

25 September 2024

CSRM HTML Navigation

The purpose of this memo is to illustrate navigating the CSRM HTML.

A link to an HTML version of CSRM:

<http://pulsar.orbitaltransports.com/csrn/>

The CSRM provides navigation by linking packages to package diagrams.

Cameo provides a useful but unsupported capability to generate a HTML version of the CSRM.

That allows someone to get acquainted with the CSRM using just a browser.

Some of the package - package diagram links may not survive the conversion to HTML.

However, navigation can be initiated in the containment tree.

What follows illustrates the relationship between the packages and package diagrams (in blue font).

The relationships are captured in links from the packages to the package diagrams.

Below are screen captures of the containment tree with arrows pointing to the package diagrams.

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01 - CubeSat System Reference Model

0 - CSRM Overview and Navigation

[PD1: CSRM Overview and Navigation](#)

1 - Stakeholders

[PD2: Stakeholders](#)

1.2 Mission Stakeholders

[PD3: Mission Stakeholders](#)

[PD4: Mission Stakeholders and Requirements - Population](#)

2 - Technical Measures

2.1 - Technical Measures - Specifications and Requirements - Population

[PD6: Technical Measures - Specifications and Requirements - Population](#)

3 - Behaviors

3.1 - Behaviors - Use Cases - Activities - Population

[PD7: Behaviors - Use Cases - Activities - Population](#)

4 - Requirements

[PD8: Requirements Hierarchy - Population](#)

5 - Architecture

[PD9: Architecture Hierarchy](#)

6 - Validation Verification

[PD10: Validation Activities - Population](#)

[PD11: Verification Activities - Population](#)

7 - CSRM Population

7.1 CSRM Population

[PD12: CSRM Population](#)

02 - CSRM Elements, Examples, and Illustrations

0 - Examples and Illustrations

[PD11: CSRM Examples and Illustrations](#)

1 - Stakeholders

1.2 Mission Stakeholders

[PD5: Mission Stakeholders - Requirements, Technical Measures, Use Cases - Illustrations](#)

2 - Technical Measures

3 - Behaviors

4 - Requirements

5 - Architecture

6 - Validation Verification

7 - CSRM Population

7.2 - CSRM Elements

[PD13: CSRM Elements - Overview](#)

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Diagram Specification Appears in Mode: Standard

SysML Package Diagram CSRM Overview and Navigation

The diagram shows a package structure for CSRM. A large package labeled '01 - CubeSat System Reference Model' contains seven sub-packages: '1 - Stakeholders', '2 - Technical Measures', '3 - Behaviors', '4 - Requirements', '5 - Architecture', '6 - Validation Verification', and '7 - CSRM Population'. A note on the right states: 'This package contains the CSRM core. Additionally, there are links to the examples and illustrations. You are free to use the elements or delete them if they do not apply to your design.'

CONTAINMENT

Diagrams

- Data
 - Relations
 - 00 - CSRM Start Here
 - 01 - CubeSat System Reference Model
 - 0 - CSRM Overview and Navigation
 - CSRM Overview and Navigation
 - This package contains CSRM example:
 - This package contains the CSRM core.
 - This package contains the extensions u
 - This package contains the glossary ter
 - This package is used by the Dassault S
 - This package is used by the Dassault S
 - 1 - Stakeholders
 - 2 - Technical Measures
 - 3 - Behaviors
 - 4 - Requirements
 - 5 - Architecture
 - 6 - Validation Verification
 - 7 - CSRM Population
 - 02 - CSRM Elements, Examples and Illustrati
 - 04 - Explore
 - CSRM Extensions
 - Derived Properties

Documentation Properties

Documentation of Diagram CSRM Overview and ...

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Package Diagram 1. CSRM Overview and Navigation

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Diagram Specification Appears in Mode: Standard

SysML Package Diagram Stakeholders

pkg [Package] 1 - Stakeholders [Stakeholders]

```

graph TD
    1[1 - Stakeholders] --> 1.1[1.1 Regulatory Agency Stakeholders]
    1 --> 1.2[1.2 Mission Stakeholders]
    1 --> 1.3[1.3 CubeSat Deployer Systems]
    1.1 --> 1.1.1[1.1.1 - Regulatory Agency Stakeholders]
    1.1 --> 1.1.2[1.1.2 - Regulatory Agency Stakeholders Concerns]
    1.1.1 --> 1.1.1.1[1.1.1.1 - Regulatory Agency Stakeholders - Examples]
  
```

«Explanation»
There are two modeling efforts. One is the SSWG developing a CubeSat Reference Model with its logical architecture. The other is a team eventually taking the CubeSat Reference Model as a basis for its mission-specific logical and physical architectures.

