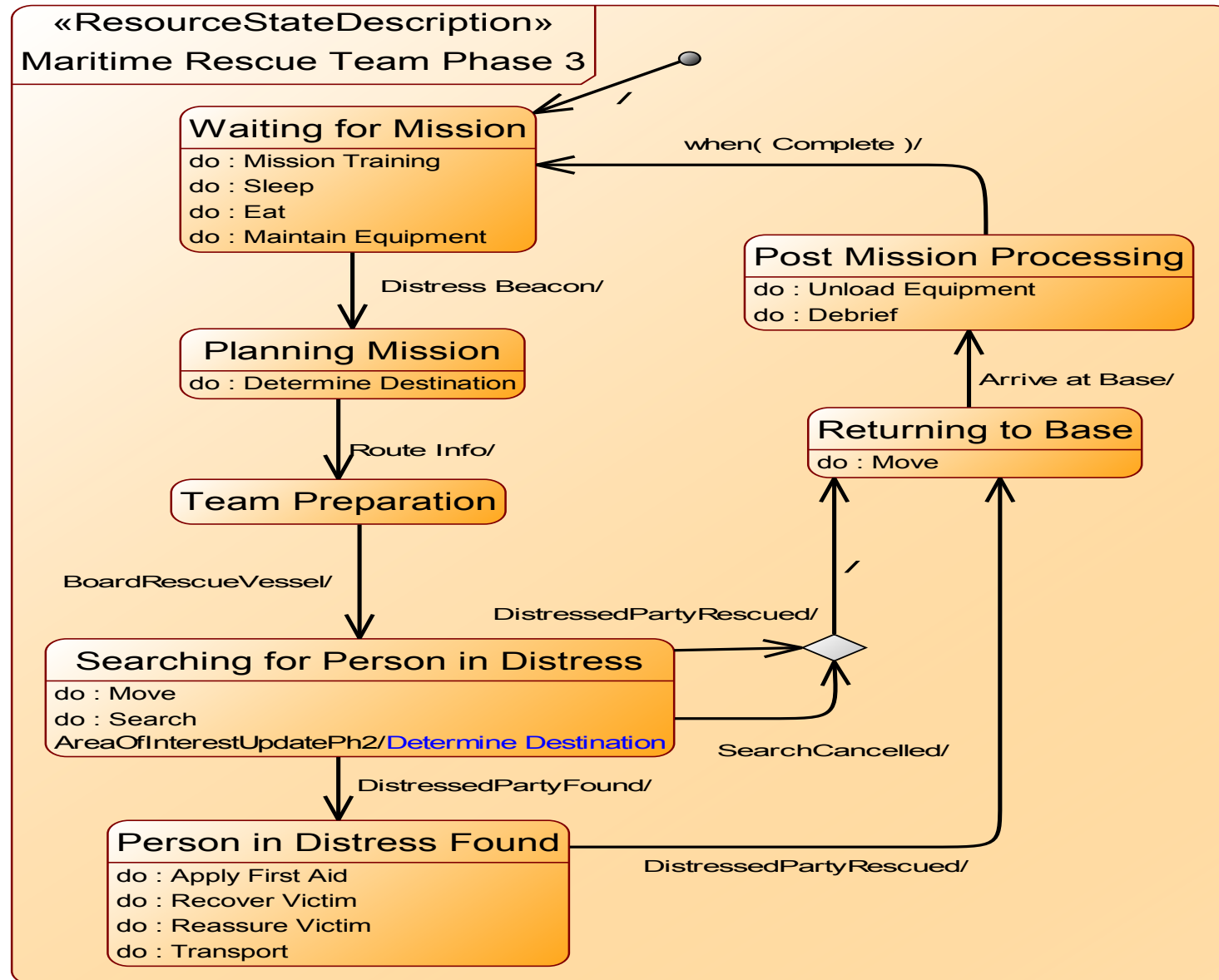


- **Stakeholders:** Systems Engineers, Software Engineers.
- **Concerns:** capture state-based behavior of an organizational resource.
- **Definition:** it is a graphical representation of states of an organizational resource and how that organizational resource responds to various events and actions.
- **Recommended Implementation:** SysML State Diagram.

PR-ST PERSONNEL STATES SPECIFICATION



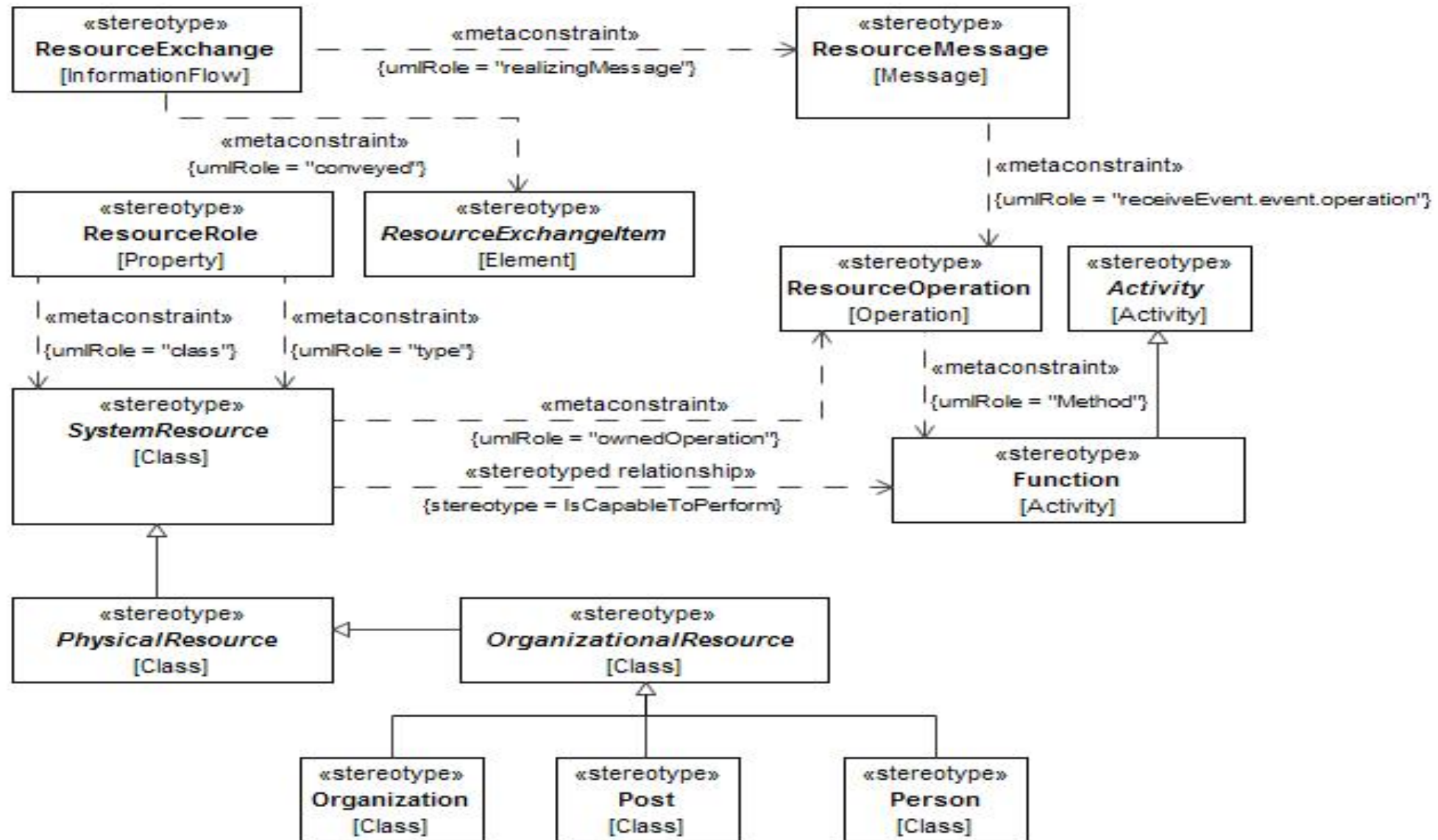
PR-ST PERSONNEL STATES SPECIFICATION



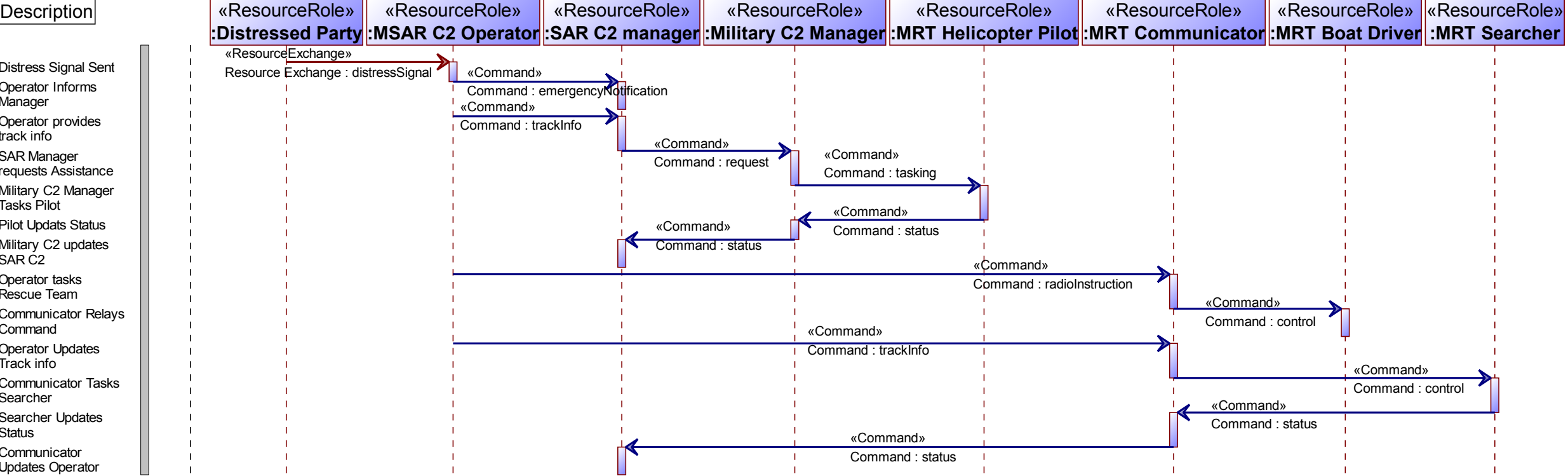
Pr-Is Personnel Interaction Scenario Specification

- **Stakeholders:** Software Engineers, Systems Engineers.
- **Concerns:** interactions between organizational resources (roles).
- **Definition:** provides a time-ordered examination of the interactions between organizational resources.
- **Recommended Implementation:** SysML Sequence Diagram, BPMN Collaboration Diagram.

