

CubeSat System Reference Model™ (CSR™) Quick Look

Space Systems Working Group (SSWG)

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CSRM Background



CSRM Project Objectives

- International Council on Systems Engineering (INCOSE) Space Systems Working Group (SSWG) project
- Objectives of CSRM Project
 - Demonstrate Model-Based Systems Engineering (MBSE) as applied to a CubeSat Mission
 - Develop a CSRM that a university team can use as starting point for their mission-specific model
 - Develop the CSRM as an Object Management Group (OMG) Specification

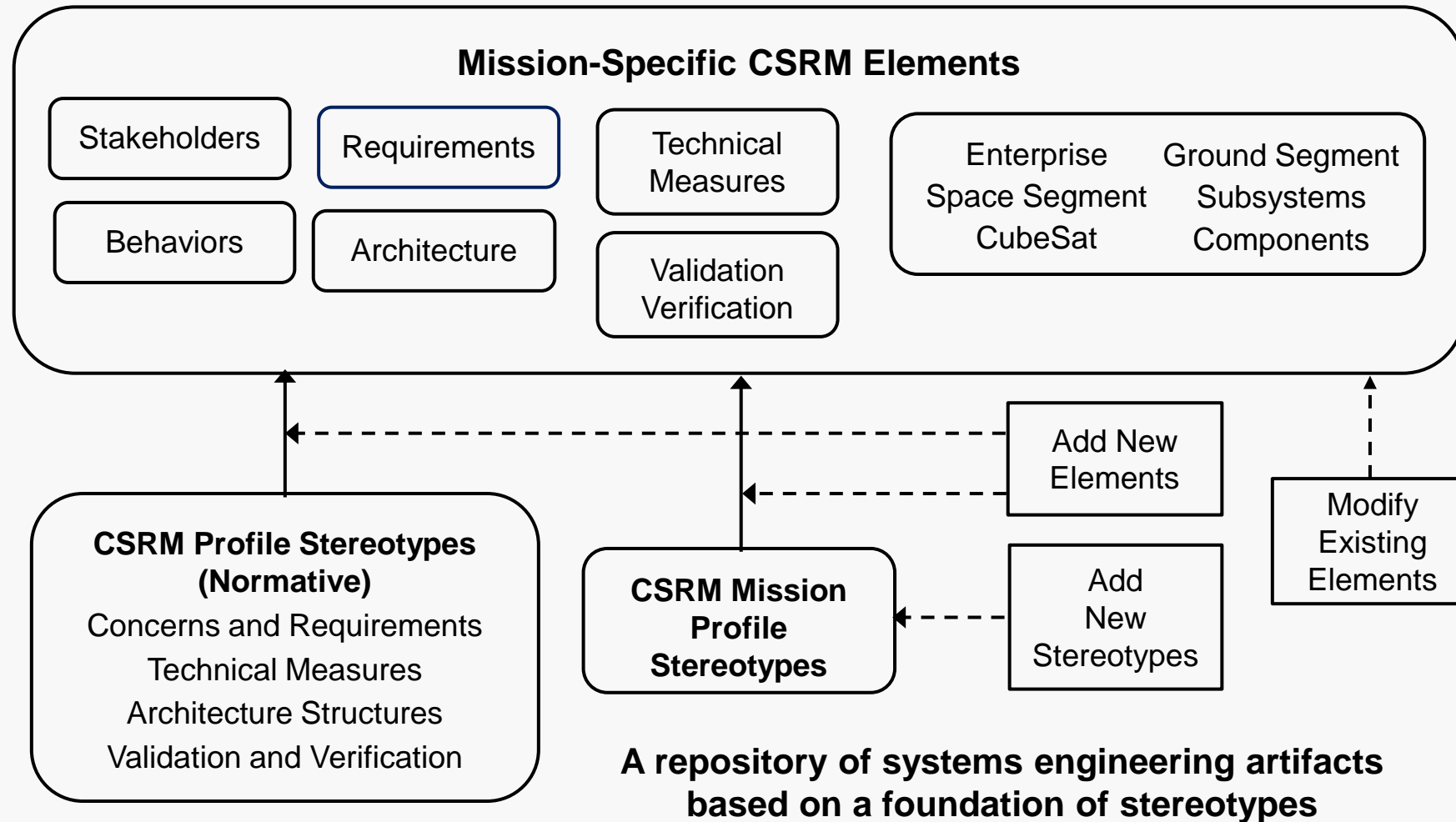


CSRM Pedigree

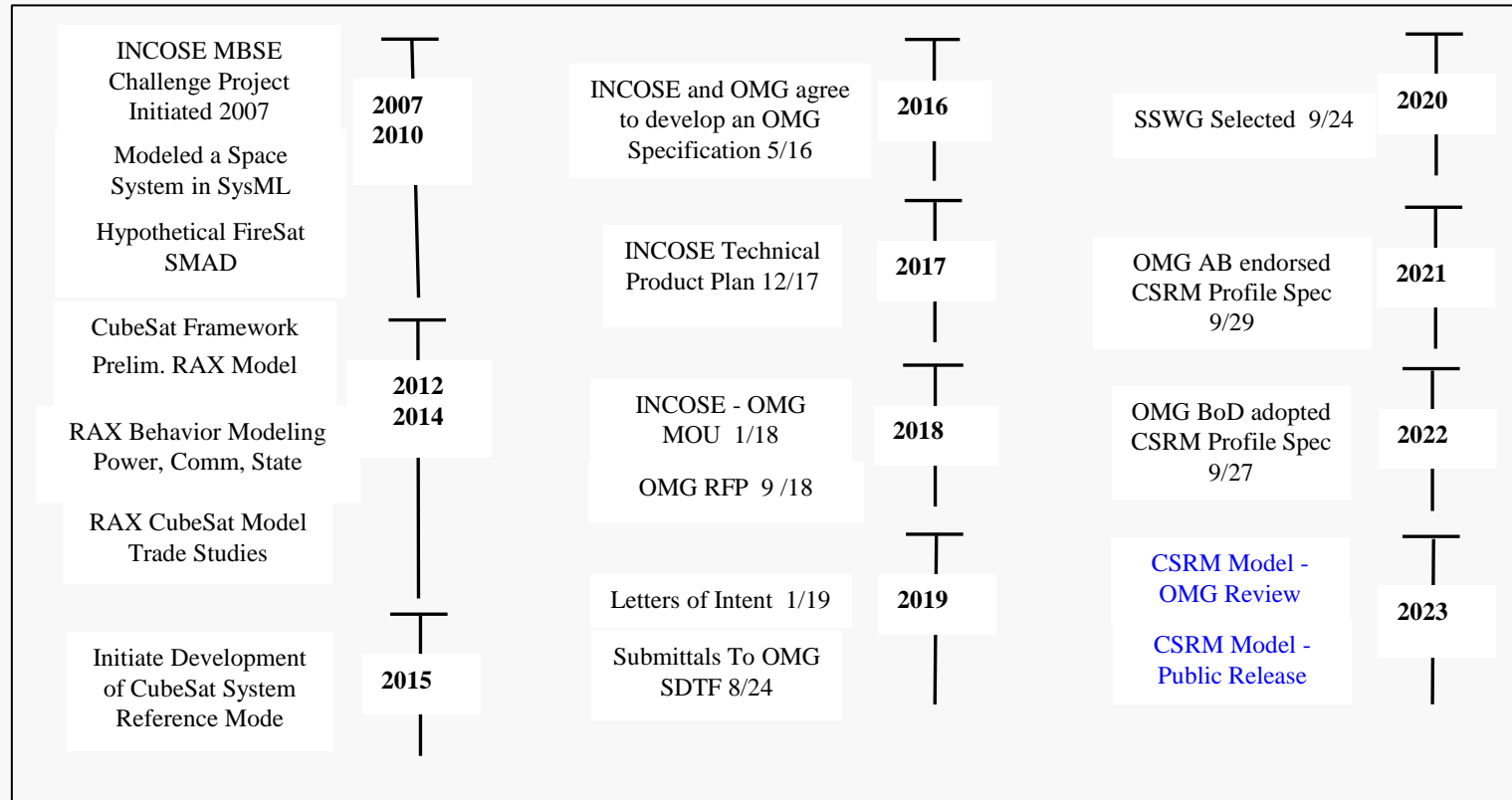
- Object Management Group (OMG) – An International Technical Standard Consortium - An International Voluntary Consensus Standards Body (VCSB)
 - The CSRM was developed in response to an OMG Request for Proposal (RFP)
 - In the past, OMG Specifications have been entirely document-based
- International Council on Systems Engineering™ (INCOSE™) – A Systems Engineering Organization and Professional Society
 - INCOSE and several others responded to the OMG RFP.
 - The INCOSE CSRM was selected to continue development



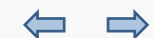
CSRM Elements



CSRM Development Timeline



OMG Specification Processes Guided CSRM Development



CSRM Quick Look



CSRM Quick Look

CubeSat System Reference Model Quick Look

OMG Environment

- CSRM Profile Specification document (normative)
- CSRM Profile Model
- CSRM Profile XMI file (normative)
- CSRM Profile HTML file

CSRM Environment

- CSRM Logical Model
- CSRM HTML file

Mission Environment

- Mission Logical Model
- Engineering Methodology
- Mission Physical Model
- Mission Specific Stakeholders, Needs...

The CubeSat System Reference Model™ (CSRM™) is a joint Object Management Group (OMG) Space Domain Task Force and International Council on Systems Engineering (INCOSE) Space Systems Working Group project.

The CSRM is a logical model of engineering artifacts used by a CubeSat mission team to build its mission-specific logical and physical models according to its engineering methodology.

The CSRM is based on Model-Based System Engineering (MBSE) principles, is OMG System Modeling Language (SysML) compliant, and is hosted on a graphical modeling tool.

The CSRM tracks core elements of stakeholders, technical measures, behaviors, and requirements across architecture levels of enterprise, space and ground segments, subsystems and components.