«Explanation»
A stakeholder is any entity that has an interest in the system. Some are interested in the models themselves and others are interested in the missions that can be realized from the mission-specific instantiations of the model, and some have interests in both.

Documentation Properties
Documentation of Diagram Stakeholders

javascript: showSpec('6b9787c7-8ace-46bf-b36e-164b0efb0e34');

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Package Diagram 2. Stakeholders

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Diagram Specification Appears in

Mode: Standard

SysML Package Diagram Mission Stakeholders

pkg [Package] 1.2 Mission Stakeholders [Mission Stakeholders]

Mission Stakeholders

1 - Stakeholders

1.2 Mission Stakeholders

1.2.1 - Mission Stakeholders

1.2.2 - Mission Stakeholder Concerns

1.2.3 - Mission Needs

1.2.4 - Mission Objectives

1.2.5 - Mission Constraints

1.2.6 - Mission Rqts

1.2.1 - Mission Stakeholders - Examples

Mission Stakeholders - Requirements, Technical Measures, Use Cases - Illustration,

Mission Stakeholders and Requirements - Population

PD5

PD4

Documentation of Diagram Mission Stakeholders

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Package Diagram 3. Mission Stakeholders

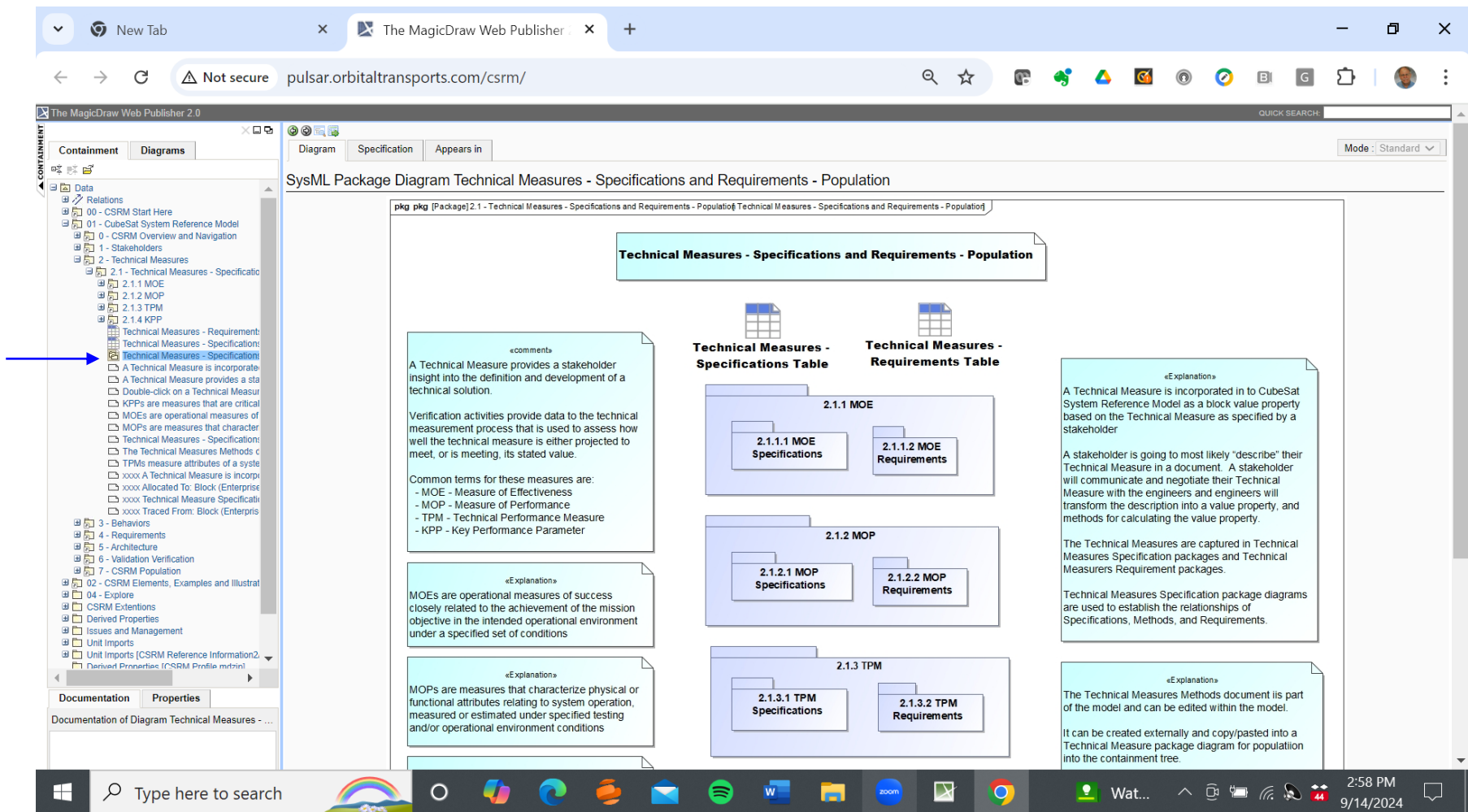
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The screenshot displays a web browser window with the URL `pulsar.orbitaltransports.com/csrm/`. The browser's address bar shows "Not secure". The page title is "The MagicDraw Web Publisher 2.0". The interface includes a left sidebar with a "CONTAINMENT" tree and a "Diagrams" tab. The "CONTAINMENT" tree lists various elements, with "Mission Stakeholders and Requirements - Pop" highlighted. The