PR-IS PERSONNEL INTERACTION SCENARIO SPECIFICATION



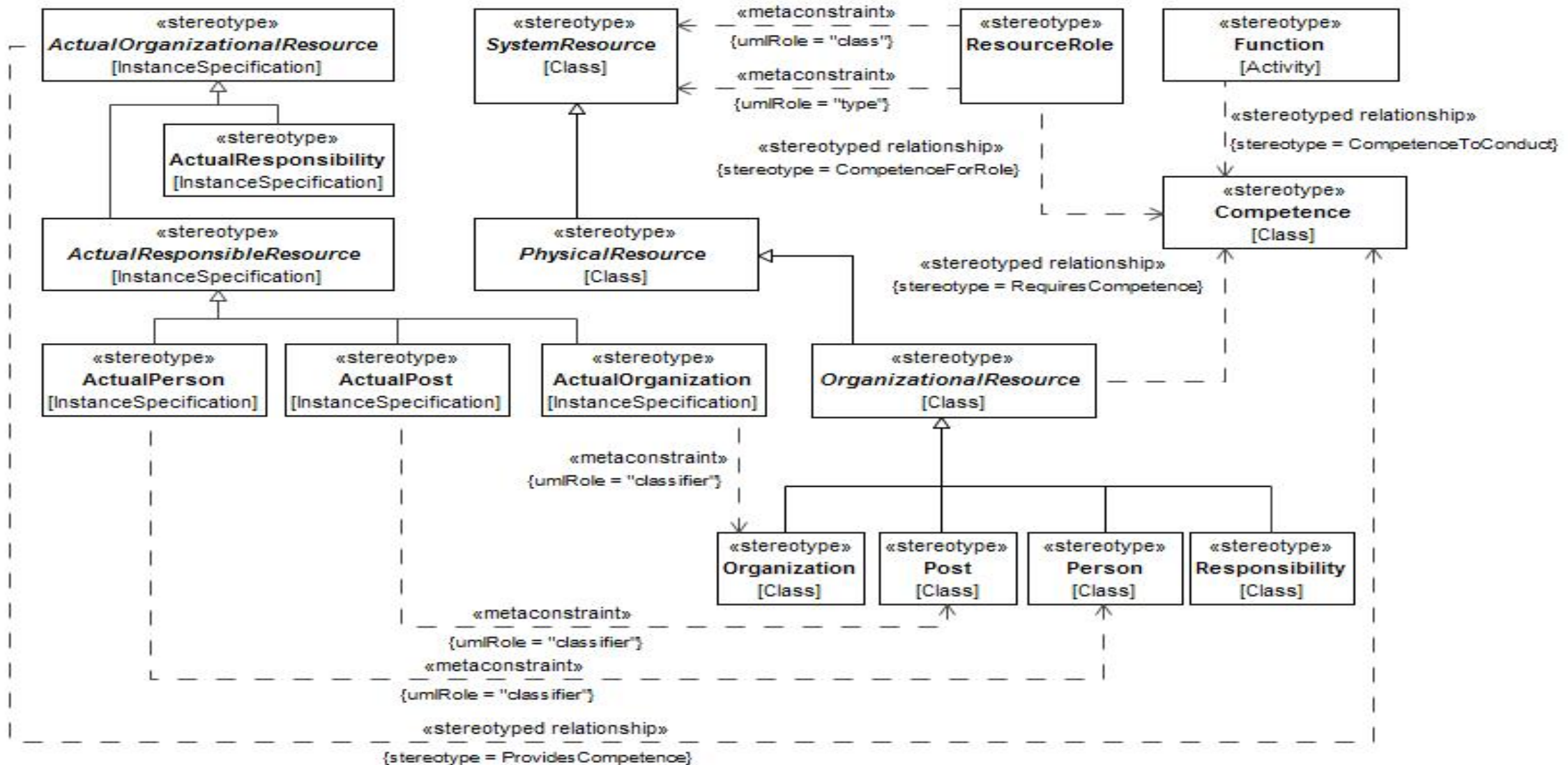
SAR Organization Context Phase 3



Pr-Cta Personnel Constraints Specification (Competencies to Posts)

- **Stakeholders:** Systems engineers, Solution providers.
- **Concerns:** allocation of competencies to actual posts.
- **Definition:** specifies requirements for actual organizational resources – by linking competencies and actual posts.
- **Recommended Implementation:** SysML Block Definition Diagram.

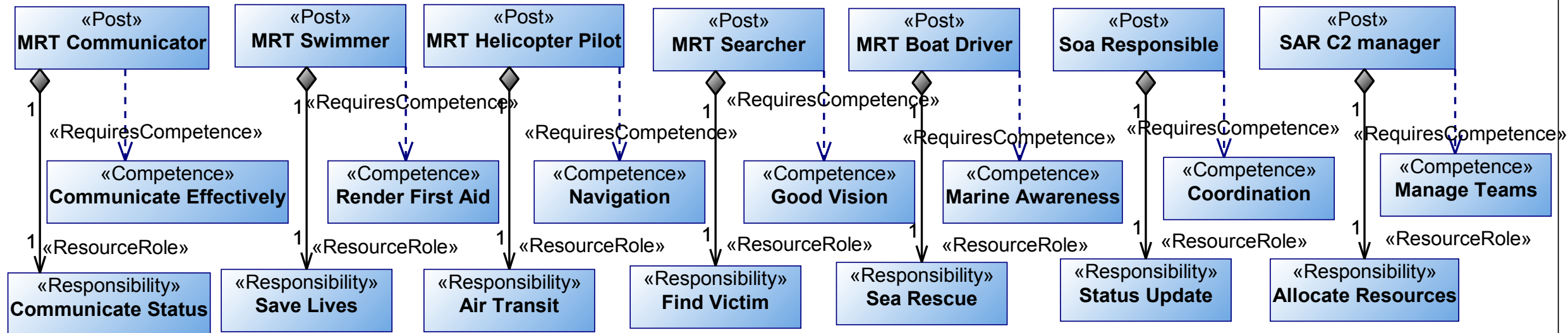
PR-CTA PERSONNEL CONSTRAINTS SPECIFICATION (COMPETENCIES TO POSTS)



PR-CTA PERSONNEL CONSTRAINTS SPECIFICATION (COMPETENCIES TO POSTS)

Definitions and Requires Competence

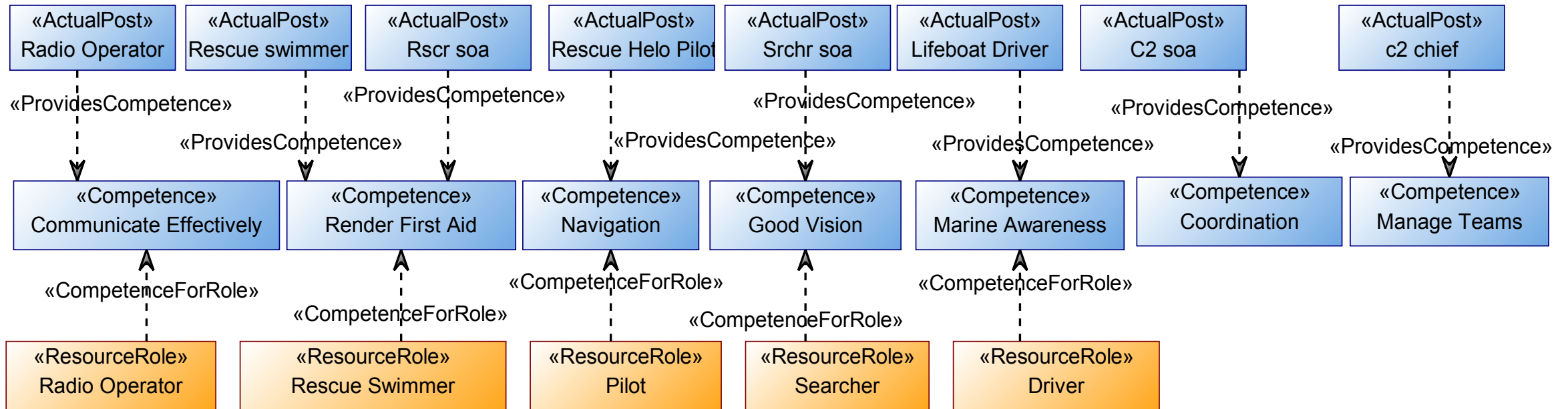
Pr-Cta [Architectural Description] Personnel Competencies



PR-CTA PERSONNEL CONSTRAINTS SPECIFICATION (COMPETENCIES TO POSTS)

