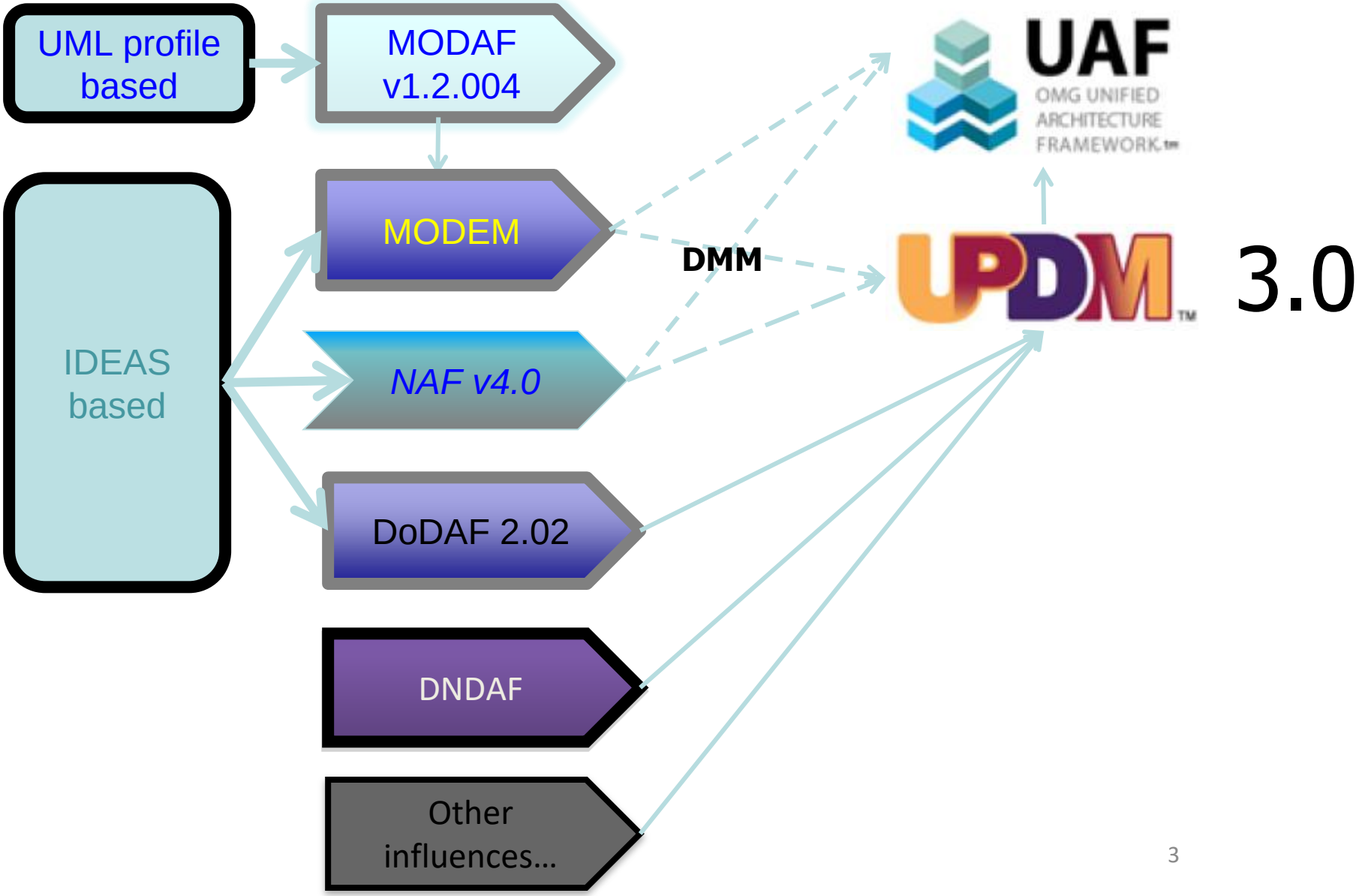
Transitioning UPDM to the Unified Architecture Framework

MC Hause (Mhause@PTC.com)

Agenda

- UAF Overview
- Smart City Example
- Security Views

UPDM 3.0->UAFP 1.0



	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	-	-			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 0p	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	-	Operational Traceability Op-Tr
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	Conceptual Data Model,	Environment Pm-En	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,		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	Measurements Pm-Me	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	-	Security Traceability Sc-Tr
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 Sd-Rm	Standards Traceability Sd-Tr
Actuals Resources Ar		Actual Resources Structure, Ar-Sr	Actual Resources Connectivity, Ar-Cn	Simulation [b]					Parametric Execution/ Evaluation [b]	-	-

Dictionary * Dc

Summary & Overview Sm-Ov

Requirements Req

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)
- 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)
- View Specifications exist at the intersections

	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Interaction Scenarios Is	Information[c] 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	-	-			Metadata Constraints [a] Md-Ct		Metadata Traceability Md-Tr
Strategic St	**CV-2 BDD**	**CV-1 IBD**	**CV-4**	-	Strategic States St-St	-			Measurable Properties	**CV-5 CV-3**	**CV-6**
Operational Op	**OV-2 BDD**	**OV-1a OV-2 IBD**	**OV-3/ OV-6**	**OV-5**	**OV-6b**	**OV-6c**			**OV-6a**	-	-
Services Sv	**ScV-1 BDD**	**ScV-2 IBD**	**ScV-3 ScV-6**	**ScV-4**	**ScV-10b**	**ScV-10c**	**DIV-1**	**Environment Pm-En ScV-7**	**ScV-10a**	**ScV 8 ScV-9**	**ScV-5, CV-7**
Personnel Pr	**OV-4 BDD**	**OV-4 IBD**	**OV-4 SV-6**	**SV-4**	**SV-10b**	**SV-10c**	**DIV-2 DIV-3**		**OV-4 Typical**	**PV-2 SV-8 SV-9**	**SV-5**
Resources Rs	**SV-1, SV-2 BDD**	**SV-1, SV-2 IBD**	**SV-3, SV-6**	**SV-4**	**SV-10b**	**SV-10c**		**SV-7**	**SV-10a**	**SV-8 SV-9**	**SV-5**
Security Sc	Security Taxonomy Sc-Tx	Security Structure Sc-Sr	Security Connectivity Sc-Cn	Security Processes Sc-Pr	-	-		**Measurements Pm-Me**	Security Constraints Sc-Ct	-	-
Projects Pj	**PV-1 BDD**	**PV-1 IBD**	**PV-2**	**PV-2**	-	-			-	**PV-2**	Project Traceability Pj-Tr
Standards Sd	**StdV-1 BDD**	**StdV-1 IBD**	-	-	-	-			-	**StdV-2**	**StdV-1**
Actuals Resources Ar		**OV-4**	**OV-4 SV-1 & SV-2**	Simulation [b]					Parametric Execution/Evaluation [b]	-	-

Dictionary * Dc (AV-2)

Summary & Overview SmOv (AV-1, OV-1 graphic)

Requirements Rq

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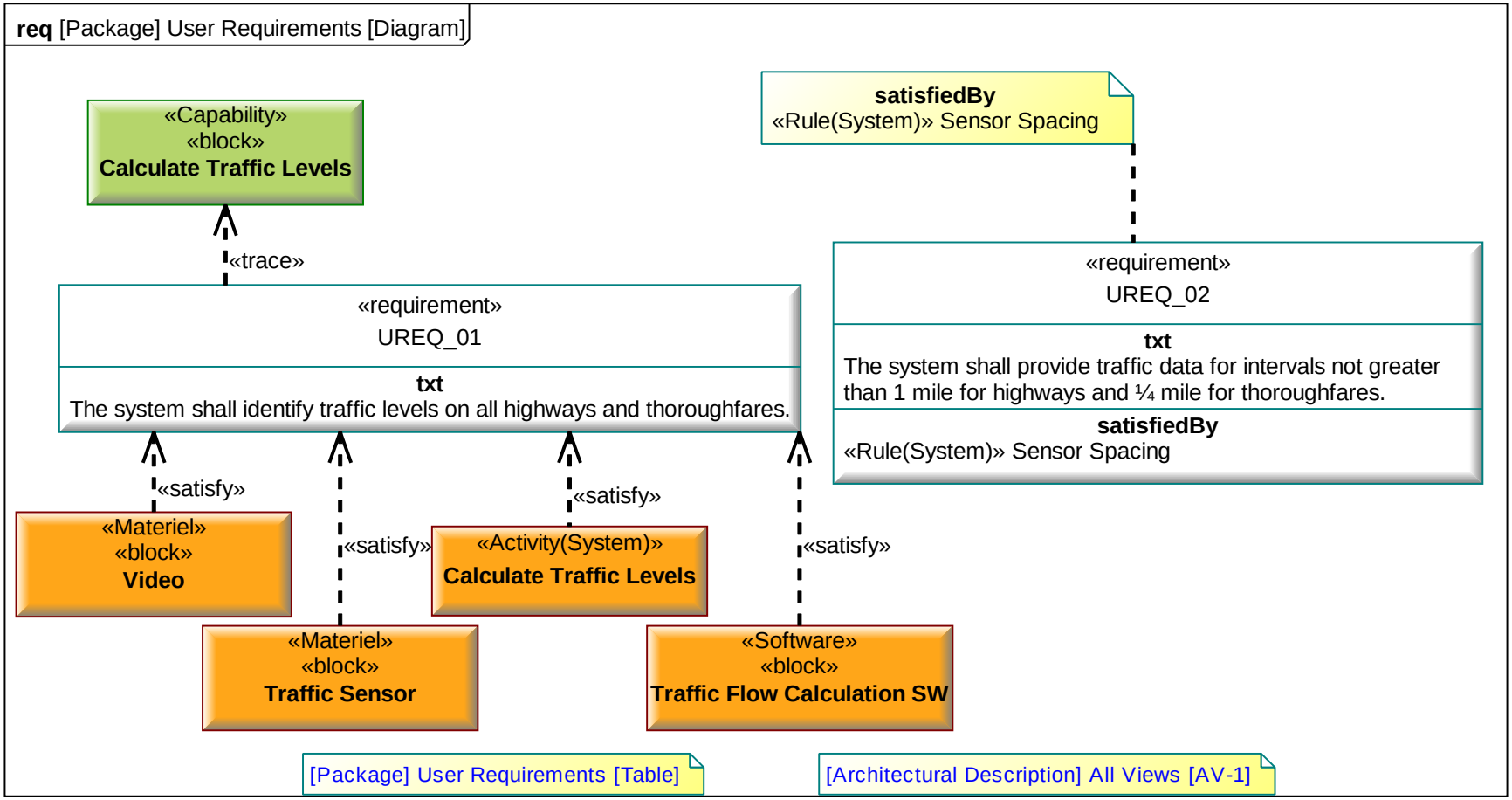
Smart City Example