main area shows a SysML Package Diagram titled "SysML Package Diagram Mission Stakeholders and Requirements - Population". The diagram contains a package named "pkg [Package] 1.2 Mission Stakeholders and Requirements - Population" which includes several tables: "Mission Stakeholders Table", "Mission Stakeholder Concerns Table", "Concerns to Stakeholder", "Mission Needs Table", "Mission Objectives Table", "Mission Constraints Table", and "Mission Rqts Table". Each table has an associated "«Explanation»" box. The "Mission Stakeholders Table" explanation states: "Mission Stakeholders - Those with an interest in the mission-specific CubeSat space and ground system." The "Mission Stakeholder Concerns Table" explanation states: "Stakeholder Concern - Interest in a system relevant to one or more of its stakeholders." The "Mission Needs Table" explanation states: "Mission Need - A concise description of a need or service that the system must provide." The "Mission Objectives Table" explanation states: "Mission Objective - A broad set of goals that must be achieved in order to successfully satisfy the stated mission need." The "Mission Constraints Table" explanation states: "Mission Constraint - A limitation placed on cost, schedule, or implementation techniques." The "Mission Rqts Table" explanation states: "Mission Requirement - Statements of fact and assumptions that define the expectations of the system in terms of mission objectives, environment, constraints, and measures of effectiveness." The interface also includes a "Documentation" tab and a "Properties" tab. The bottom of the browser window shows the Windows taskbar with various application icons and the system clock displaying "10:50 AM 9/15/2024".