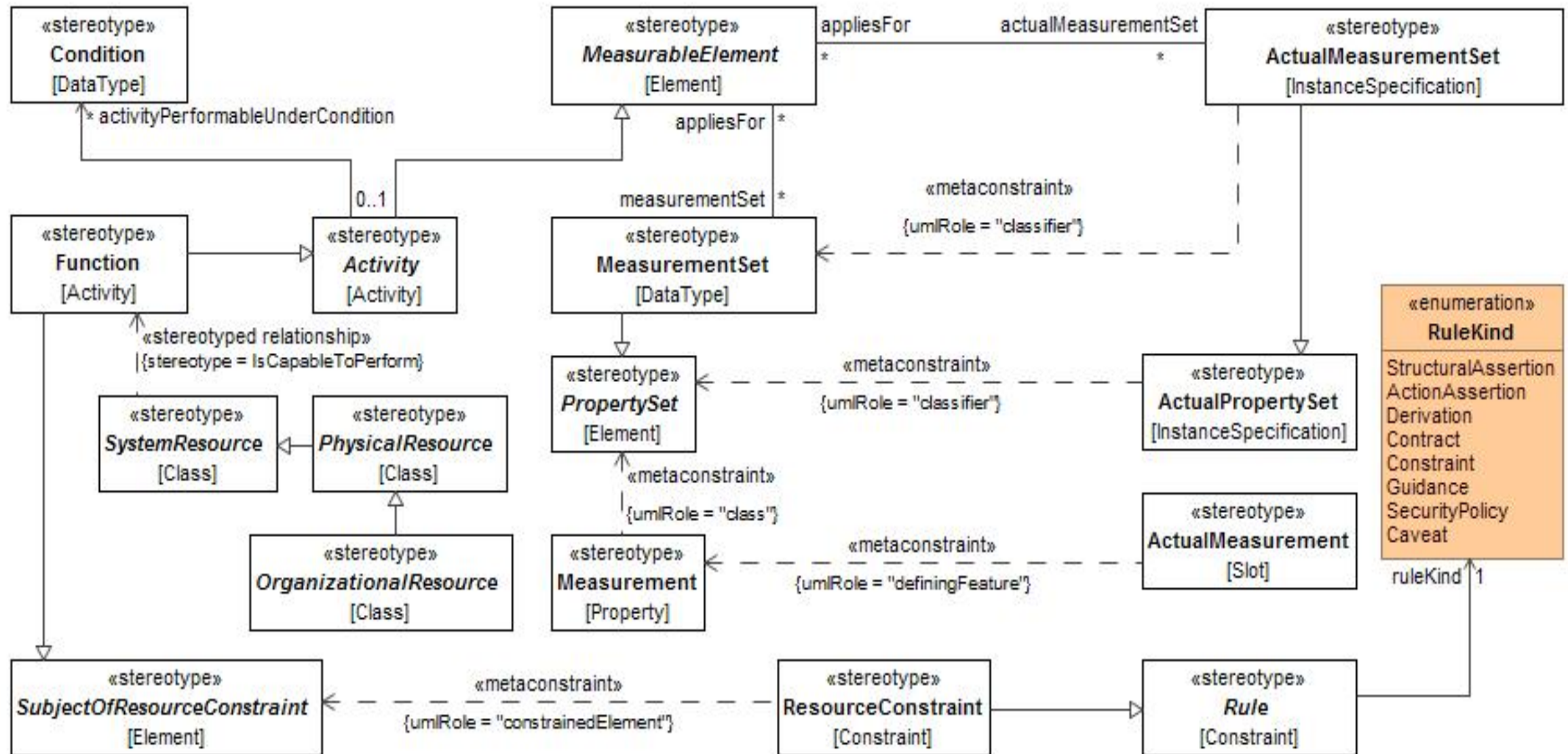
Roles and Actuals for Provides Competence

Pr-Cta Personnel Constraints Specification (Competencies to Posts)



- **Stakeholders:** Systems engineers, Solution providers, Human resources.
- **Concerns:** optimization of organizational resource behavior.
- **Definition:** captures the factors that affect, constrain and characterize organizational resource behavior as the basis for performance predictions at the level of actual persons and actual organizations. It creates a bridge between static architectural definitions and behavior predictions through executable models.
- **Recommended Implementation:** tabular format, SysML Parametric Diagram, SysML Block Definition Diagram.

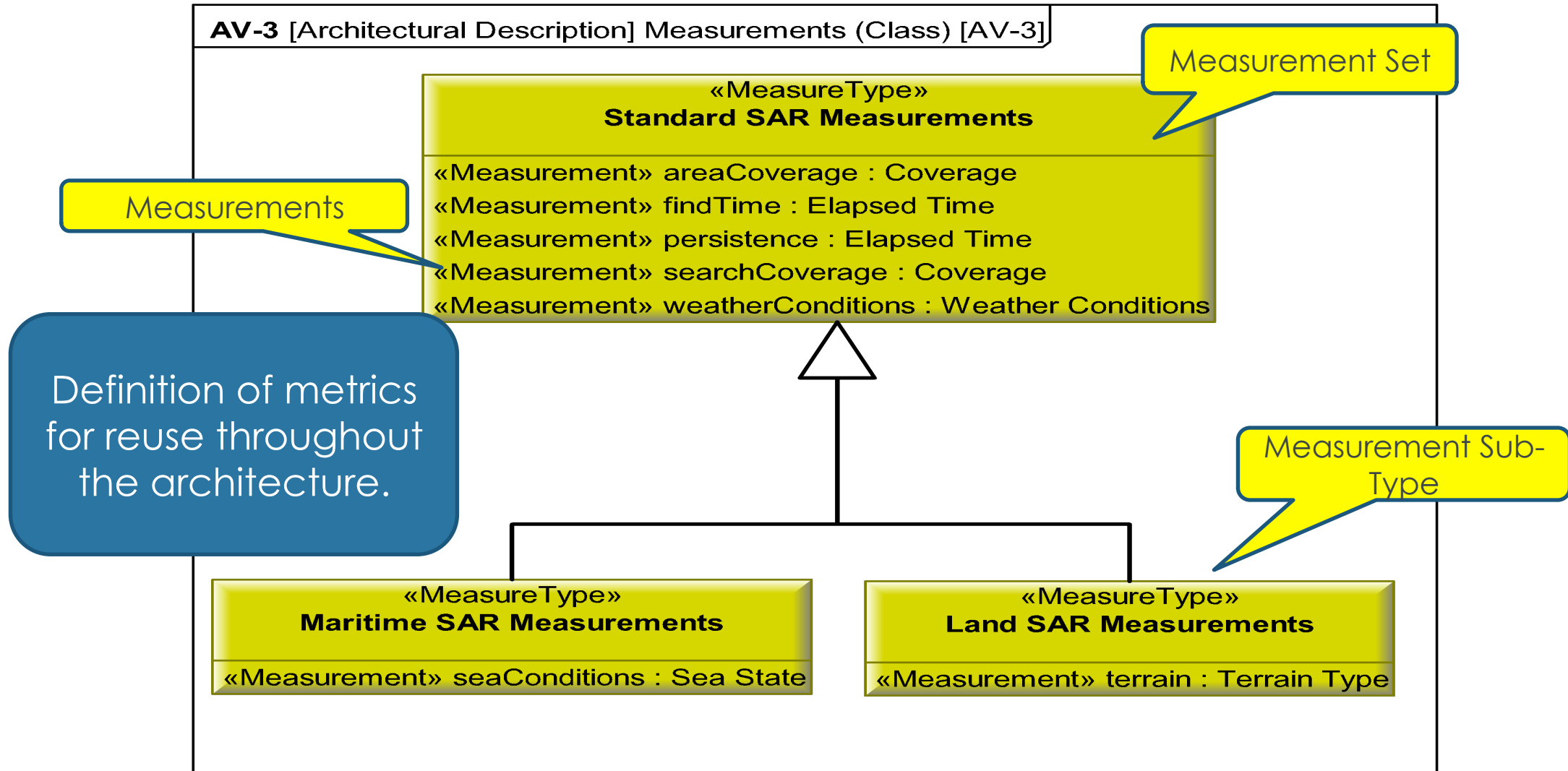
PR-CTB PERSONNEL CONSTRAINTS SPECIFICATION (DRIVERS)



Conditions

Md-Tx [Architectural Description] All View [1]			
«LightCondition» Darkness	«Environment» Arctic Water	«Condition» High Seas	«GeoPoliticalExtentType» Ocean geoPoliticalExtentTypeKind GeoFeatureType requiredEnvironment «Environment» Cold Water «Environment» Temperate Water «Environment» Arctic Water
«LightCondition» Low Light	«Environment» Temperate Water	«Condition» Calm Sea	
«LightCondition» Low Clouds	«Environment» Cold Water	«Condition» Medium Waves	
«LightCondition» Bright Sunlight			

AV-3 MEASUREMENTS DEFINITIONS



AV-3 [Architectural Description] Measurements (Actual) [AV-3]

«Measure» {intention = Estimate} Initial Values : Maritime SAR Measurements
seaConditions : Sea State = Sea State 6 areaCoverage : Coverage = 500 findTime : Elapsed Time = <8 hours persistence : Elapsed Time = >15 hours searchCoverage : Coverage = 400 weatherConditions : Weather Conditions = Heavy Rain

«Measure» {intention = Required} Required Values : Maritime SAR Measurements
seaConditions : Sea State = Sea State 8 areaCoverage : Coverage = 600 findTime : Elapsed Time = <5 hours persistence : Elapsed Time = >20 hours searchCoverage : Coverage = 500 weatherConditions : Weather Conditions = Stormy

Actual Property Set

«Measure» {intention = Result} Final Values : Maritime SAR Measurements
seaConditions : Sea State = Sea State 8 areaCoverage : Coverage = 650 findTime : Elapsed Time = <4 hours persistence : Elapsed Time = >20 hours searchCoverage : Coverage = 550 weatherConditions : Weather Conditions = Stormy