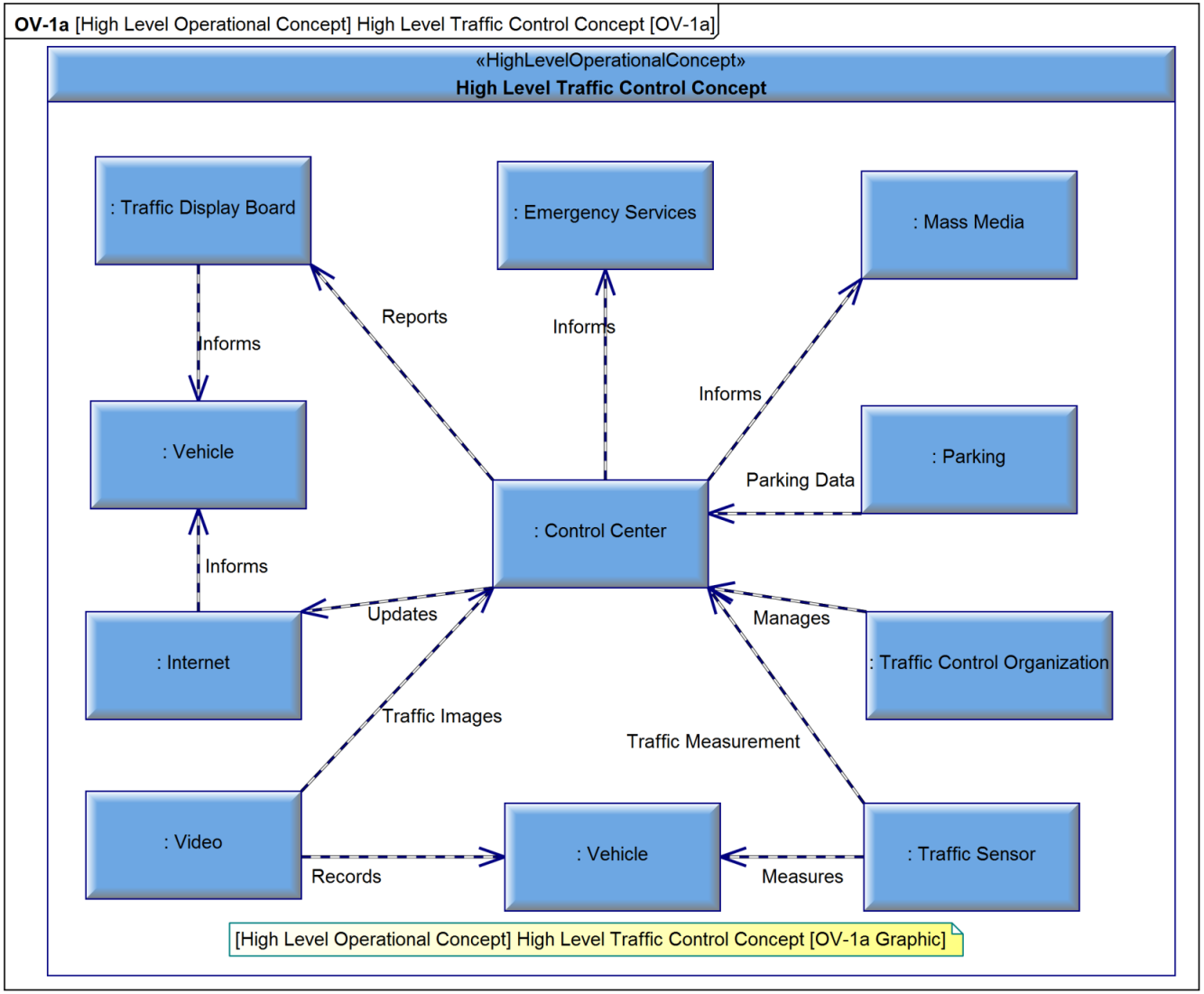
Problem Statement for Traffic Management System

- 1. General Background
  - The city of Autoville has just elected a new city council with a mandate to reduce traffic on the highways and thoroughfares.
  - After receiving a grant of $200M from the federal government, they have decided to acquire a traffic management system to help them identify areas and times of high traffic density so they can take measures to alleviate the effects of it.
  - The city of Autoville has 100 miles of highway with 10 interchanges and 300 miles of thoroughfares with 100 major intersections.
  - Systems will include controlled parking facilities, availability monitoring and dissemination, emergency management, traffic control and prediction, and support for electric vehicles.