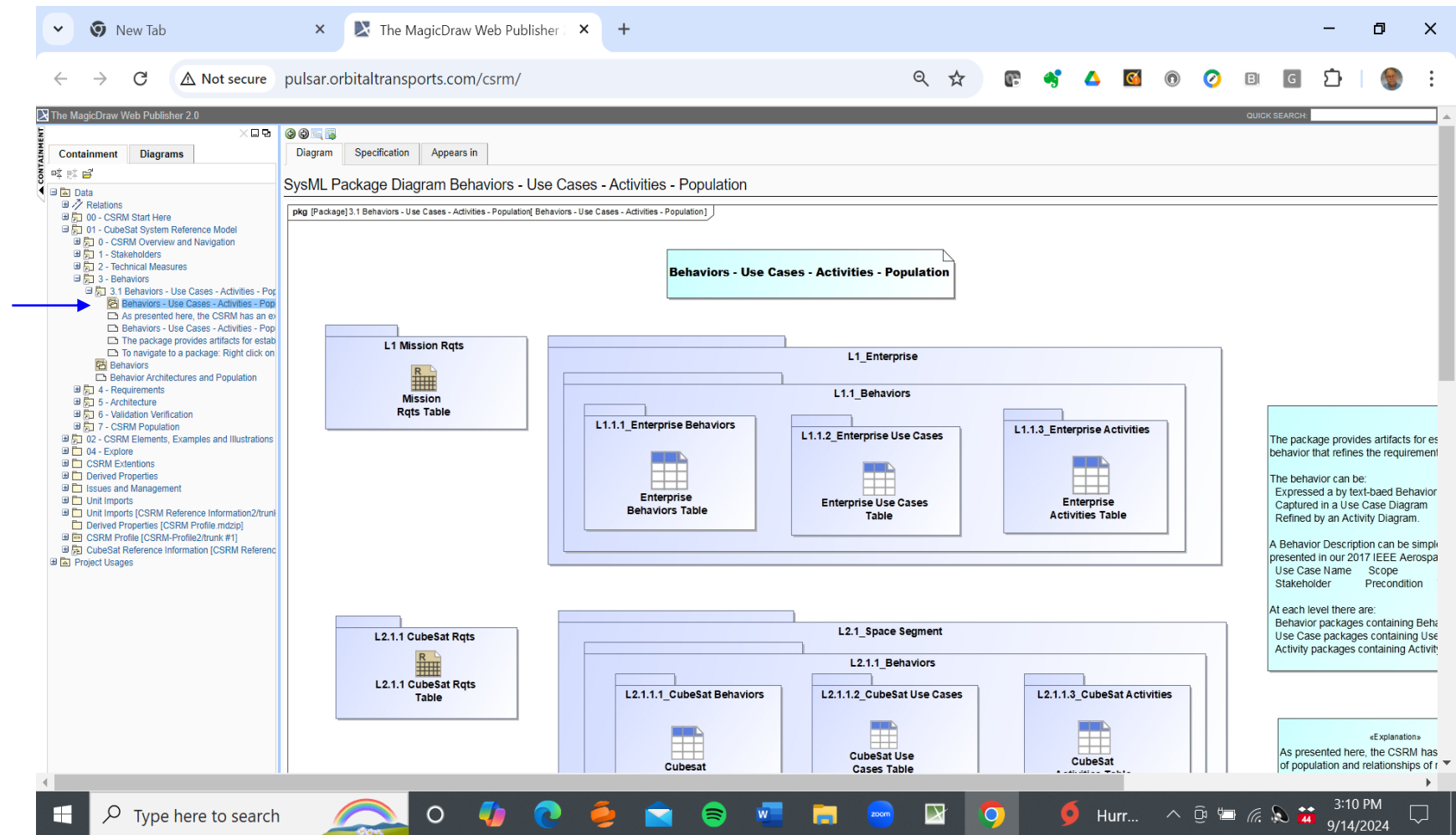
Package Diagram 4. Mission Stakeholders and Requirements - Population

PD3



Package Diagram 6. Technical Measures - Specifications and Requirements - Population

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Package Diagram 7. Behaviors - Use Cases - Activities - Population

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The MagicDraw Web Publisher 2.0

Containment Diagrams

Diagram Specification Appears in

Mode: Standard

SysML Package Diagram Requirements Hierarchy - Population

pkg [Package] 4 - Requirements Requirements Hierarchy - Population

4 - Requirements

- L1 Mission Rqts
- L2 Segment Rqts
 - L2.1 Space Segment Rqts
 - L2.1.1 CubeSat Rqts
 - L2.2 Ground Segment Rqts
- L3 Subsystem Rqts
 - L3.1 CubeSat Subsystems Rqts
 - L3.2 Ground Subsystems Rqts
- L4 Component Rqts
 - L4.1 CubeSat Subsystems Components Rqts
 - L4.2 Ground Subsystems Components Rqts

«Explanations»

The requirement elements reside in the containment tree. The requirement tables are views of the requirement elements. A table can be deleted but the requirement elements and their hierarchy remains.

Requirements are added to the table using "Add New" or "Add Nested" and the requirement ids are automatically updated.

«Explanations»

Requirement packages are numbered to be consistent with the corresponding architecture packages.

Individual requirements are numbered uniquely according to a prefix based on the name of the requirements packages.