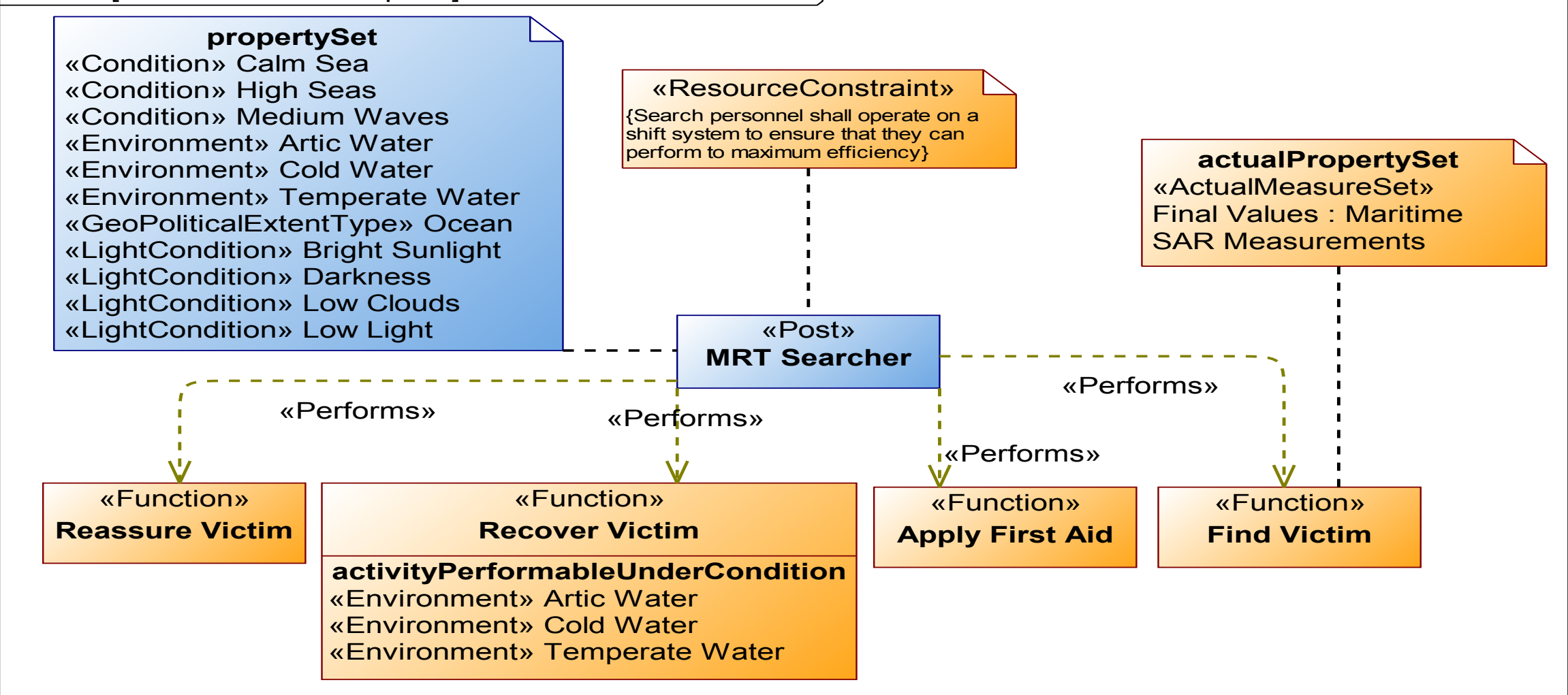
«Measure» {intention = Estimate} UPDM : Standard SAR Measurements
intention Estimate
areaCoverage : Coverage = 10 findTime : Elapsed Time = 20 persistence : Elapsed Time = 50 searchCoverage : Coverage = 60 weatherConditions : Weather Conditions = 70

Measurement Values

PR-CTB PERSONNEL CONSTRAINTS SPECIFICATION (DRIVERS)

Properties and Constraints (Rules)

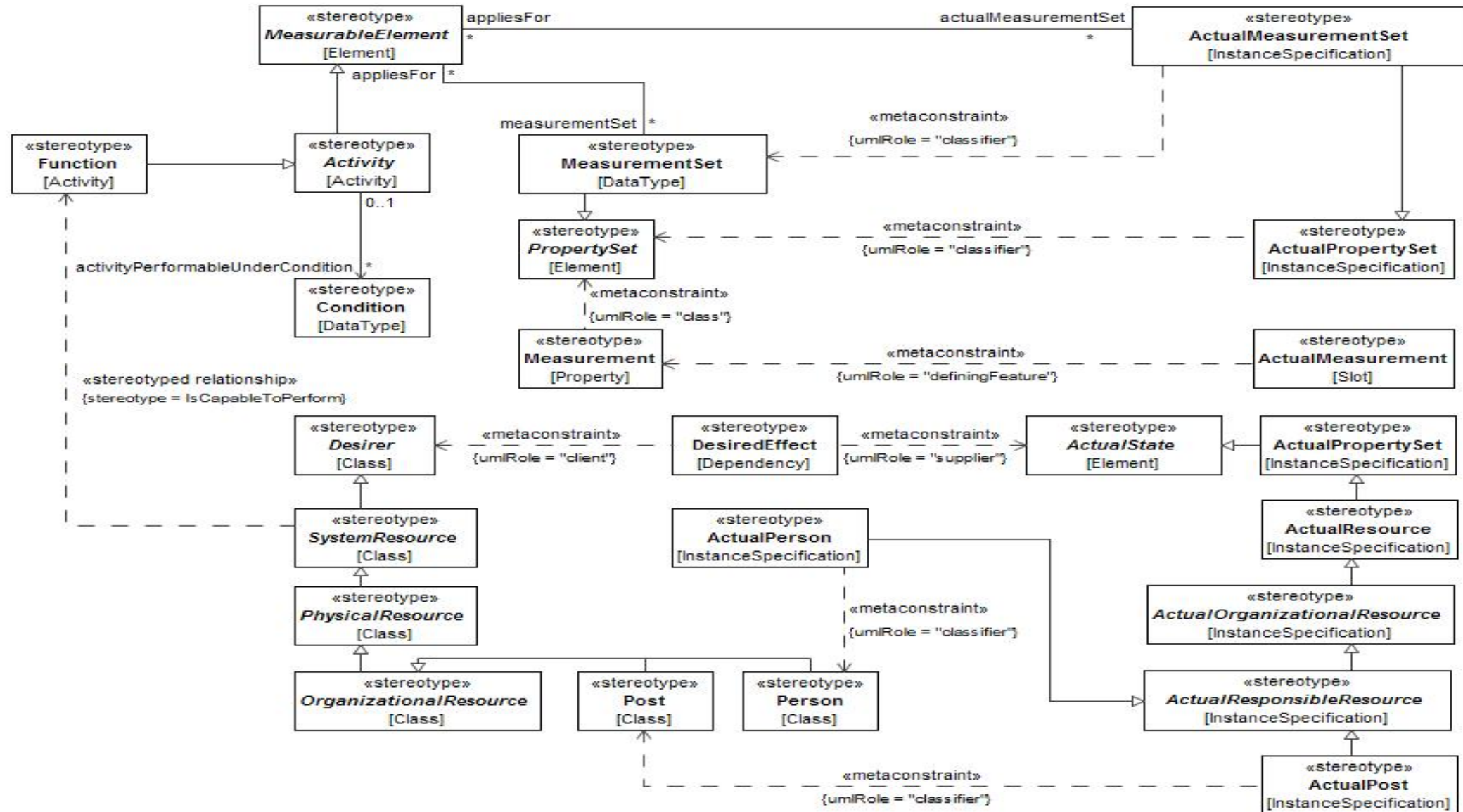
Pr-Ctb [Architectural Description] Drivers Personnel Drivers



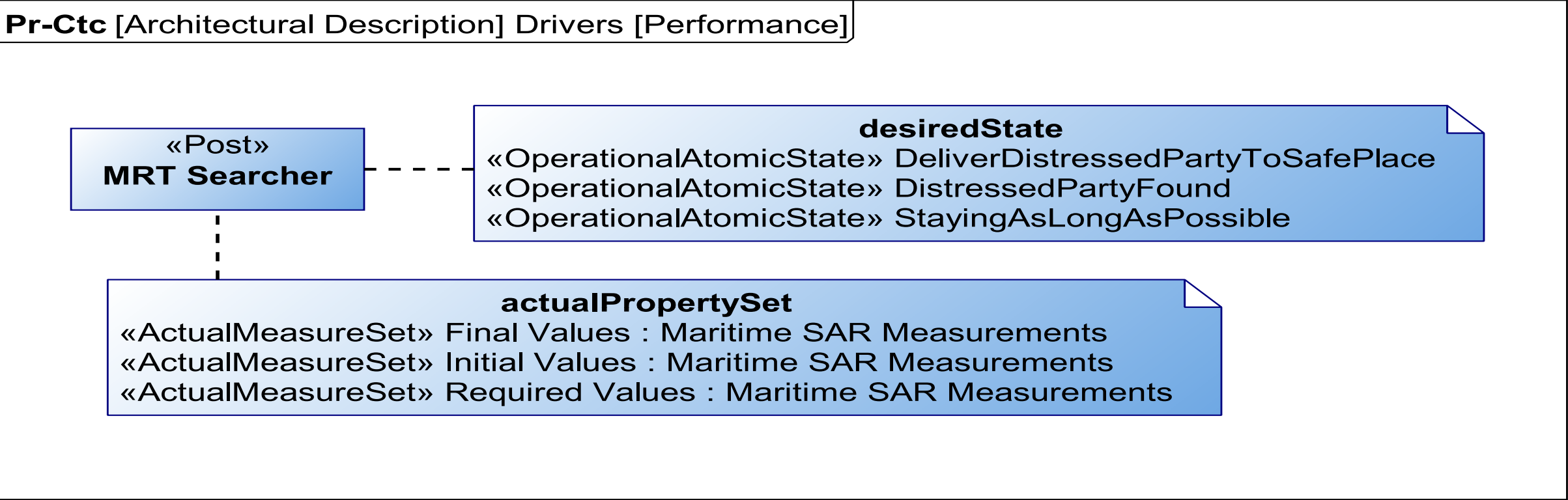
Pr-Ctc Personnel Constraints Specification (Performance/ Quality Objectives)

- **Stakeholders:** Human resources, solution providers.
- **Concerns:** how well an actual organizational resource matches the needs of the actual organization.
- **Definition:** provides a repository for human-related measures (i.e. quality objectives and performance criteria (HFI values)), targets and competences.
- **Recommended Implementation:** SysML Block Definition Diagram.