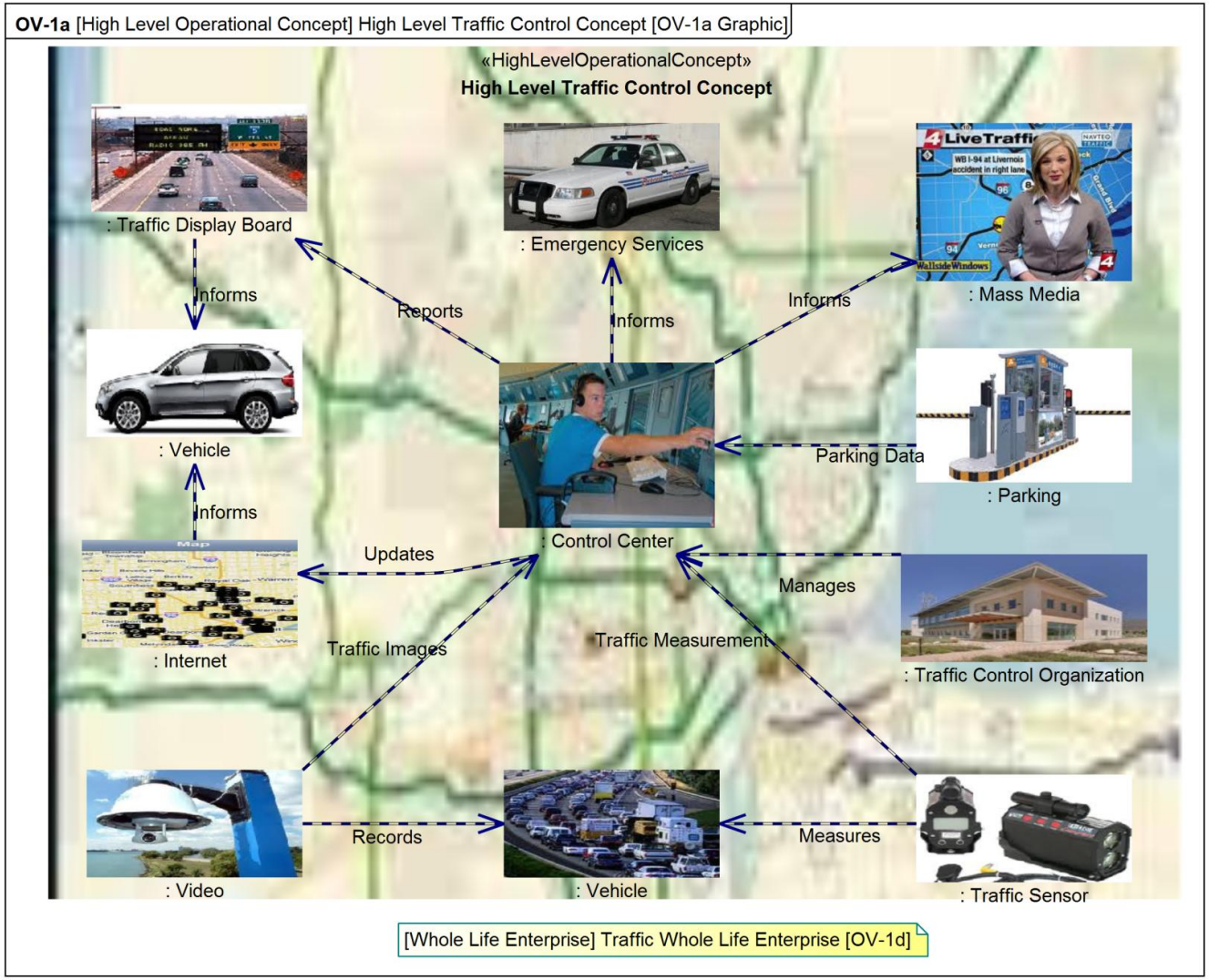
SysML Requirements Diagram



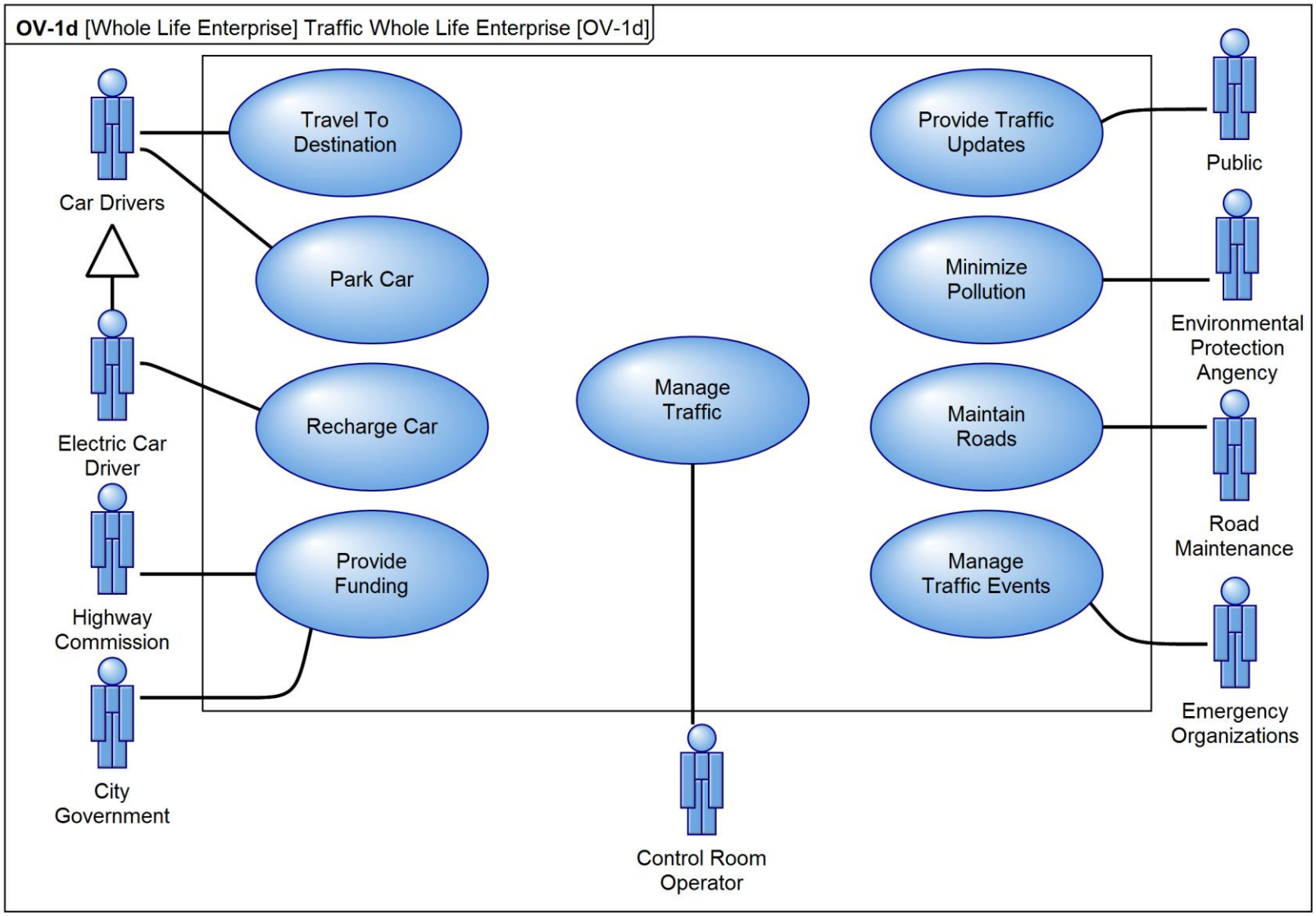
Operational Concept with Boxes



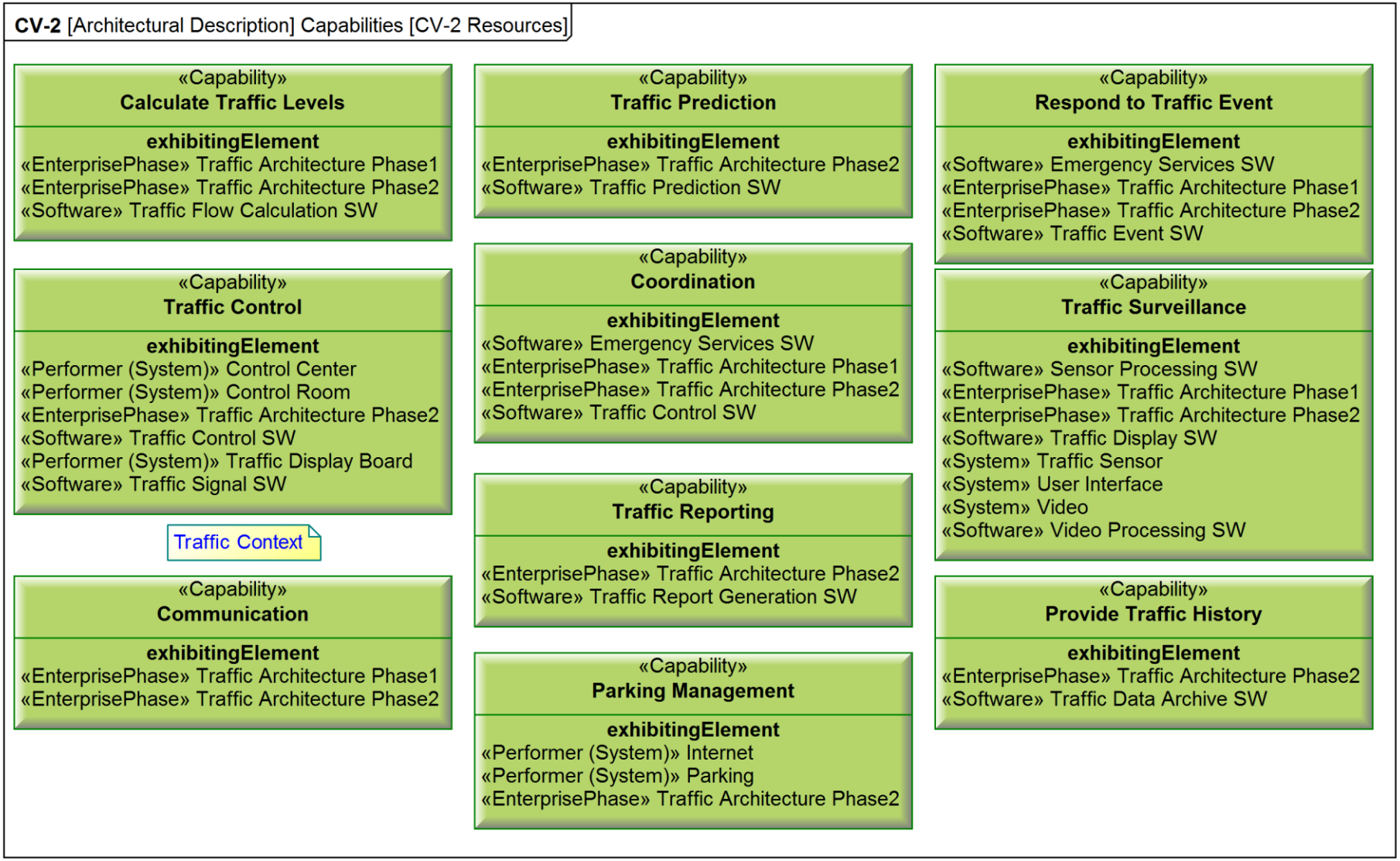
Operational Concept with Graphics



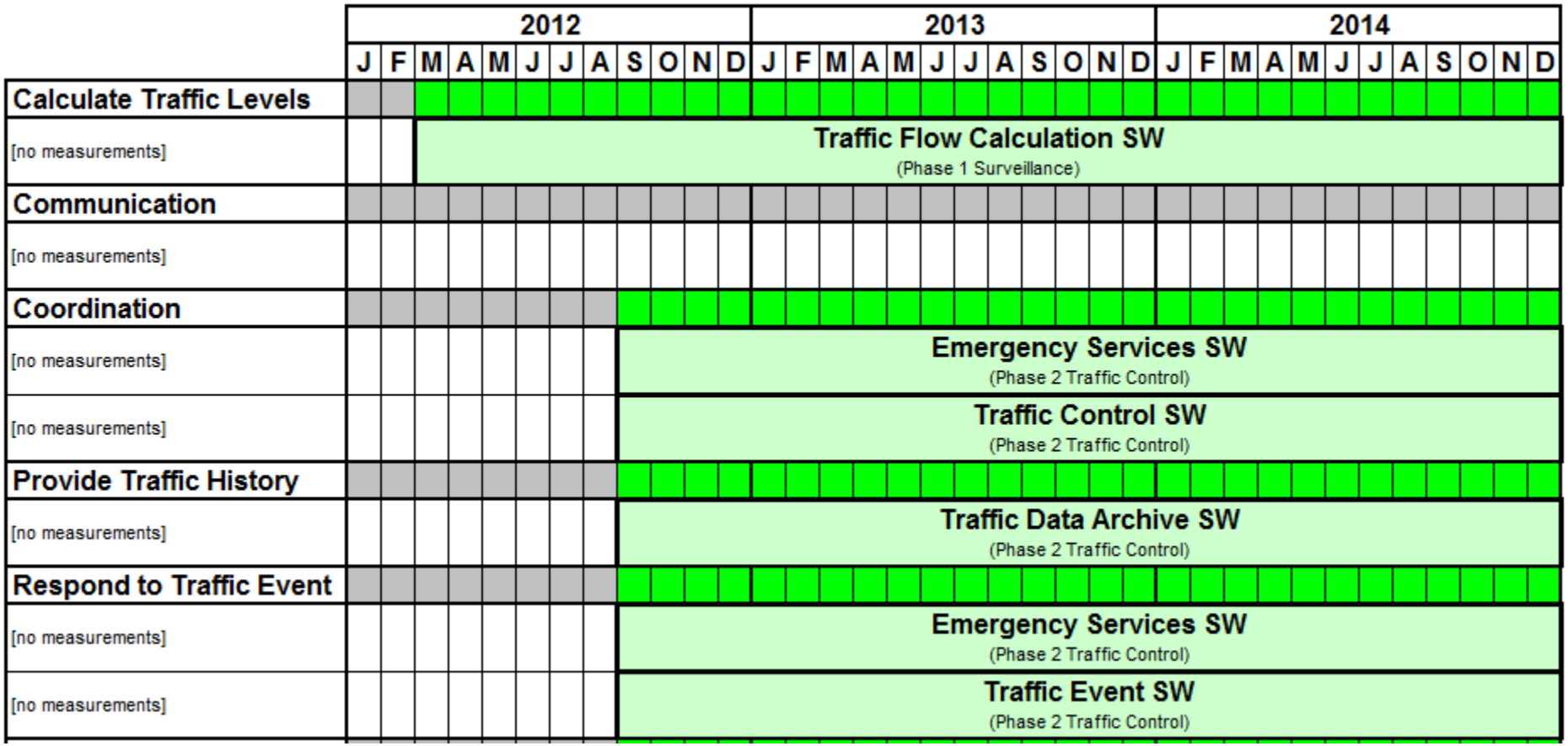
Traffic Management Use Cases and Stakeholders



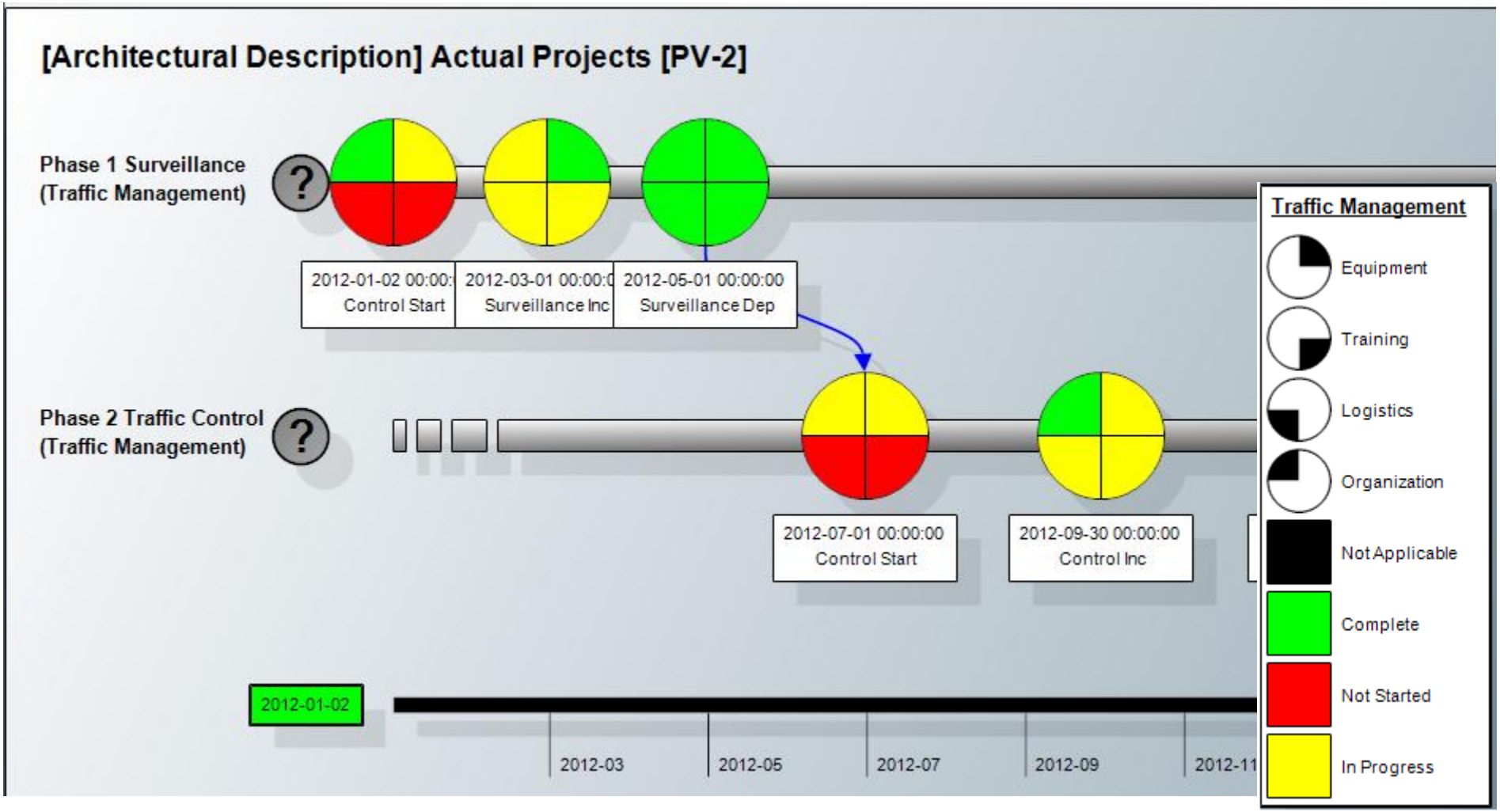
Capability Taxonomy with Implementing Resources