«Explanations»

The modeler can easily change the prefix by Select a requirement in the containment tree and Select Element Numbering

«Explanations»

The requirement element properties include:

Rationale	Traced To	Traced From	Derived From	Verify Method
Verified By	Satisfied By			

«HowTo»

Double-click on the CubeSat, Ground Segment, CubeSat Subsystem, and Ground Subsystem requirement packages to navigate to the requirement tables.

«HowTo»

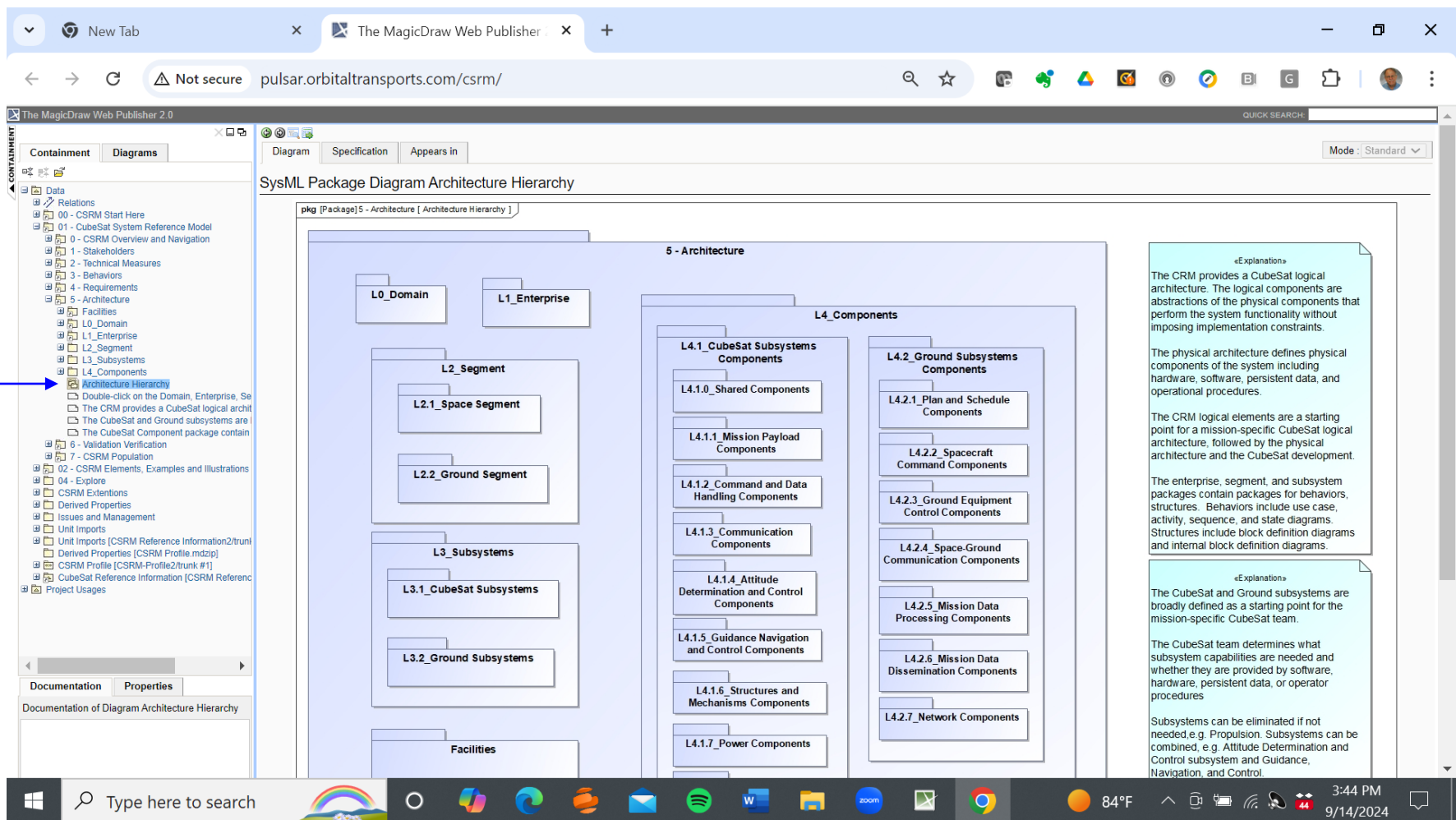
Double-click on table and add and delete requirements as needed

Click on Add New to add a new requirement to the containment tree and to the table.