PR-CTC PERSONNEL CONSTRAINTS SPECIFICATION (PERFORMANCE/ QUALITY OBJECTIVES)

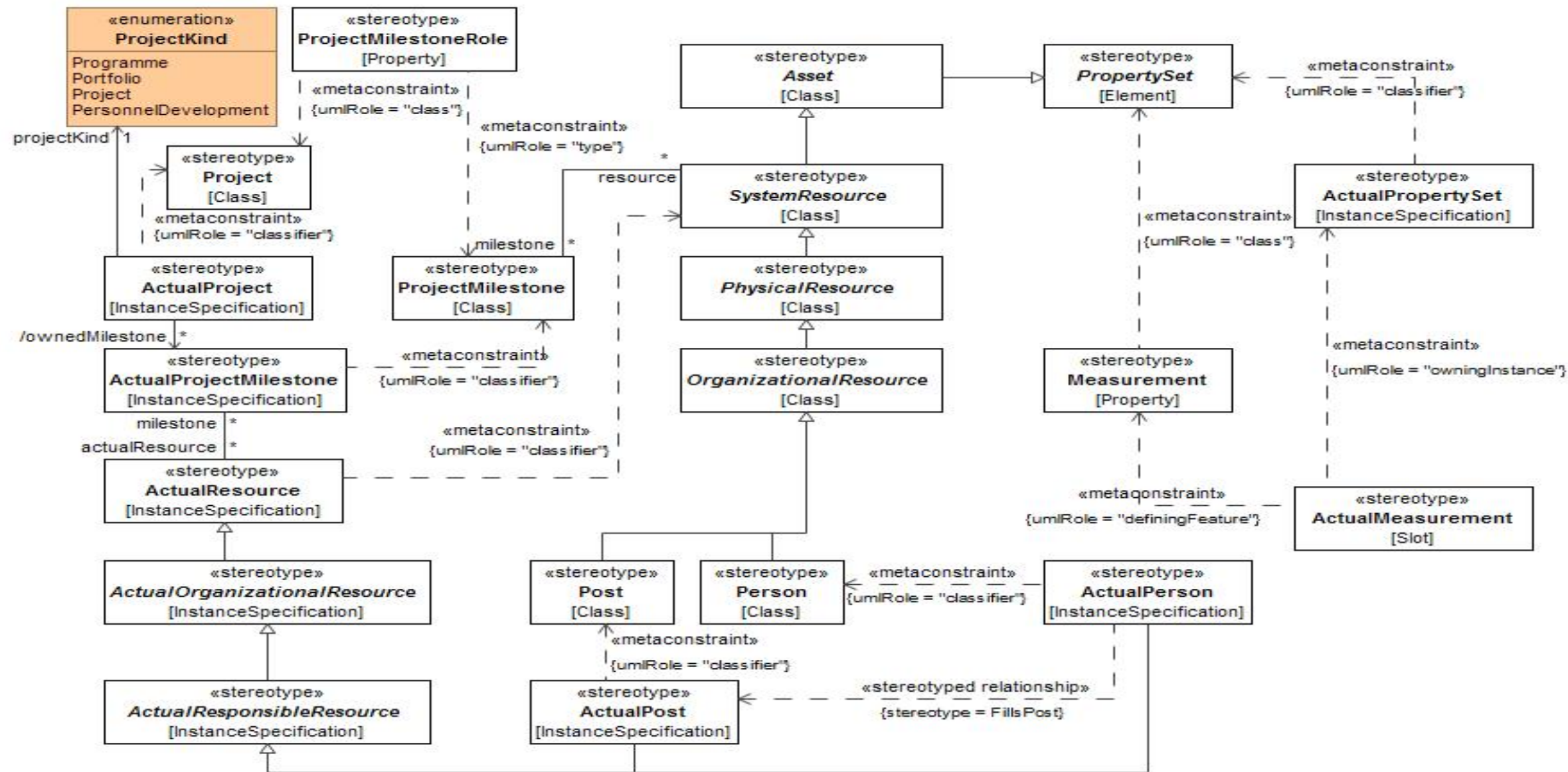


PR-CTC PERSONNEL CONSTRAINTS SPECIFICATION (PERFORMANCE/ QUALITY OBJECTIVES)



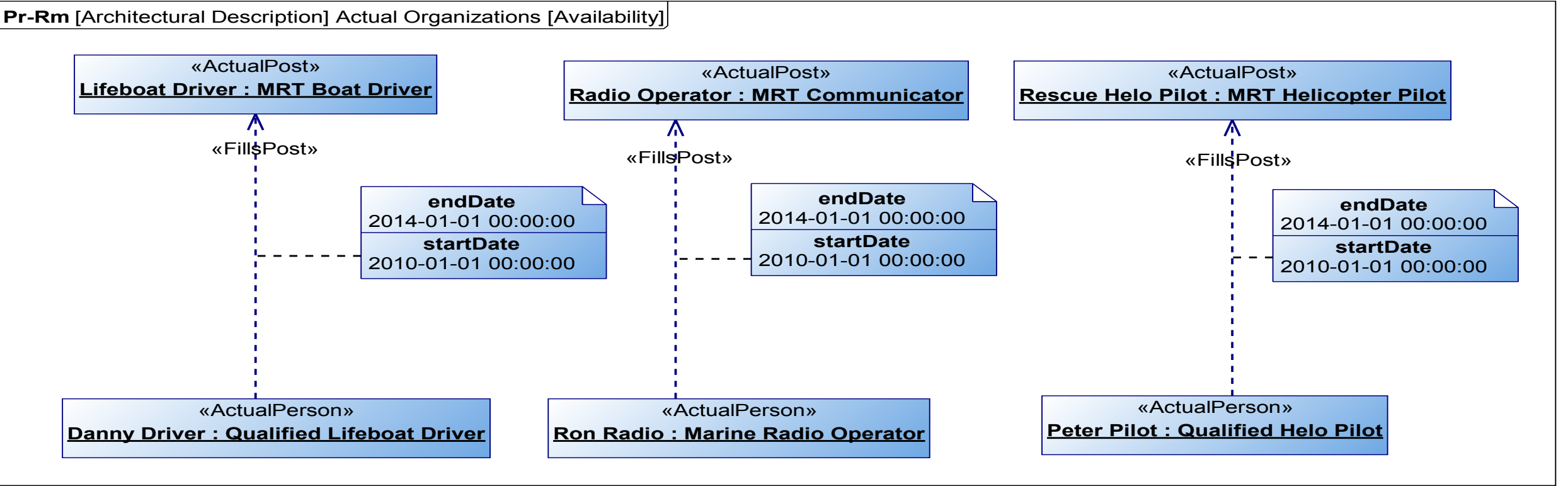
- **Stakeholders:** Human Resources, Training, Logisticians, Solution Providers.
- **Concerns:** the staffing and training of resources.
- **Definition:** defines the requirements and functions to ensure that actual persons with the right competencies, and in the right numbers, are available to fulfill actual posts.
- **Recommended Implementation:** Timeline, SysML Block Definition Diagram

PR-RMA PERSONNEL ROADMAP SPECIFICATION (AVAILABILITY)



PR-RMA PERSONNEL ROADMAP SPECIFICATION (AVAILABILITY)

Definition



PR-RMA PERSONNEL ROADMAP SPECIFICATION (AVAILABILITY)

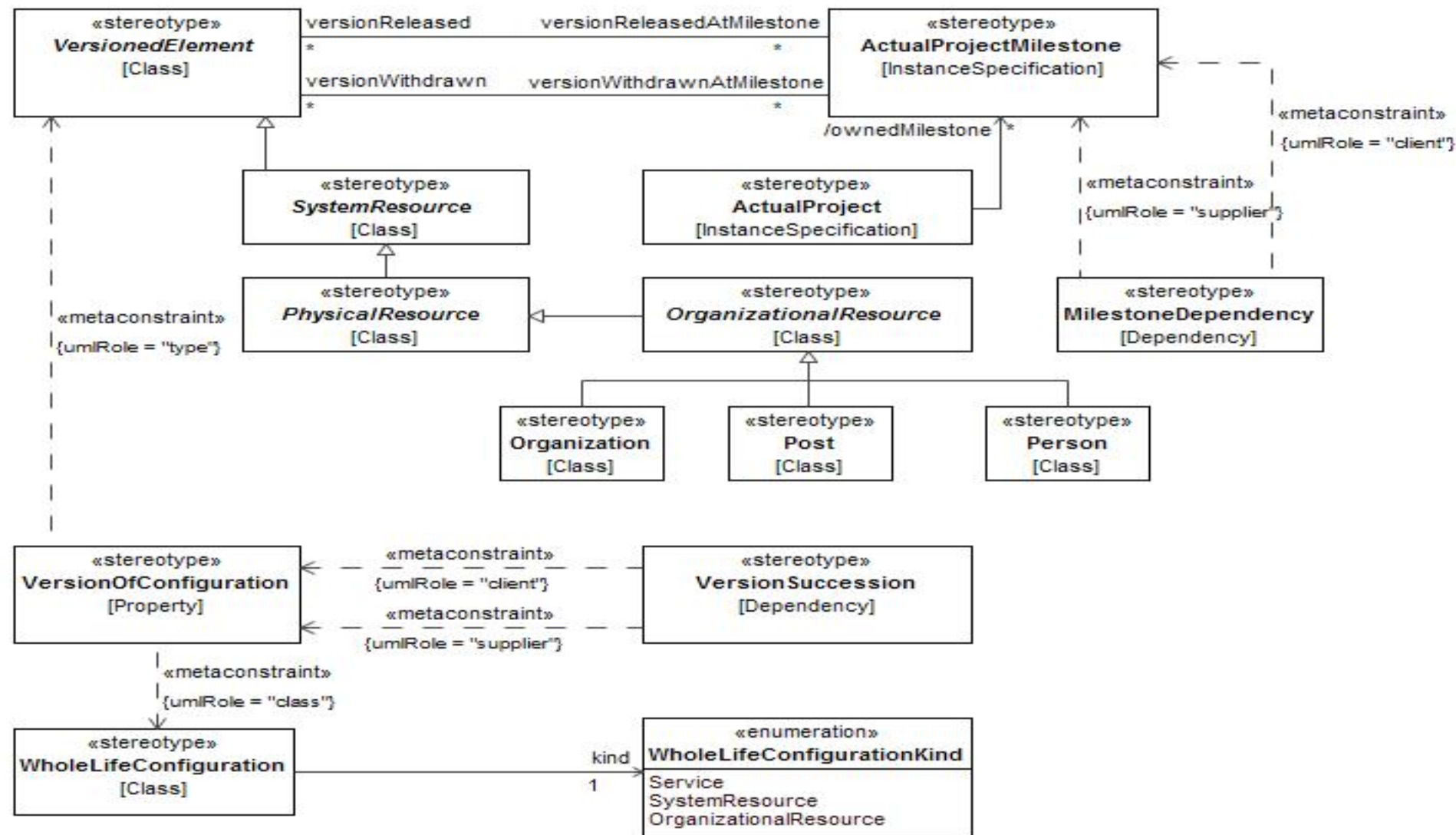
Report

Architectural Description] Actual Organizations [Availability Table]