CV-3 Capability Phasing and System Deployment



PV-2 Actual Project Timeline



SV-8 Systems Evolution Description

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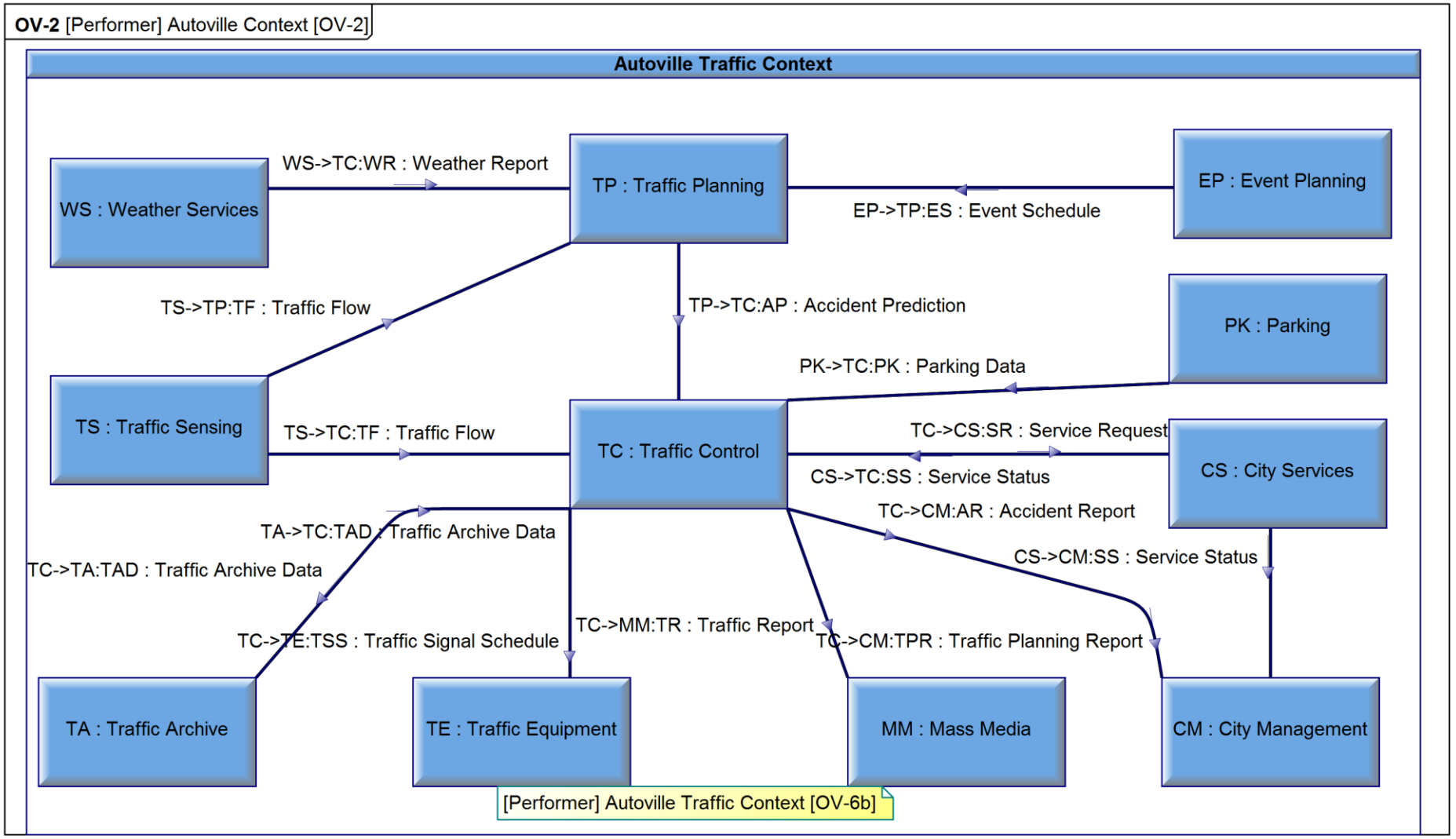
Capability	Realizing Resource		Milestone Dates		
Name	Name	Components	2012-03-01	2012-09-30	2014-12-31
Calculate Traffic Levels	«Software» Traffic Flow Calculation SW		Increment		Retirement
Communication					
Coordination	«Software» Emergency Services SW			Increment	Retirement
	«Software» Traffic Control SW			Increment	Retirement
Provide Traffic History	«Software» Traffic Data Archive SW			Increment	Retirement
Respond to Traffic Event	«Software» Emergency Services SW			Increment	Retirement
	«Software» Traffic Event SW			Increment	Retirement
Traffic Control	«Software» Traffic Signal SW			Increment	Retirement
	«System» Control Center	«System» Control Room		Increment	Retirement
	«System» Control Room	«Person Role Type» Control Room Operator		Increment	Retirement
		«Person Role Type» Control Room Operator			
		«System» Control System			
		«Materiel» User Interface			
		«Materiel» User Interface			
	«System» Traffic Display Board			Increment	Retirement
	«Software» Traffic Control SW			Increment	Retirement

Operational Structure



Interaction Summary (ICD)

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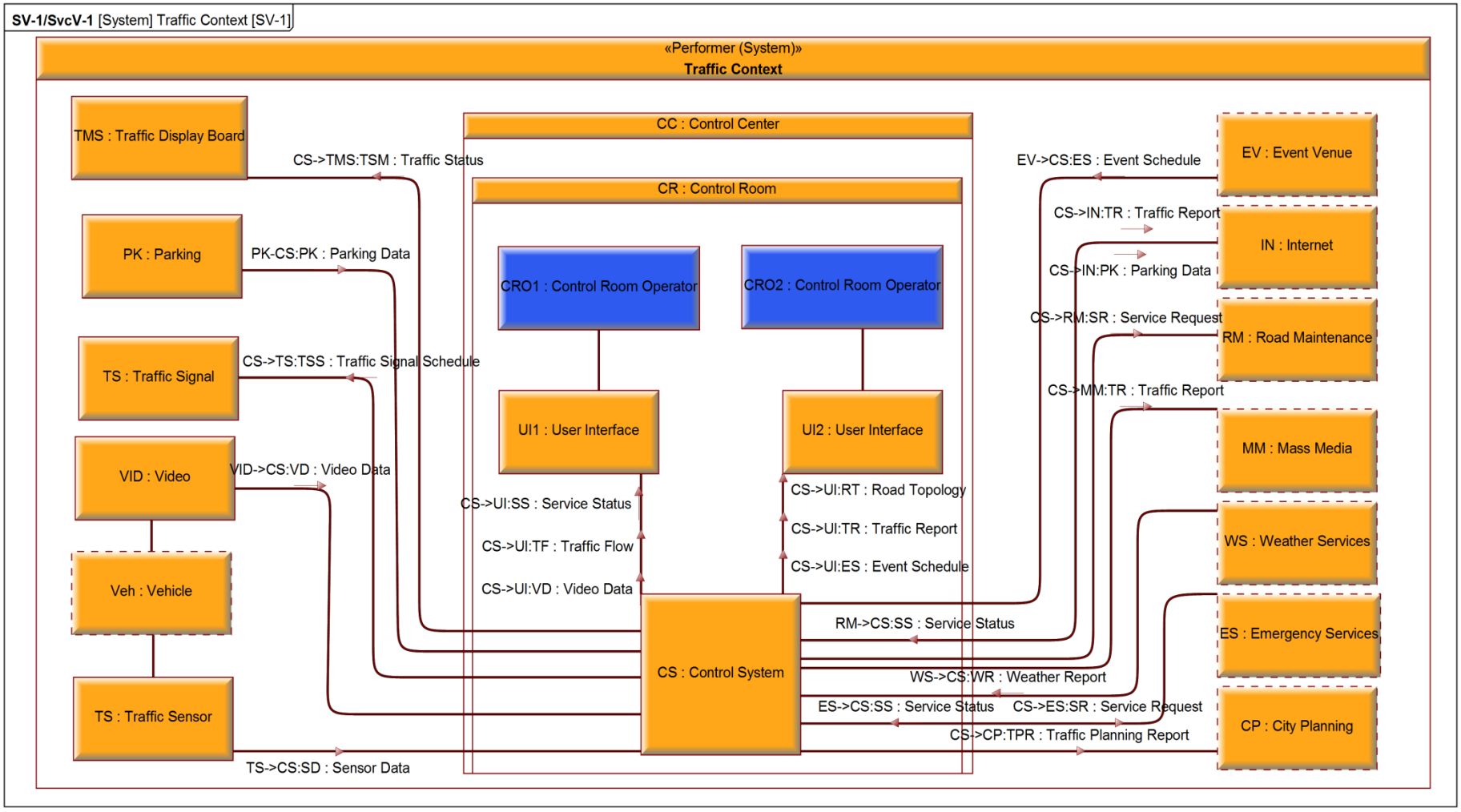
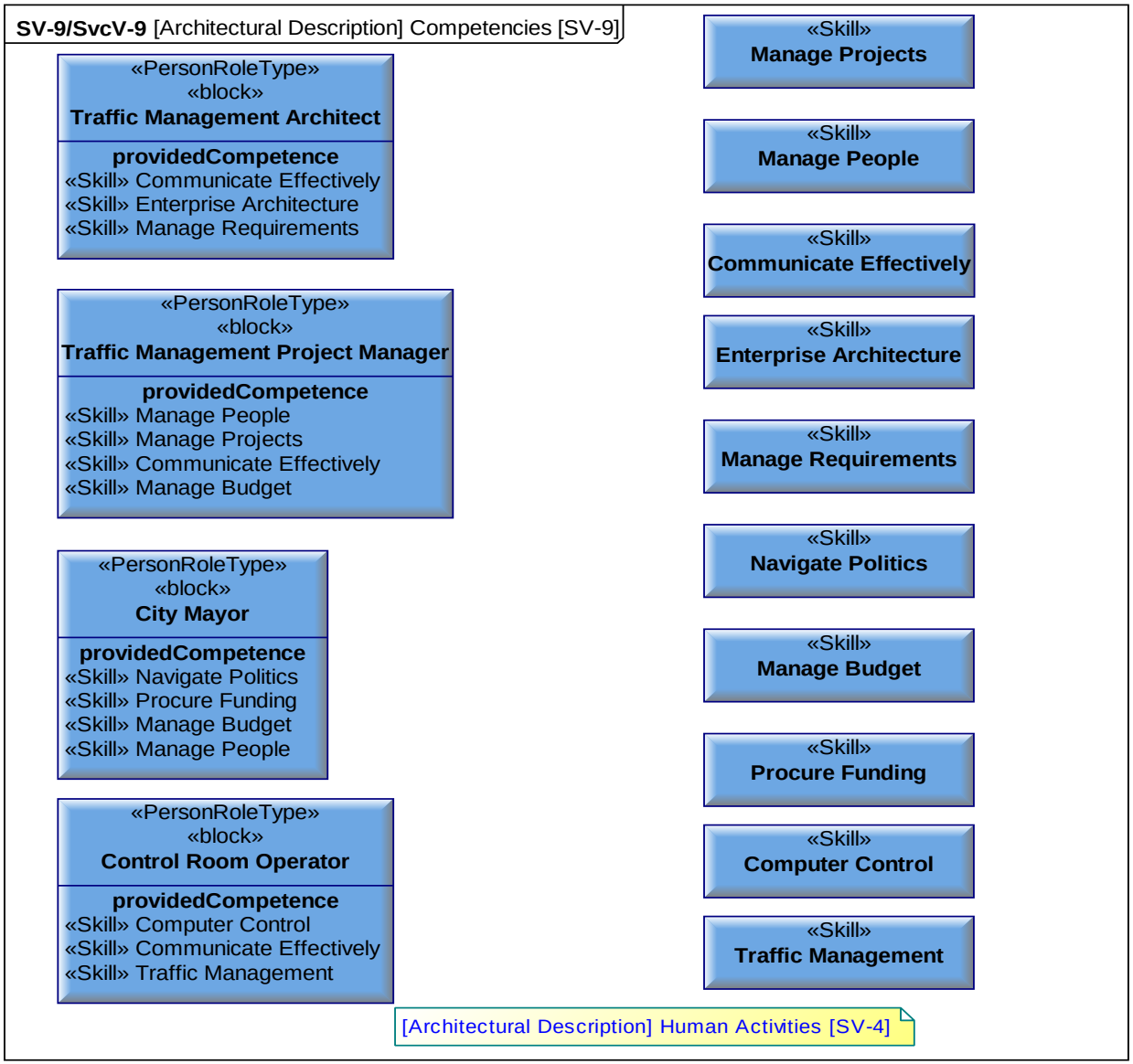
Information Exchange		Producer		Needline	Consumer	
Name	Conveyed	Perfomer	Activity (Operational)	Name	Perfomer	Activity (Operational)
CS->CM:SS	«Information Element» Service Status	«Performer» City Services		CS - CM	«Performer» City Management	
CS->TC:SS	«Information Element» Service Status	«Performer» City Services		CS - TC	«Performer» Traffic Control	
EP->TP:ES	«Information Element» Event Schedule	«Performer» Event Planning		EP - TP	«Performer» Traffic Planning	
TA->TC:TAD	«Information Element» Traffic Archive Data	«Performer» Traffic Archive		TA - TC	«Performer» Traffic Control	
TC->CM:AR	«Information Element» Accident Report	«Performer» Traffic Control		CM - TC	«Performer» City Management	
TC->CM:TPR	«Information Element» Traffic Planning Report	«Performer» Traffic Control		CM - TC	«Performer» City Management	
TC->CS:SR	«Information Element» Service Request	«Performer» Traffic Control		CS - TC	«Performer» City Services	
TC->MM:TR	«Information Element» Traffic Report	«Performer» Traffic Control		TC - M	«Performer» Mass Media	
TC->TA:TAD	«Information Element» Traffic Archive Data	«Performer» Traffic Control		TA - TC	«Performer» Traffic Archive	
TC->TE:TSS	«Information Element» Traffic Signal Schedule	«Performer» Traffic Control		TC - TE	«Performer» Traffic Equipment	
TP->TC:AP	«Information Element» Accident Prediction	«Performer» Traffic Planning		TP - TC	«Performer» Traffic Control	
TS->TC:TF	«Information Element» Traffic Flow	«Performer» Traffic Sensing		TS - TC	«Performer» Traffic Control	
TS->TP:TF	«Information Element» Traffic Flow	«Performer» Traffic Sensing		TP - TS	«Performer» Traffic Planning	
WS->TC:WR	«Information Element» Weather Report	«Performer» Weather Services		WS - TP	«Performer» Traffic Planning	