Right-click the new requirement in the table then left-click Select in Containment

Package Diagram 8. Requirements Hierarchy - Population

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Package Diagram 9. Architecture Hierarchy

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Diagram Specification Appears in

Mode: Standard

SysML Package Diagram Validation Activities - Population

pkg [Package] 6.1 - Validation Activities [Validation Activities - Population]

Validation Activities - Population

Validation Activities Table

«Explanation»

Validation confirms, by providing objective evidence, that the system, as-built (or as it will be built), satisfies the stakeholders' needs, objectives, and moes. That is, the right system has been (or will be) built.

«HowTo»

Instructions for adding a new Validation Activity

Double-click on Activities table and then click on Add New to add a new Activity to the containment tree and to the table.

Right click the new element in the table then left click Select in Containment Tree to navigate to the new element.

«HowTo»

Instructions for establishing a relationship between a Technical Measure and a Validation Activity

Open the Validation Activities Table

Add a new Validation Activity or locate an existing one

Double click in the Verifies cell of the Verification Activity element to reveal three ellipses.

Click on the ellipses. Search for the applicable Technical Measure.

CONTAINMENT

Diagrams

00 - CSRM Start Here

01 - CubeSat System Reference Model

0 - CSRM Overview and Navigation

1 - Stakeholders

2 - Technical Measures

3 - Behaviors

4 - Requirements

5 - Architecture

6 - Validation Verification

6.1 - Validation Activities

Validation Activities Table

Validation Activities - Population

Validation Activity Example

Instructions for adding a new Validation Activity ...

Instructions for establishing a relationship between ...

Validation Activities - Population

Validation confirms, by providing objective eviden...

6.2 - Verification Activities

Validation Verification

7 - CSRM Population

02 - CSRM Elements, Examples and Illustrations

CSRM Extensions

Derived Properties

Unit Imports

Unit Imports [CSRM Reference Information2/trunk #1]

Derived Properties [CSRM Profile.mdzip]

CSRM Profile [CSRM-Profile2/trunk #1]

CubeSat Reference Information [CSRM Reference Information2/h

Documentation Properties

Documentation of Comment

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Package Diagram 10: Validation Activities - Population

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Diagram Specification Appears in

Mode: Standard

SysML Package Diagram Verification Activities - Population

pkg [Package]6.2 - Verification Activities [Verification Activities - Population]

Verification Activities - Population

Verification Activities Table

«Explanation»

Verification confirms, by providing objective evidence, that the system and all its elements perform their intended functions and satisfy the requirements allocated to them. That is, the system has been built right.

«HowTo»

Instructions for adding a new Verification Activity

Double-click on the Activities table and then click on Add New to add a new Activity to the containment tree and to the table.

Right click the new element in the table then left click Select in Containment Tree to navigate to the new element.

«HowTo»

Instructions for establishing a relationship between a Requirement and a Validation Activity

Open Validation Activities Table below.

Add a new Validation Activity or locate an existing one.

Either

Double click in the Verified By cell of the Technical Measure element to reveal three ellipses.

Click on the ellipses. Search for the applicable Validation Activity.

Click on the Plus Sign to move the Validation Activity from the List Tab to the Selected Elements column.

Click on Add to populate the Verified By cell of the Technical Measure element.

Documentation Properties

Documentation of Diagram Verification Activities - Population

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Package Diagram 11. Verification Activities - Population

The MagicDraw Web Publisher 2.0

Diagram Specification Appears in

Mode: Standard

SysML Package Diagram CSRM Population

pkg [Package] 7.1 - CSRM Population

- Regulatory Agency Stakeholders and Concerns - Population
- Mission Stakeholders and Requirements - Population
- Technical Measures - Specifications and Requirements - Population
- Behaviors - Use Cases - Activities - Population
- Requirements Hierarchy - Population
- Validation Verification
- CubeSat Rqts - Population
- CubeSat Subsystems Rqts - Population
- CubeSat Components Rqts - Population
- CubeSat Subsystems - Population
- CubeSat Components - Population
- Ground Segment Rqts - Population
- Ground Subsystem Rqts - Population
- Ground Component Rqts - Population
- Ground Subsystems - Population
- Ground Subsystems Components - Population

Documentation Properties

Documentation of Diagram CSRM Population

javascript:gotoElement('a58646a3-5839-4eac-a65c-15292c89ee50', false, true, ...)