[illegible]

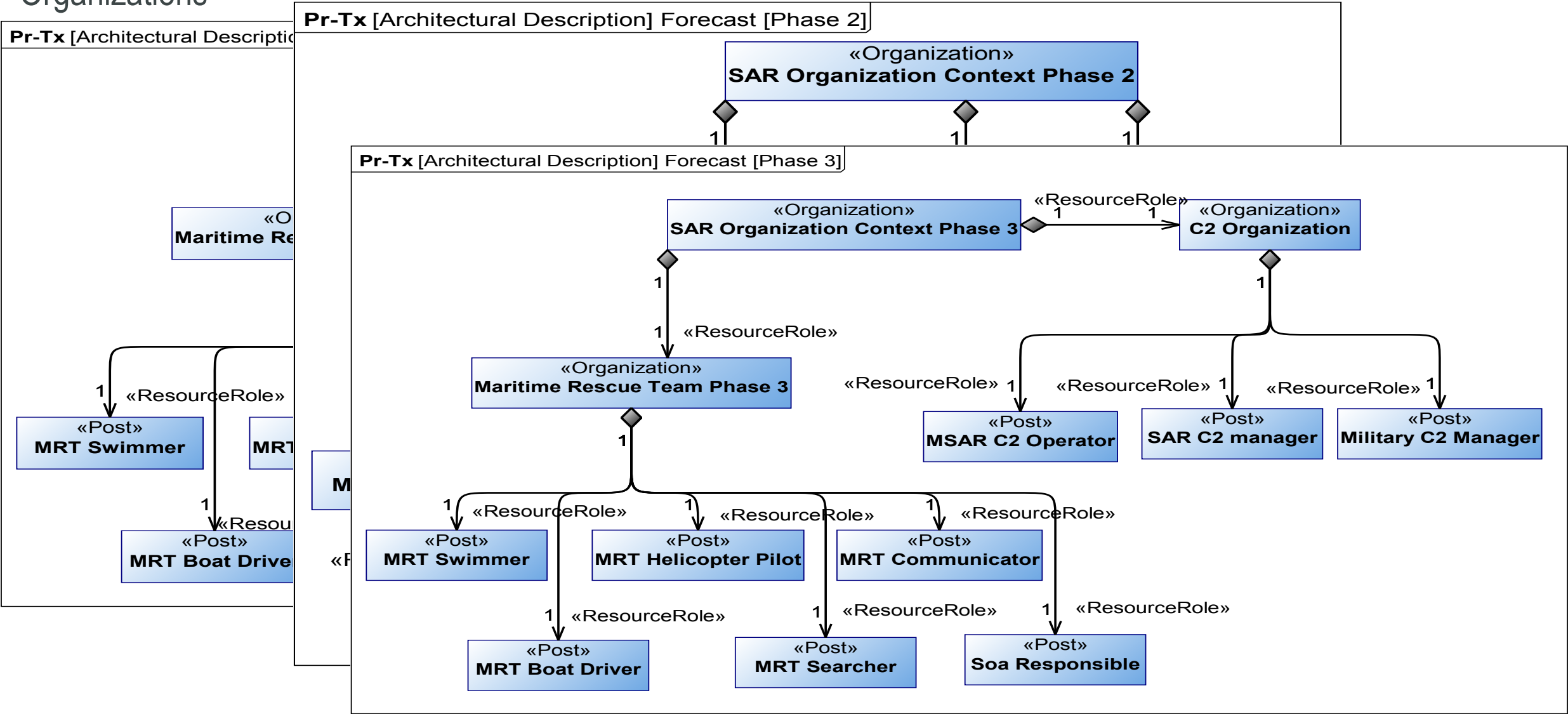
- **Stakeholders:** Human resources, Solution Providers.
- **Concerns:** organizational structure changes over time.
- **Definition:** provides an overview of how a organizational structure changes over time. It shows the structure of several organizational structures mapped against a timeline.
- **Recommended Implementation:** timeline, SysML Block Definition Diagram, SysML Internal Block Diagram.

PR-RMB PERSONNEL AVAILABILITY SPECIFICATION (EVOLUTION)

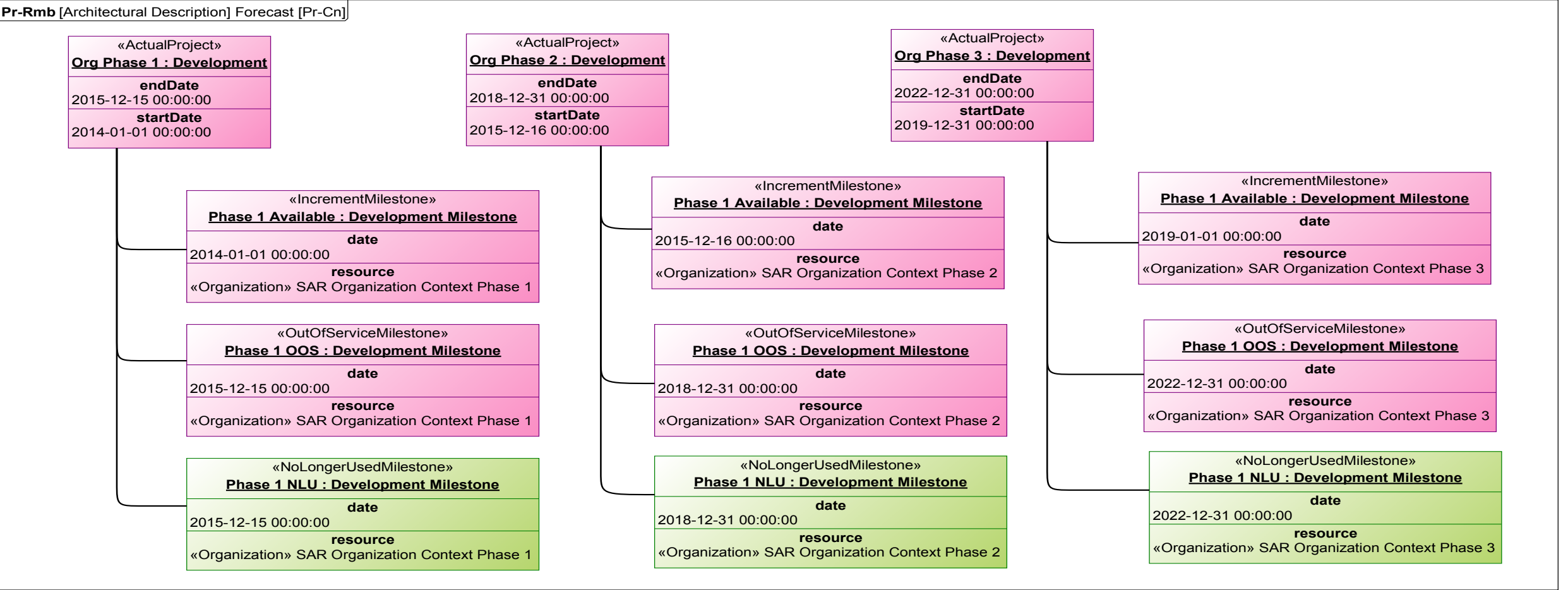


PR-RMB PERSONNEL AVAILABILITY SPECIFICATION (EVOLUTION)

Organizations



PR-RMB PERSONNEL AVAILABILITY SPECIFICATION (EVOLUTION)



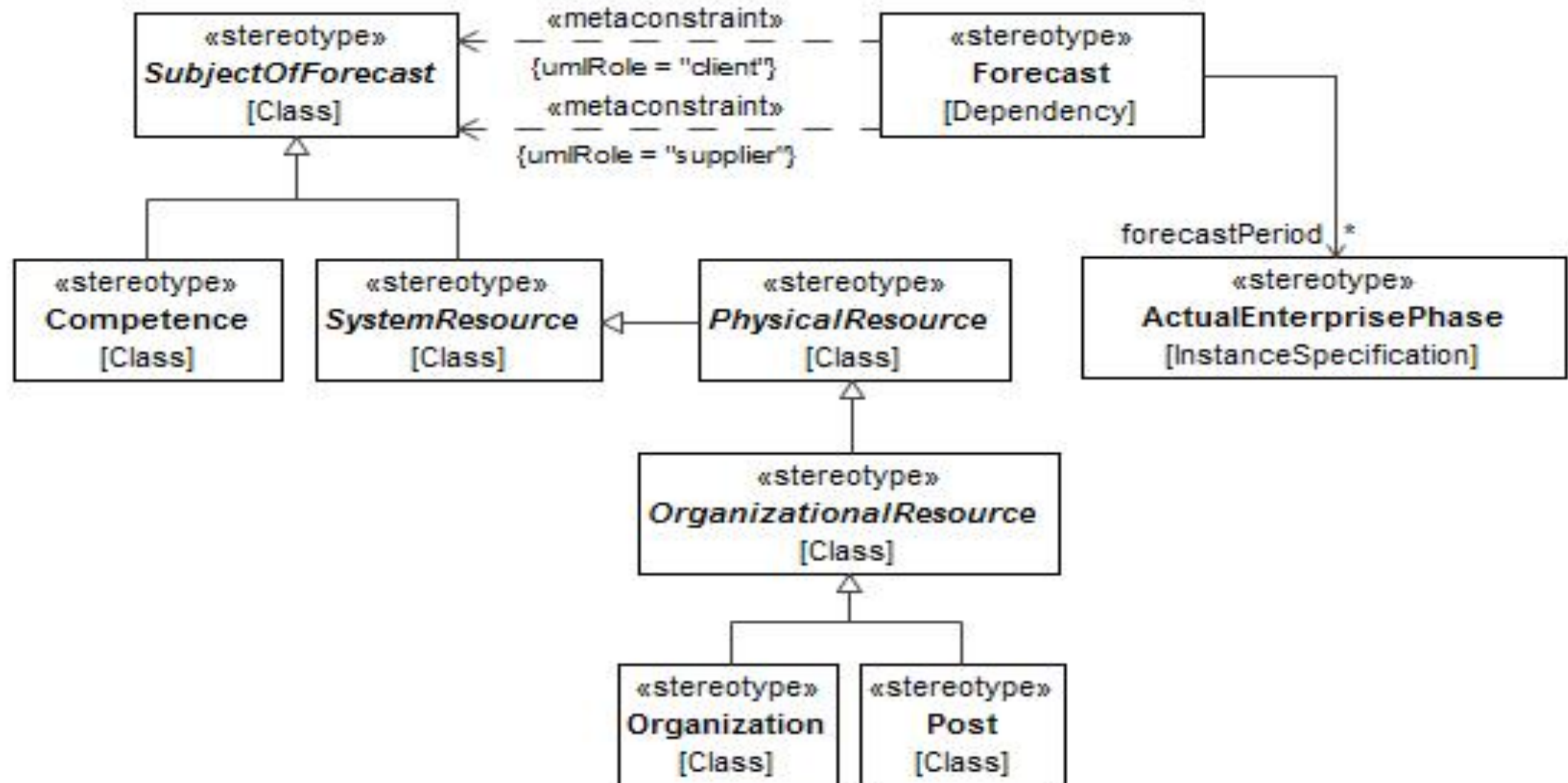
PR-RMB PERSONNEL AVAILABILITY SPECIFICATION (EVOLUTION)