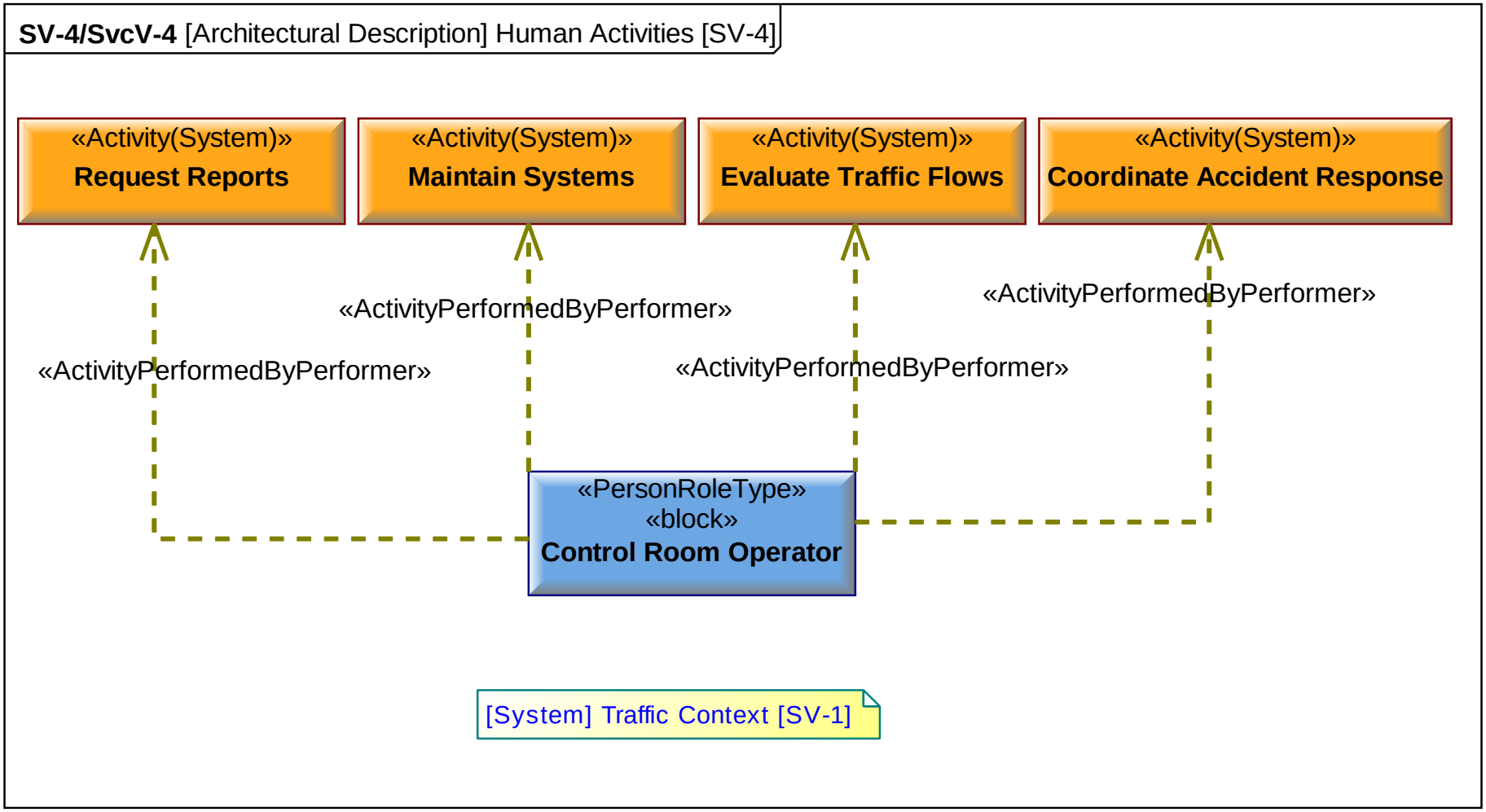
Traffic Management Systems



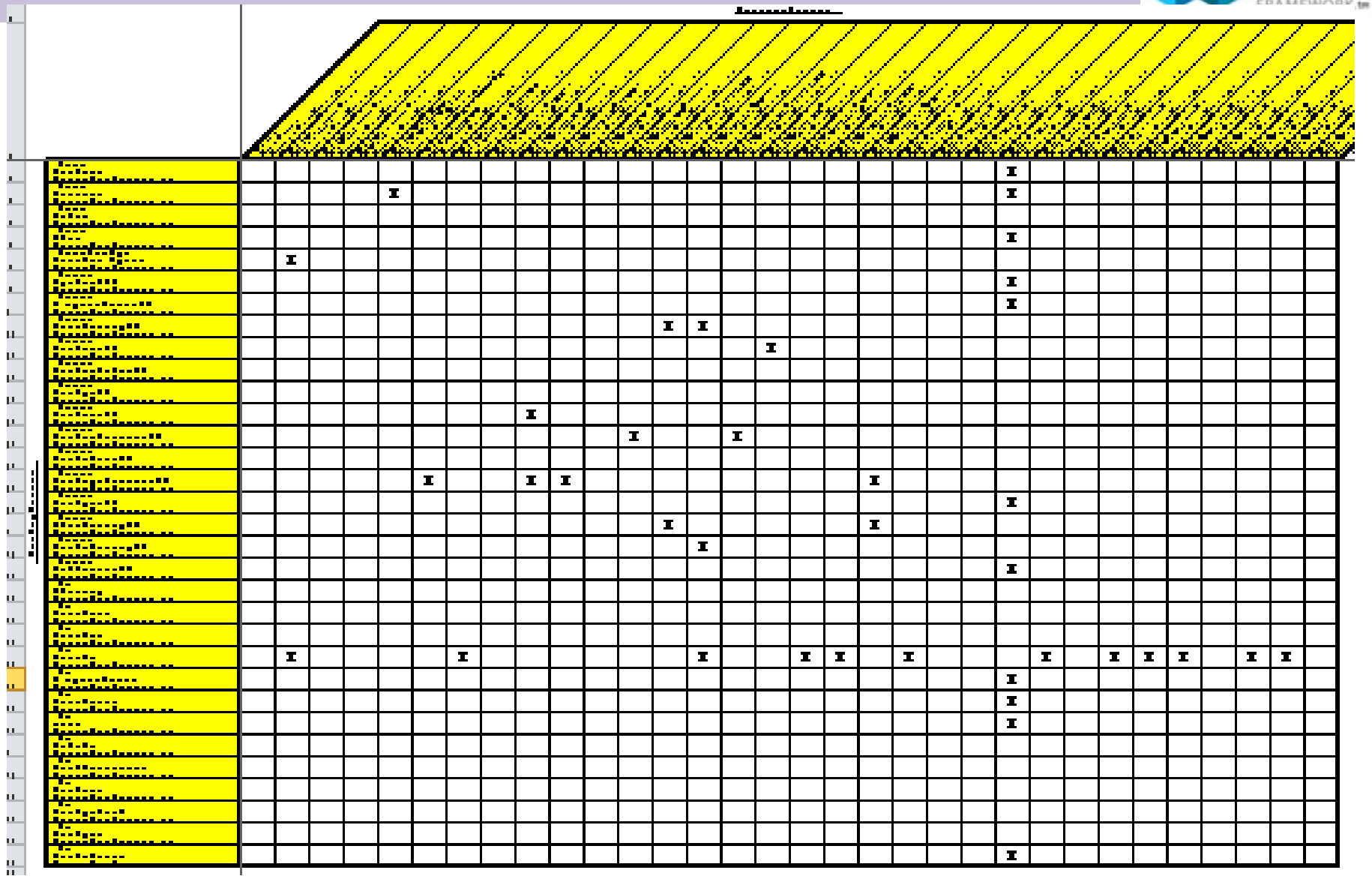
Personnel Competencies



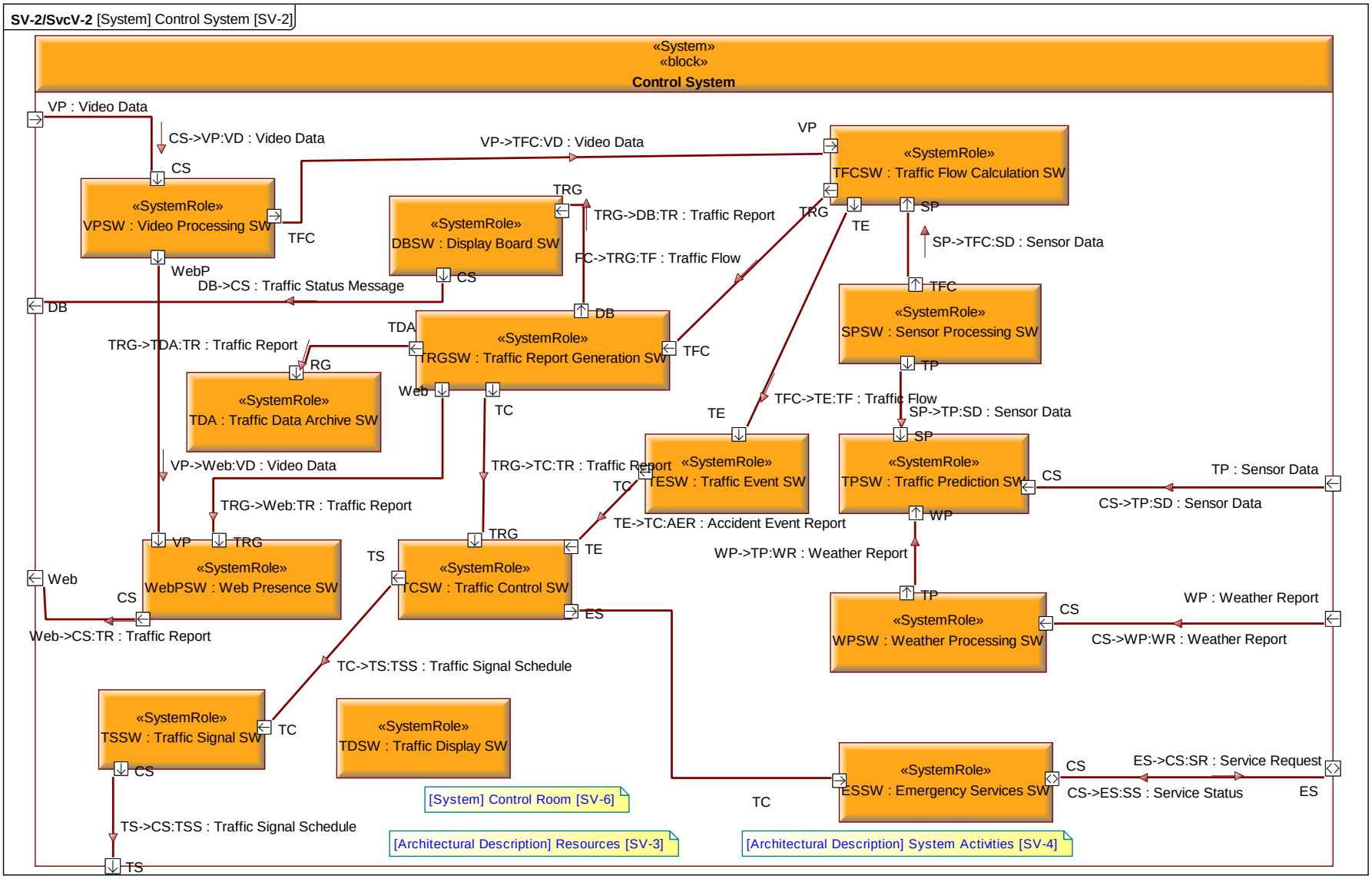
Operator Activities



System Connection Matrix – N^2



SV-2 Software Interfaces and Interactions



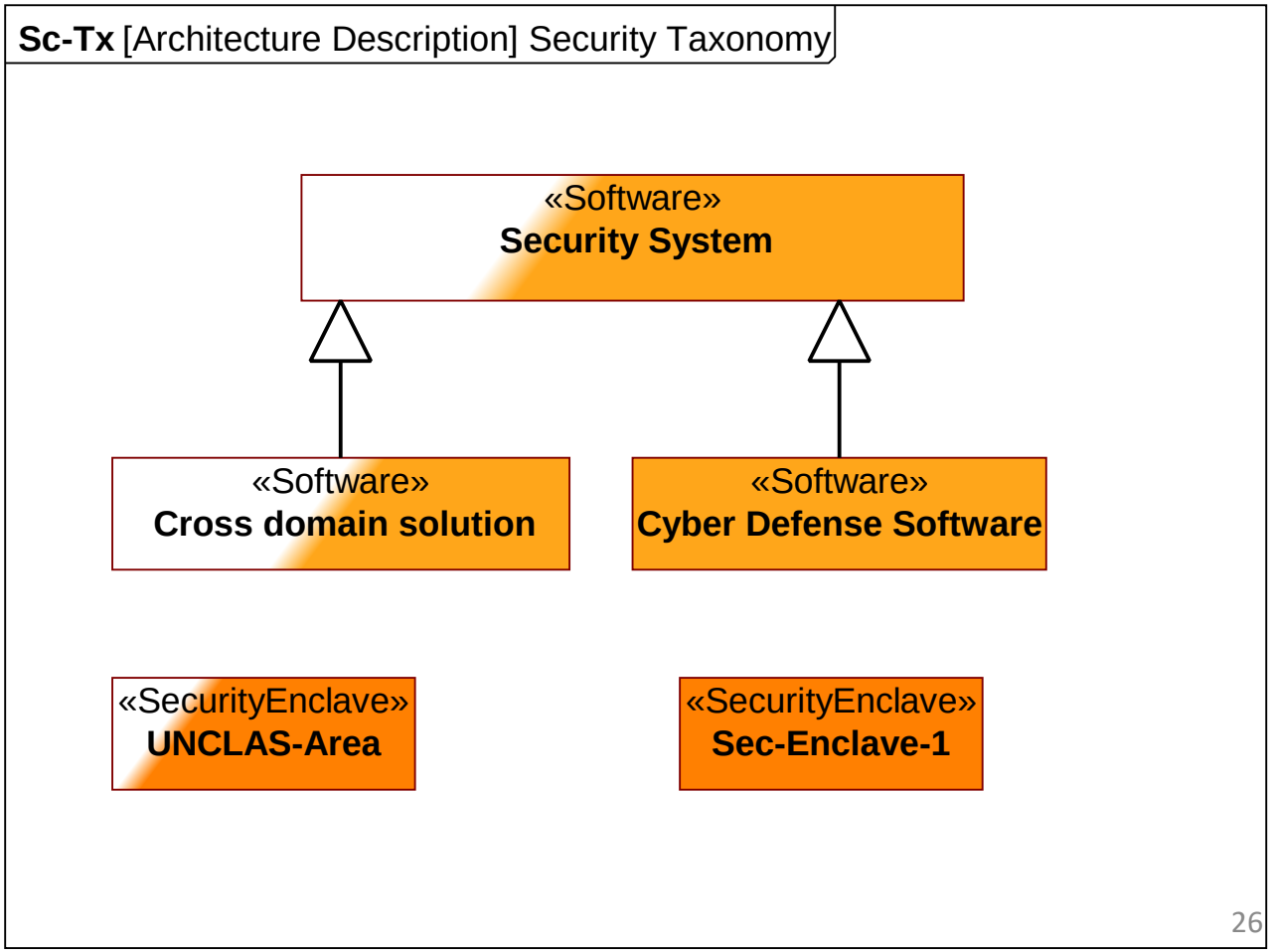
Security Views

Security Views

- The security domain (Sc) describes security assets and security enclaves. Sc views define the hierarchy of security assets and asset owners, security constraints (policy, laws, and guidance) and detail where they are located (security enclaves).
- **Stakeholders:** Security Architects, Security Engineers. Systems Engineers, Operational Architects.