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Package Diagram 12: CSRM Population

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The MagicDraw Web Publisher 2.0

Diagram Specification Appears in

Mode: Standard

SysML Package Diagram CSRM Examples and Illustrations

The diagram shows a package structure for CSRM Examples and Illustrations. The package is titled "02 - CSRM Elements, Examples and Illustrations". It contains seven sub-packages: 1 - Stakeholders, 2 - Technical Measures, 3 - Behaviors, 4 - Requirements, 5 - Architecture, 6 - Validation Verification, and 7 - CSRM Population. A note on the right side of the diagram states: "This package contains CSRM examples and illustrations. This is provided to aid in development and to explain how to use the CSRM. Be careful to not use the elements in this package as part of your design. We suggest copying any element to the primary model. This section should be removed when not required for reference."

CONTAINMENT

- Data
 - Relations
 - 00 - CSRM Start Here
 - 01 - CubeSat System Reference Model
 - 02 - CSRM Elements, Examples and Illustrations
 - 0 - Examples and Illustrations
 - CSRM Examples and Illustrations**
 - 1 - Stakeholders
 - 2 - Technical Measures
 - 3 - Behaviors
 - 4 - Requirements
 - 5 - Architecture
 - 6 - Validation Verification
 - 7 - CSRM Population
 - CSRM Extensions
 - Derived Properties
 - Unit Imports
 - Unit Imports [CSRM Reference Information2/trunk #1]
 - Derived Properties [CSRM Profile.mdzip]
 - CSRM Profile [CSRM-Profile2/trunk #1]
 - CubeSat Reference Information [CSRM Reference Information2/trunk #1]
 - Project Usages

Documentation Properties

Documentation of Diagram CSRM Examples and Illu...

Package Diagram 11. CSRM Examples and Illustrations

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CONTAINMENT Diagrams

Diagram Specification Appears in

SysML Package Diagram CSRML Elements - Overview

pkg [Package] 7.2 - CSRML Elements - Overview

«Explanation»

The CSRML is a logical model consisting of model elements and diagrams. Shown below are CSRML elements and example element properties.

The Mission-specific CubeSat Model (MCM) is based on the CSRML. The MCM provide the basis for design and development of the mission-specific CubeSat.

The mission team identifies the systems engineering methodology to be followed and then updates the MCM organization, elements, element properties, relationships, and diagrams as follows:

- 1) Determine if the CSRML elements are necessary and sufficient. If not, modify accordingly.
- 2) Identify stakeholders and stakeholder terminology such as concerns, needs, objectives, and constraints, as they relate to establishing mission requirements.
- 3) Establish the relationships between use cases, technical measures, and space and ground segment and subsystems requirements. These relationships can be exhibited in model artifacts such as requirement tables, requirement diagrams, and dependency matrices.
- 4) Identify the model artifacts that are needed such as for: stakeholder buy-off, internal and external design reviews, and design specifications.

«HowTo»

Select CSRML Elements
Select Create Element
Select Element

«HowTo»

Select Properties
Select Element
Select Edit Compartments
Select Element Properties
Select form Hidden and move to Selected

«HowTo»

Set font size
Select Element
Select Symbol Properties
Select Font
Select Ellipses
Select 14
Select Show Stereotypes
Select Text, or

Stakeholders

Stakeholder

«StakeholderConcern»
Stakeholder Concern
Id = "11"
Text = ""

«MissionObjective»
Mission Objective

Requirements

«MissionRequirement»
Mission Requirement
Id = "17"
Text = ""

«CubeSatRequirement»
CubeSat Requirement
Id = "18"
Text = ""

«GroundSegmentRequirement»
Ground Segment Requirement

Behaviors

«Explanation»

A Behavior can be specified by a Behavior description, a Use Case diagram, or an Activity diagram

Behaviors

Architecture Hierarchy

«block»
Domain

enterprise

«block»
Enterprise

segment

«Explanation»
«HowTo»

Select Architectural Element
Select Edit Compartments
Select Element Properties
Select Part
Move from Hidden to Selected
Select Architectural Element
Select Part property
Select Directed Composition

Type here to search

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Package Diagram 12: CSRML Elements - Overview

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