[Architectural Description] Personnel Forecast [Phases]

Capability Name	Exhibiting Element							
	Name	Components	2014-01-01	2015-12-15	2015-12-16	2018-12-31	2019-01-01	2022-12-31
	«Organization» SAR Organization Context Phase 1	«Organization» Maritime Rescue Team Phase 1	Increment	Out Of Service				
		«Post» MSAR C2 Operator						
		«Post»						
	«Organization» SAR Organization Context Phase 2	SAR C2 manager			Increment	Out Of Service		
		«Organization»						
		Maritime Rescue Team Phase 2						
	«Organization» SAR Organization Context Phase 3	«Post» MSAR C2 Operator					Increment	Out Of Service
		«Organization»						
		C2 Organization						
Common operational picture access	«Organization» SAR Organization Context Phase 3	«Organization» Maritime Rescue Team Phase 3					Increment	Out Of Service
		«Organization»						
		C2 Organization						
Distress Signal Monitoring	«Organization» SAR Organization Context Phase 1	«Organization» Maritime Rescue Team Phase 1	Increment	Out Of Service				
		«Post» MSAR C2 Operator						
		«Post»						
	«Organization» SAR Organization Context Phase 2	SAR C2 manager			Increment	Out Of Service		
		«Organization»						
		Maritime Rescue Team Phase 2						
	«Organization» SAR Organization Context Phase 3	«Post» MSAR C2 Operator					Increment	Out Of Service
		«Organization»						
		C2 Organization						
	«Organization» SAR Organization Context Phase 1	«Organization» Maritime Rescue Team Phase 1	Increment	Out Of Service				
		«Post» MSAR C2 Operator						
		«Post»						
	«Organization» SAR Organization Context Phase 2	SAR C2 manager			Increment	Out Of Service		
		«Organization»						
		Maritime Rescue Team Phase 2						
	«Organization» SAR Organization Context Phase 3	«Post» MSAR C2 Operator					Increment	Out Of Service
		«Organization»						
		C2 Organization						
	«Organization» SAR Organization Context Phase 3	«Organization» Maritime Rescue Team Phase 3					Increment	Out Of Service
		«Organization»						
		C2 Organization						
Military C2								
MSAR C2 phase 1	«Organization» SAR Organization Context Phase 1	«Organization» Maritime Rescue Team Phase 1	Increment	Out Of Service				
		«Post» MSAR C2 Operator						
		«Post»						
MSAR C2 phase 2	«Organization» SAR Organization Context Phase 2	SAR C2 manager			Increment	Out Of Service		
		«Organization»						
		Maritime Rescue Team Phase 2						
	«Organization» SAR Organization Context Phase 3	«Post» MSAR C2 Operator					Increment	Out Of Service
		«Organization»						
		C2 Organization						
Position location of persons in distress	«Organization» SAR Organization Context Phase 2	«Organization» Maritime Rescue Team Phase 3			Increment	Out Of Service		
		«Post» SAR C2 manager						
		«Organization»						
	«Organization» SAR Organization Context Phase 3	Maritime Rescue Team Phase 2					Increment	Out Of Service
		«Post» MSAR C2 Operator						
		«Organization»						
Recovery phase 1	«Organization» SAR Organization Context Phase 1	«Organization» C2 Organization	Increment	Out Of Service				
		«Organization»						
		Maritime Rescue Team Phase 3						
Recovery phase 2	«Organization» SAR Organization Context Phase 2	«Organization» Maritime Rescue Team Phase 1			Increment	Out Of Service		
		«Post» MSAR C2 Operator						
		«Post» SAR C2 manager						
		«Organization»						
	«Organization» SAR Organization Context Phase 2	Maritime Rescue Team Phase 2			Increment	Out Of Service		
		«Post»						
		«Post»						

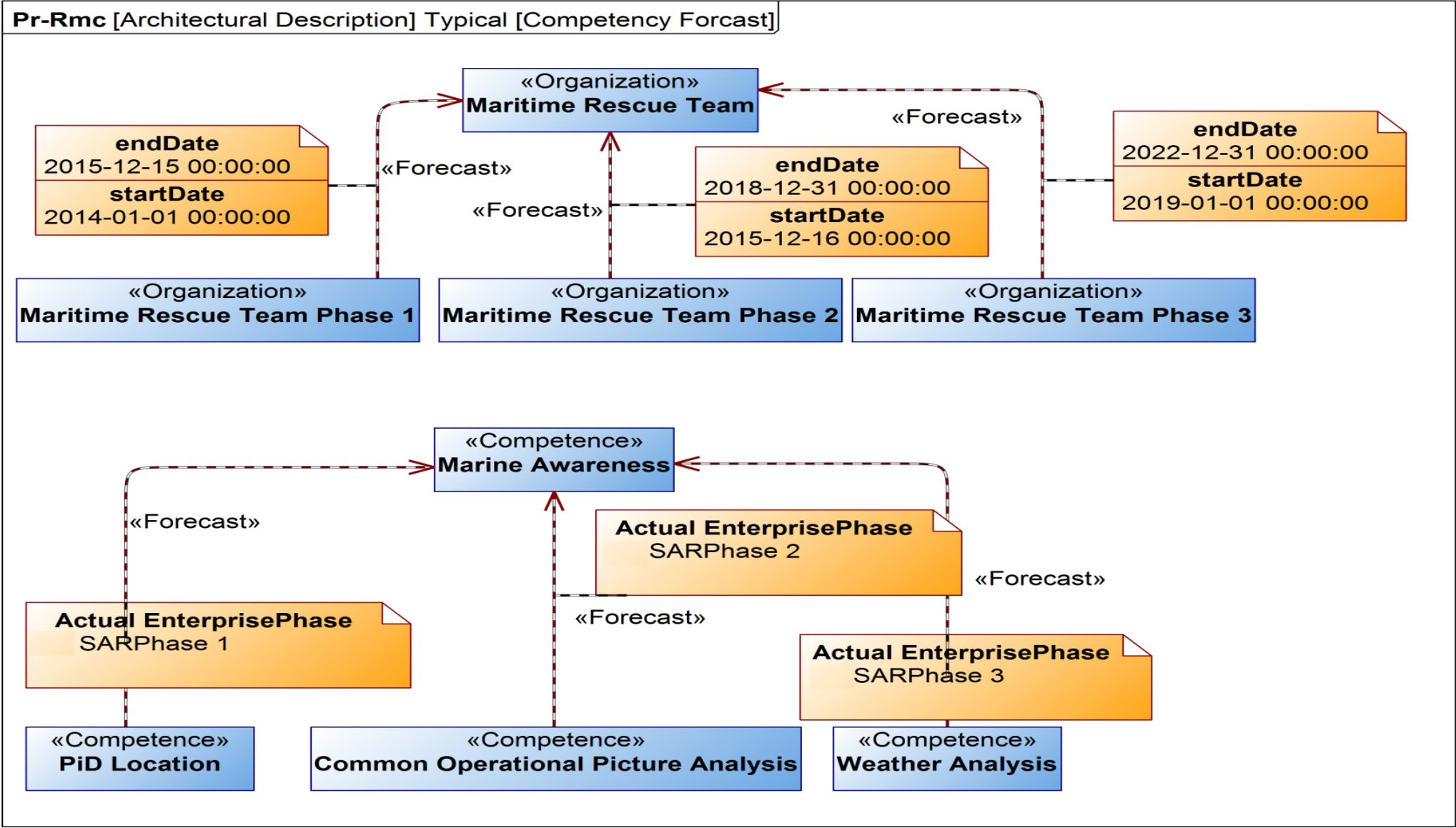
- **Stakeholders:** Human resources, Logisticians, Solution Providers.
- **Concerns:** competencies and skills forecast.
- **Definition:** defines the underlying current and expected supporting competencies and skills of organizational resources.
- **Recommended Implementation:** timeline, tabular format, SysML Block Definition Diagram.