- **Concerns:** addresses the security constraints and information assurance attributes that exist on exchanges between resources and OperationalPerformers
- **Definition:** illustrates the security assets, security constraints, security controls, families, and measures required to address specific security concerns.

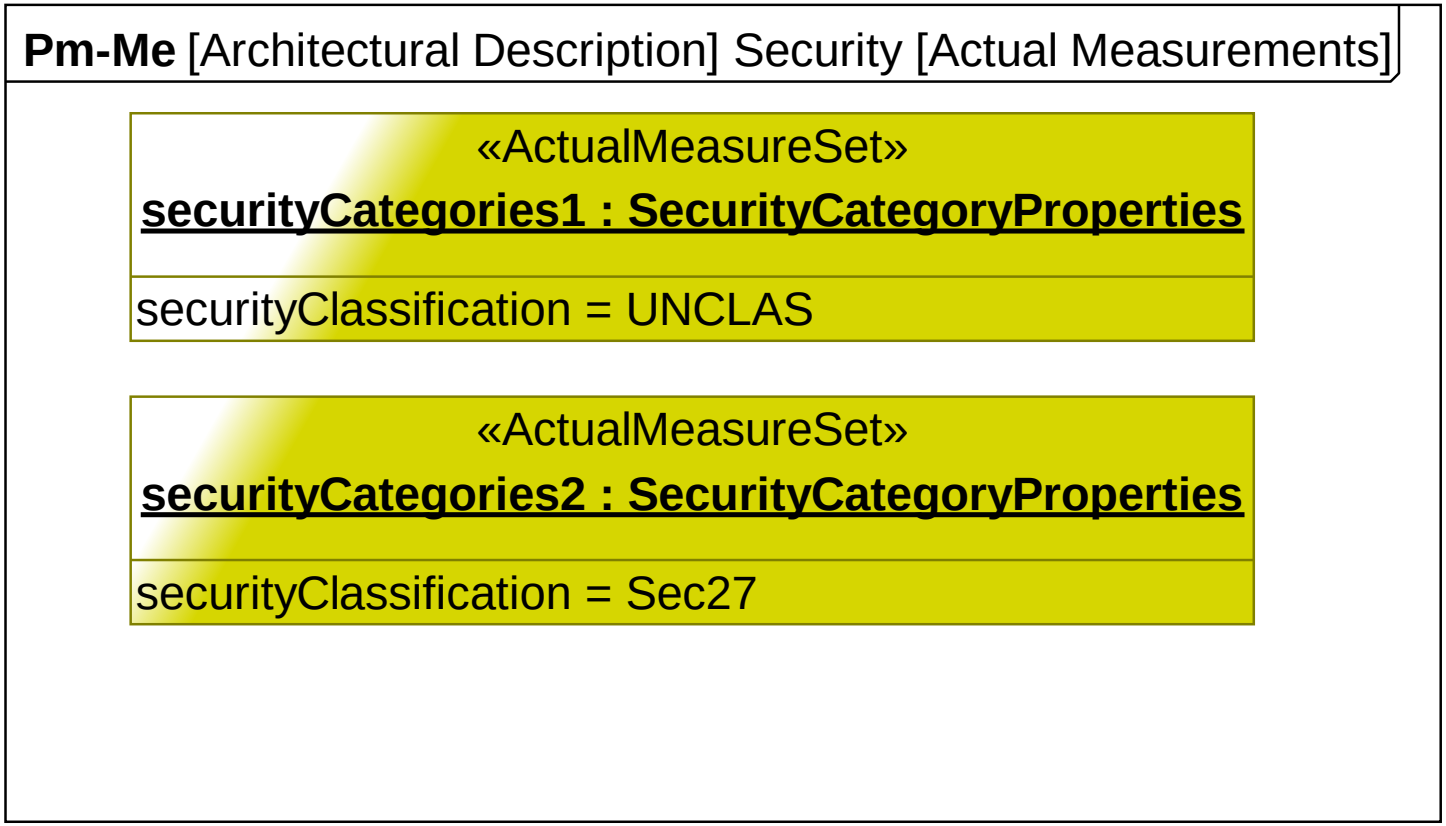
Security Taxonomy

- Defines the hierarchy of security assets and asset owners that are available to implement security, security constraints (policy, guidance, laws and regulations) and details where they are located (security enclaves).



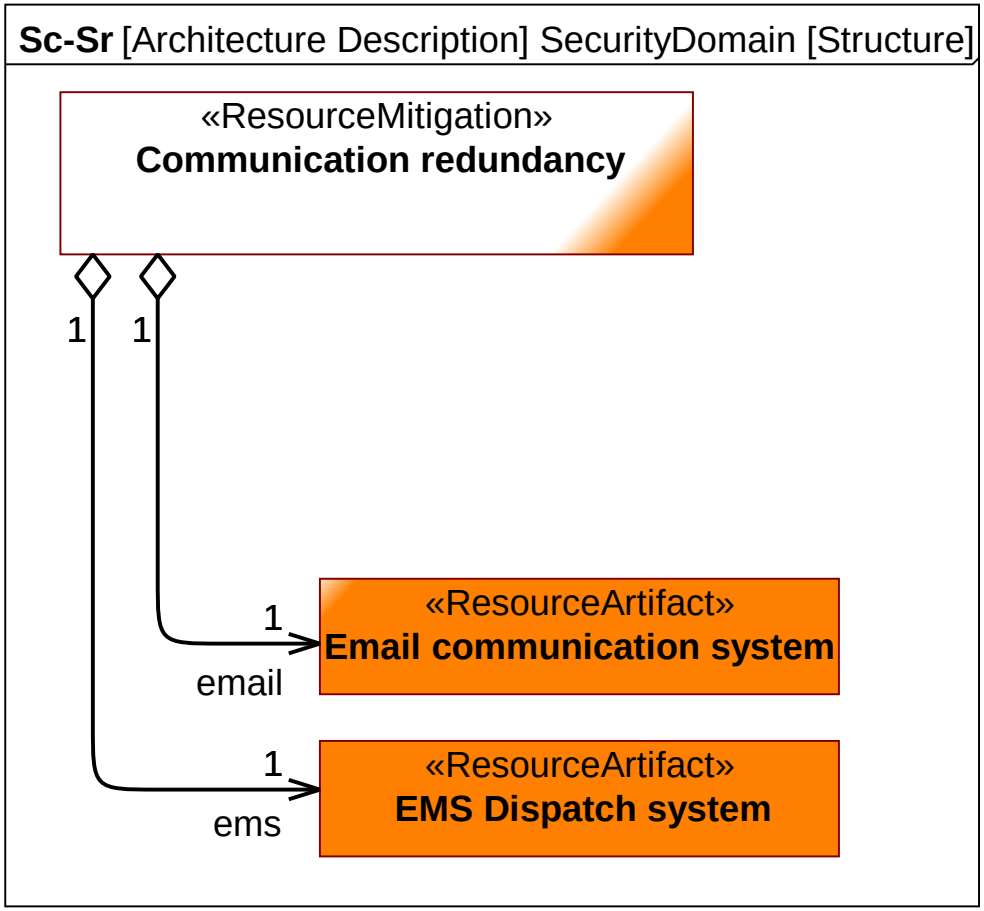
Actual Security Measurements

- Actual security classifications that will be used in the model



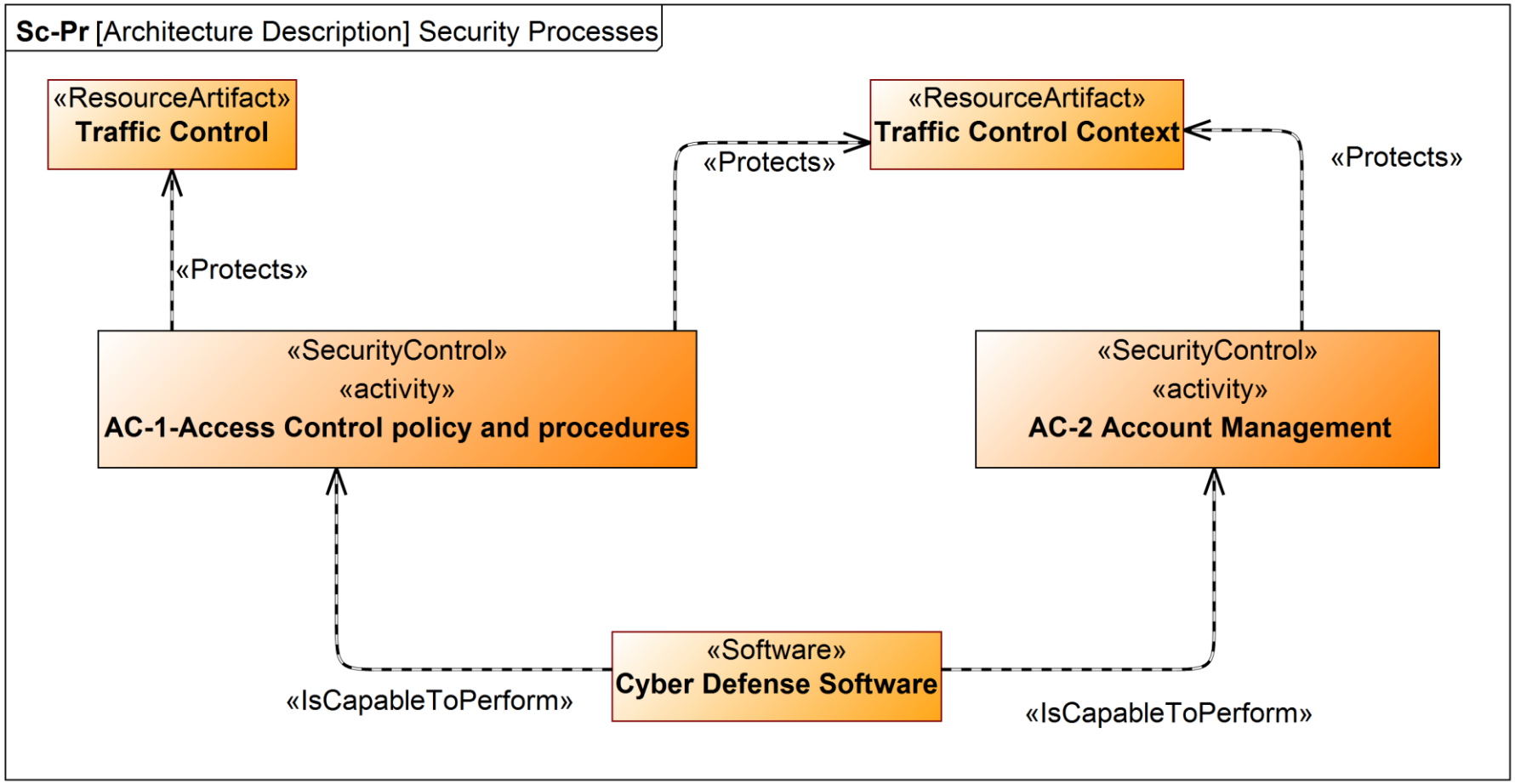
Security Structure

- Shows the structure of security information and where it is used



Security Process

- Security Profile Showing Security Controls' Allocation to Assets/Resources



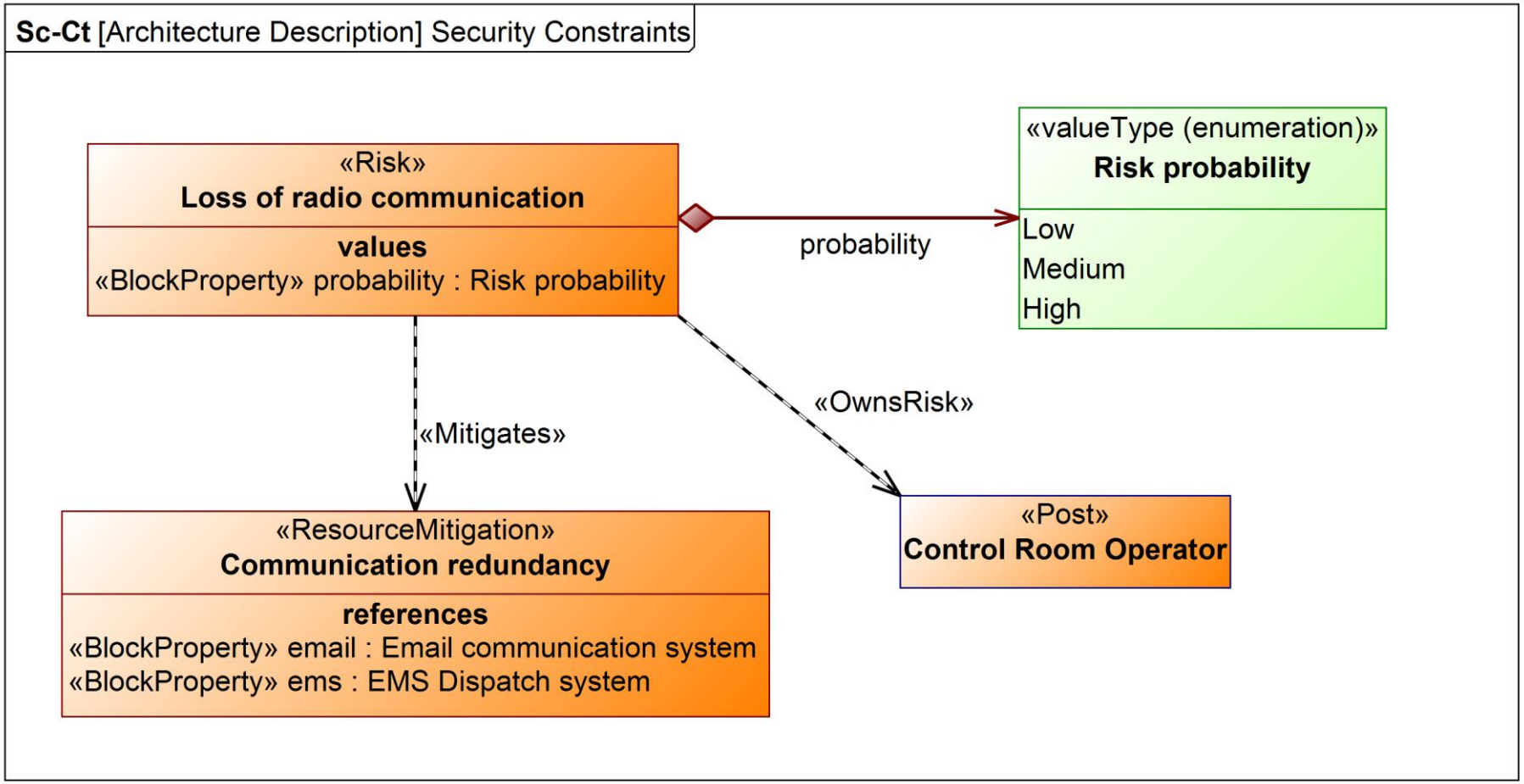
Security Constraints

Specifies textual rules/non-functional requirements that are security constraints on resources, information and data (e.g. security-related in the form of rules (e.g. access control policy).

		EMS Dispatch System	Traffic Control	Telemetry Data	Tasking Order	Traffic Data
AC-2	Account Management	X				X
AU-3	Content of Audit Records		X	X	X	
AU-5	Response to Audit Processing Failures	X	X	X		
AU-6	Audit Review, Analysis, and Reporting				X	X
IA-2	Identification and Authentication (Organizational Users)		X	X	X	X
IA-4	Identifier Management					
IA-5	Authenticator Management	X	X	X	X	X