PR-RMC PERSONNEL ROADMAP FORECAST SPECIFICATION



PR-RMC PERSONNEL ROADMAP FORECAST SPECIFICATION

Definition

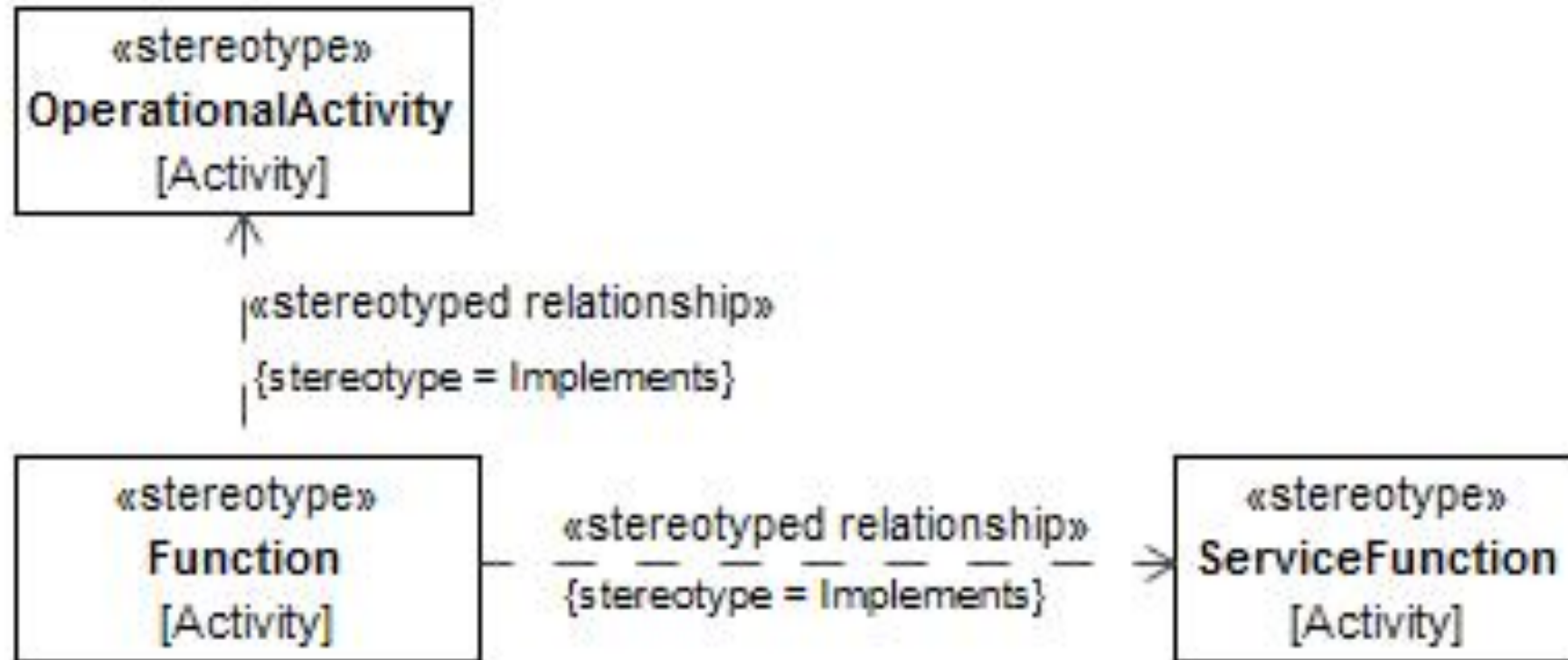


Report

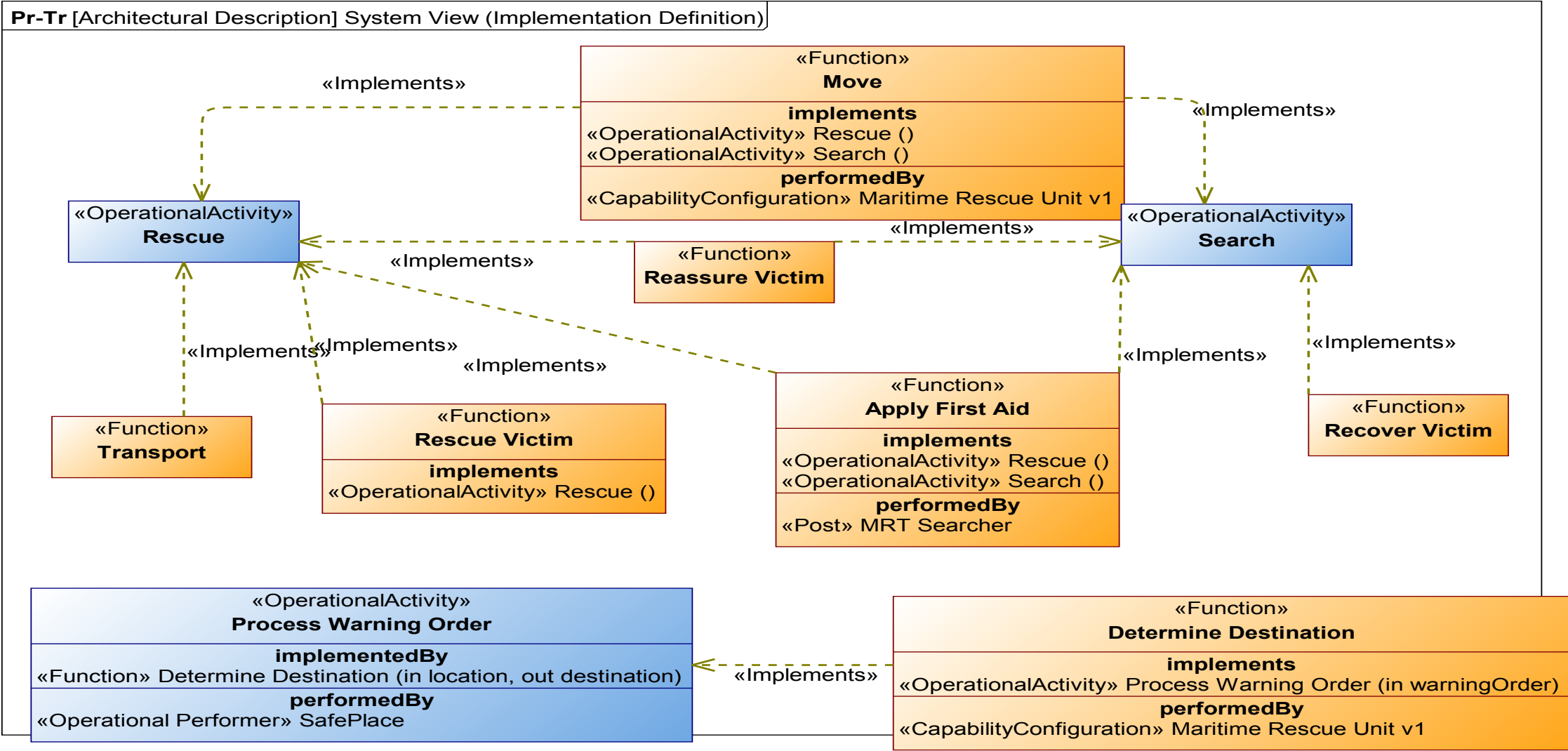
[Architectural Description] Typical [Competency Forecast]

Category Type	Category	SARPhase 1	SARPhase 2	SARPhase 3
«Competence»	Marine Awareness	PiD Location	Common Operational Picture Analysis	Weather Analysis
«Organization»	Maritime Rescue Team	Maritime Rescue Team Phase 1	Maritime Rescue Team Phase 2	Maritime Rescue Team Phase 3

- **Stakeholders:** Systems Engineers, Enterprise Architects, Solution Providers, Business Architects.
- **Concerns:** traceability between operational activities and functions that implements them.
- **Definition:** depicts the mapping of functions (performed by organizational resources) to operational activities and thus identifies the transformation of an operational need into a purposeful function performed by an organizational resource or solution.



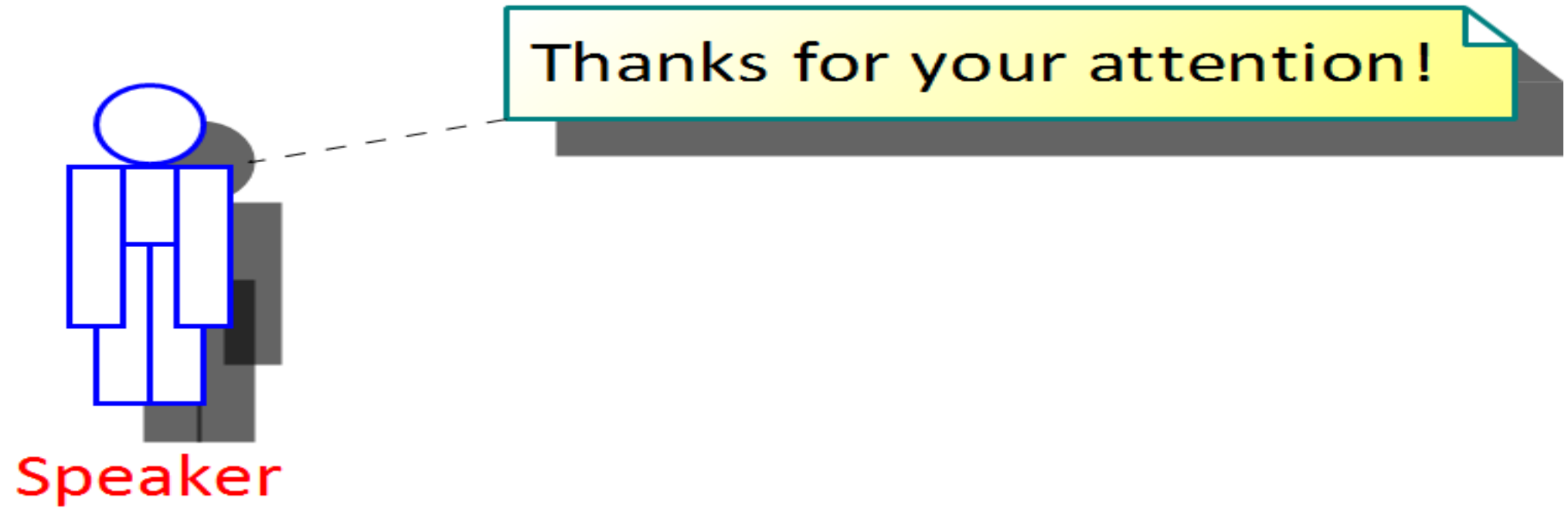
Definition



[Architectural Description] System View (Implementation Matrix)

		Implemented By							
Implements		«Function» Apply First Aid	«Function» Determine Destination	«Function» Move	«Function» Reassure Victim	«Function» Recover Victim	«Function» Rescue Victim	«Function» Transport	
	«OperationalActivity» Rescue	X		X	X		X	X	
	«OperationalActivity» Search	X		X	X	X			
	«Activity» Process Warning Order								

- The UAF defines enterprise architectures
 - At various levels of abstraction
 - From multiple viewpoints
- The UAF implements DoDAF, NAF and MODAF in SysML
 - Traces to systems engineering
 - Provides multiple forms of trade-off analysis
- Human Factors have been integrated into the UAF as a set of personnel views
- This will enable systems that are fit for humans





ptc