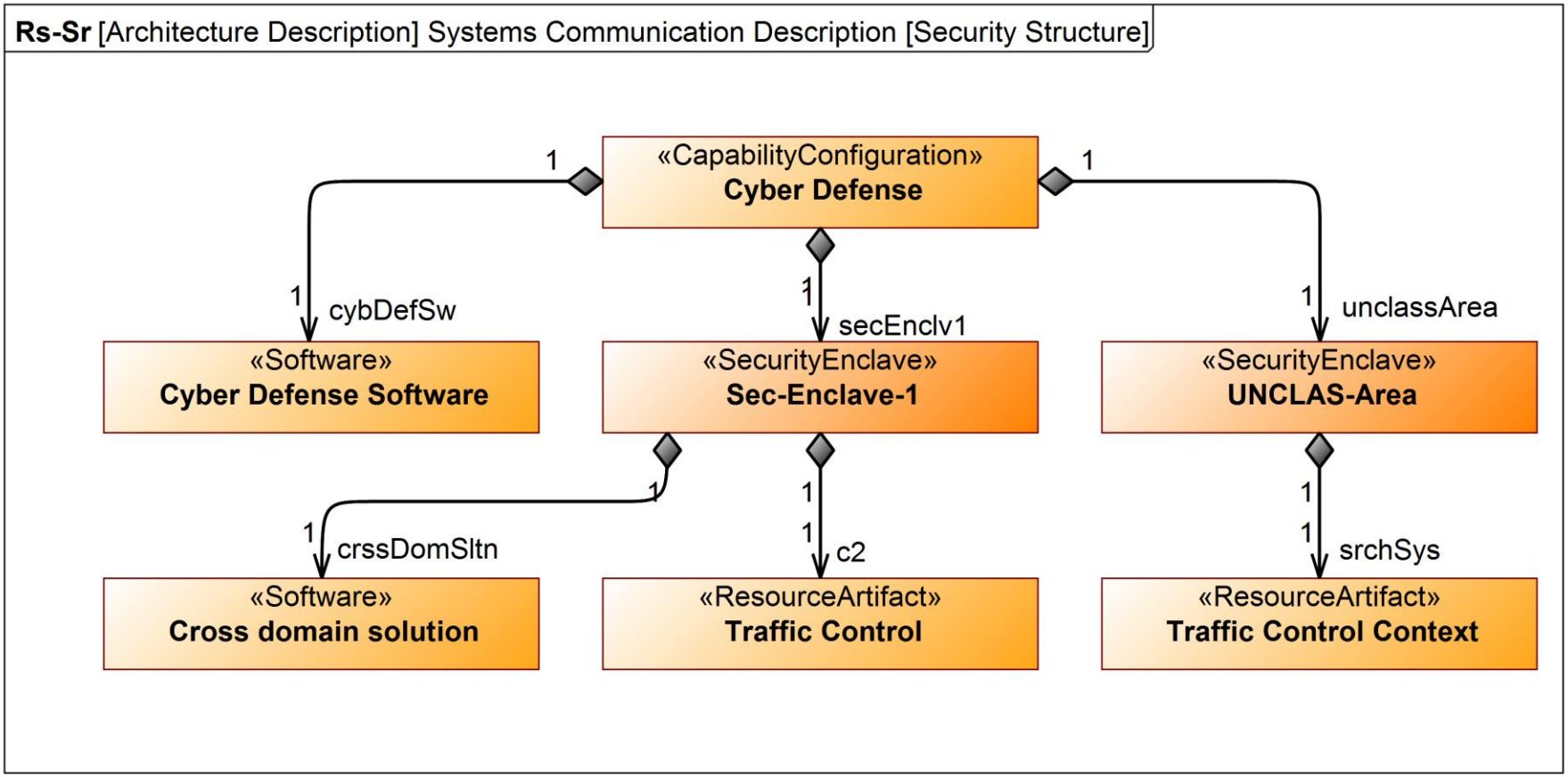
Security Constraints

- Risk and risk mitigation associated with systems and information/data



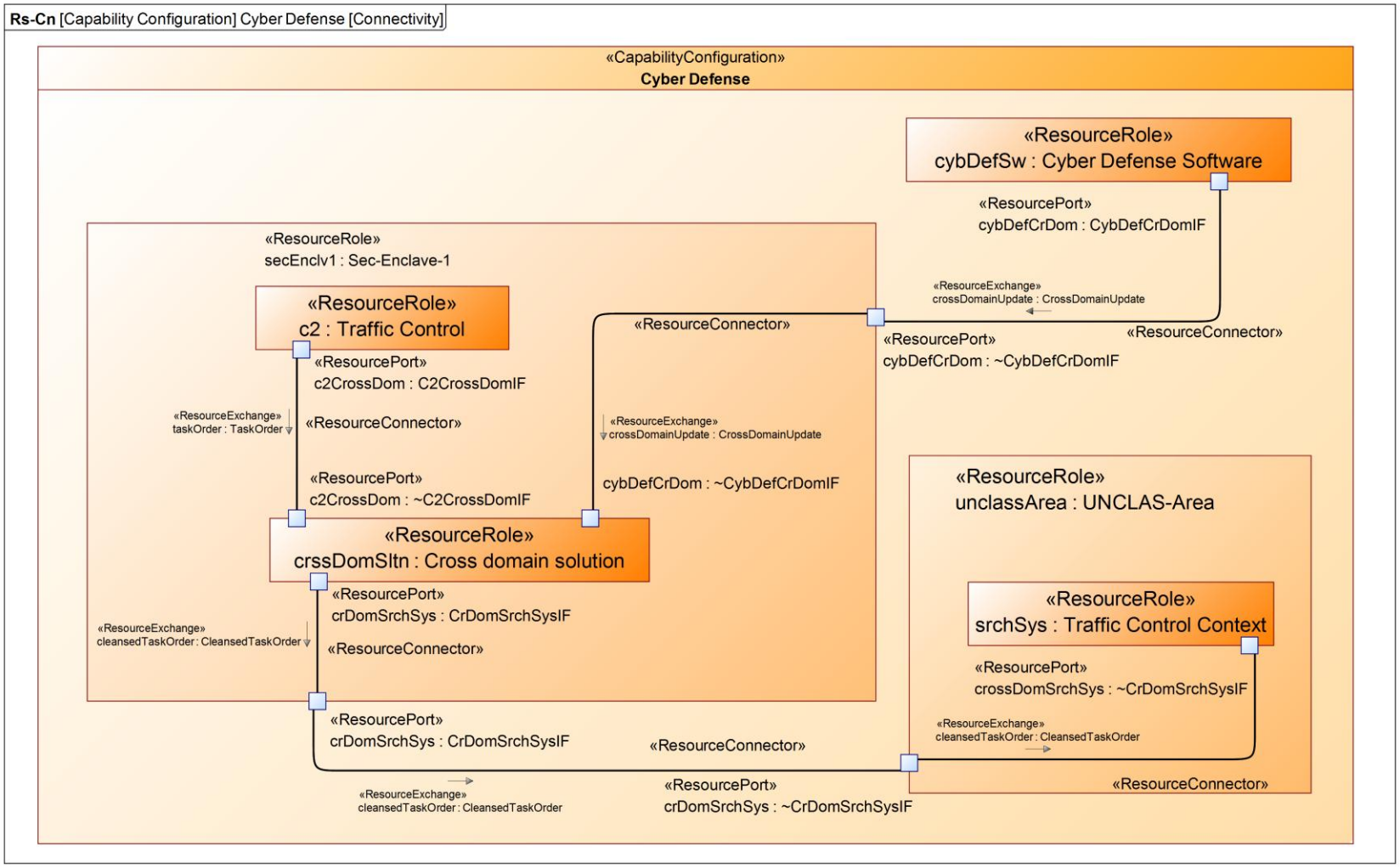
Security Decomposition

- System composition across security enclaves



Security Implementation

- Cyber Defense system composition and interactions



Security Connectivity Matrix

- Lists security exchanges across security assets; the applicable security controls; and the security enclaves that house the producers and consumers of the exchanges. Measurements can optionally be included

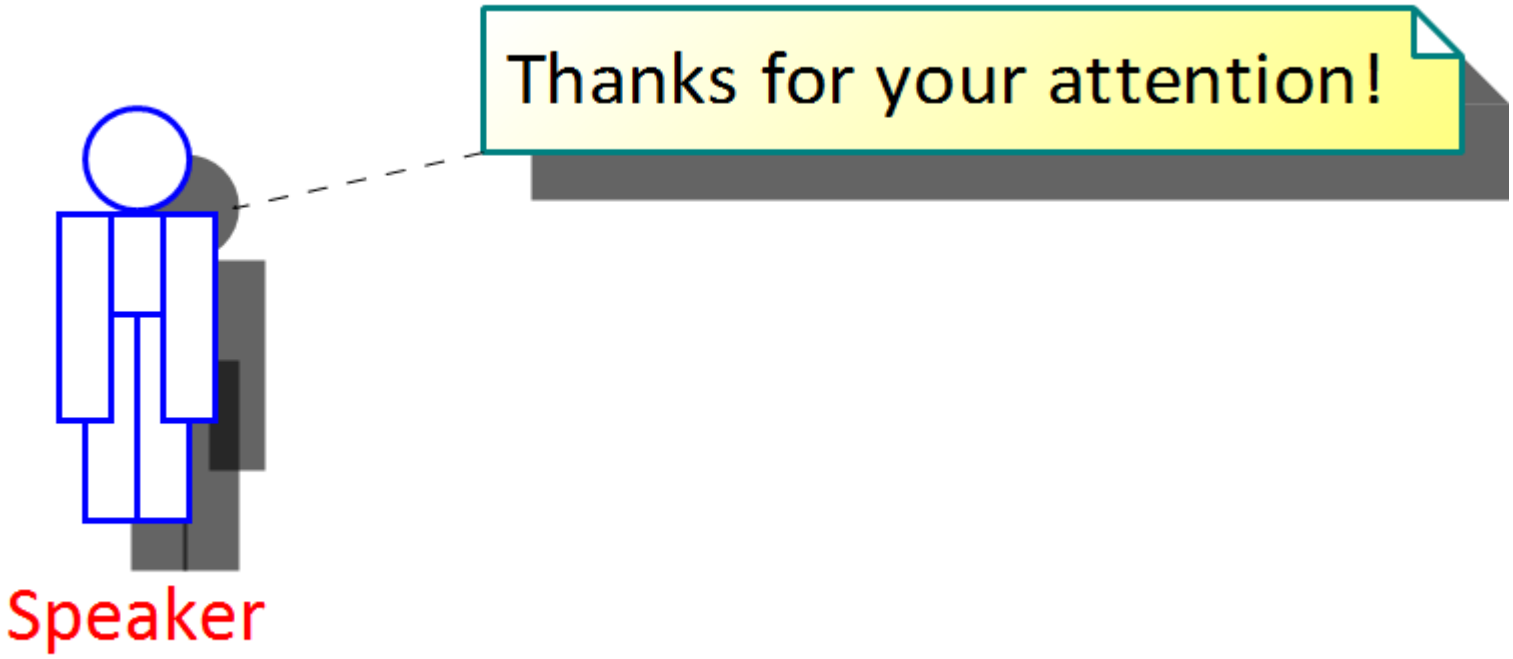
[Capability Configuration] Cyber Defense [matrix]

Resource Exchange		Classification	Producer	Connector / Interface	Consumer
Name	Conveyed	Level	Resource	Name	Resource
crossDomainUpdate	«Exchange Element» CrossDomainUpdate	Classified	«Software» Cyber Defense Software	CybDS-SecEnc	«SecurityEnclave» Sec-Enclave-1
cleansedTaskOrder	«Exchange Element» CleansedTaskOrder	Unclassified	«SecurityEnclave» Sec-Enclave-1	SecEnc-Uncl	«SecurityEnclave» UNCLAS-Area
taskOrder	«Exchange Element» TaskOrder	Classified	«Resource Artifact» C2 System	CrsDS-C2	«Software» Cross domain solution
cleansedTaskOrder	«Exchange Element» CleansedTaskOrder	Classified	«Software» Cross domain solution	CrsDS- SecEnc	«SecurityEnclave» Sec-Enclave-1
crossDomainUpdate	«Exchange Element» CrossDomainUpdate	Classified	«SecurityEnclave» Sec-Enclave-1	SecEnc-CrsDS	«Software» Cross domain solution
cleansedTaskOrder	«Exchange Element» CleansedTaskOrder	Unclassified	«SecurityEnclave» UNCLAS-Area	Uncl-SrchSys	«Resource Artifact» Search System

Summary and conclusion

- UAF has the potential to improve communication, collaboration and interoperability between
  - Nations
  - Government and Industry
  - Industry to Industry
- Grid approach allows different industries to reuse, extend or create new views appropriate to them (Fit for purpose)
- Improving the discovery and reuse of architectural artifacts
- Supports SoS modeling and SoSE
  - Military and Civilian Projects

Questions and Answers

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