The CSRM is a repository for systems engineering artifacts. However, it is not prepopulated. That is the job of the mission team. The mission team is free to adopt a different logical architecture and modify the CSRM components to accommodate the change.

The CSRM can be applied to small satellites in general.

AN OMG STANDARD
CSRM
CubeSat System Reference Model
INCOSE

- [CSRM-HTML](#)
- [Documentation Overview 2023-11-11](#)
- [Papers 2023-12-22](#)
- [Memos 2023-12-26](#)

12 papers
12 memos

2--2017-IEEE-Aerospace-Conf--MBSE-Approach-for-Defining-the-Behaviors-of-CubeSats
3--2018-IEEE-Aerospace-Conf--MBSE-Approach-for-Technical-Measurement-with-Application-to-a-CubeSat
5--2019-Small-Sat-Conf--Developing-a-CubeSat-MBSE-System-Reference-Model--Interim-Status-#5

Section: 1 Page 1 of 1 Column: 1 296 words

Documentation Screen Shot


CSRM Documentation - Overview - 2023-11-11 - Word

David Kaslow

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11 November 2023

CSRM Documentation - Overview



Below is an overview of CSRM Documentation

Items 1 - 5 are internal to the CSRM

Items 6 and 7 relate to the self-documentation of packages and package diagrams

Items 8 and 9 are external to the CSRM

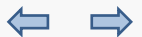
CSRM Documentation - Overview

- 1 - Overview and Navigation Packages**
- 2 - Reference Information Packages**
- 3 - Population Packages**
- 4 - Elements**
- 5 - Examples and Illustrations**
- 6 - Examples of Hovering a Cursor to Reveal Definitions and Descriptions**
- 7 - Example of Using Comments to Provide Explanation and How-To**
- 8 - Papers and Presentations**
- 9 - Memos**
Memos provide guidance in addition to the Explanation and How-To comments imbedded in the CSRM.

Section: 1 Page 1 of 7 Column: 1 331 words

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Memos Screen Shot

Name	Date modified	Type	Size
0 - csmr composition and purpose - 2022-06-23	3/25/2023 5:52 PM	Adobe Acrobat Docu...	18 KB
1 - stakeholders - 2023-03-25	3/25/2023 5:20 PM	Adobe Acrobat Docu...	88 KB
1.2 - mission stakeholders -2023-09-28	9/29/2023 3:11 PM	Adobe Acrobat Docu...	53 KB
1.2.0 - mission stakeholders and requirements -...	3/25/2023 5:23 PM	Adobe Acrobat Docu...	110 KB
1.2.2 - mission stakeholders - requirements, tec...	3/25/2023 5:24 PM	Adobe Acrobat Docu...	569 KB
2.1 - technical measures - specifications and req...	9/29/2023 3:15 PM	Adobe Acrobat Docu...	391 KB
2.2 - technical measures - specifications and re...	3/25/2023 5:25 PM	Adobe Acrobat Docu...	357 KB
3.1 - architecture - requirements, structures, beh...	3/25/2023 5:27 PM	Adobe Acrobat Docu...	304 KB
3.2 - behaviors - use cases - activities - populati...	9/29/2023 3:18 PM	Adobe Acrobat Docu...	563 KB
4 - requirements hierarchy - population - 2023-...	3/30/2023 2:49 PM	Adobe Acrobat Docu...	188 KB
5 - architecture hierarchy - 2023-09-28	9/29/2023 3:21 PM	Adobe Acrobat Docu...	462 KB
10 - csmr copyrights and licenses - 2023-12-22	12/25/2023 2:17 PM	Adobe Acrobat Docu...	108 KB
CSR Memos - List - 2023-12-26	12/26/2023 7:10 PM	Microsoft Word Doc...	59 KB
CSR Memos - List - 2023-12-26	12/26/2023 11:05 AM	Adobe Acrobat Docu...	34 KB
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Papers Screen Shot

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1 - 2014 IEEE Aerospace Conf - Integrated MBS...	1/22/2014 1:11 PM	Adobe Acrobat Docu...	1,031 KB
2 - 2017 IEEE Aerospace Conf - MBSE Approac...	1/9/2017 4:15 PM	Adobe Acrobat Docu...	1,893 KB
3 - 2018 IEEE Aerospace Conf - MBSE Approac...	1/8/2018 12:31 PM	Adobe Acrobat Docu...	775 KB
4 - 2018 IEEE Aerospace Conf - Developing a C...	10/20/2017 8:31 AM	Adobe Acrobat Docu...	1,573 KB
5 - 2019 Small Sat Conf - Developing a CubeSa...	6/9/2019 12:54 PM	Adobe Acrobat Docu...	1,607 KB
6 - 2020 IEEE Aerospace Conf - Development a...	1/2/2020 8:34 AM	Adobe Acrobat Docu...	2,264 KB
7 - 2021 IEEE Aerospace Conf - Mission Engine...	1/22/2021 10:40 AM	Adobe Acrobat Docu...	593 KB
8 - 2021 INCOSE IW - Development and Applic...	7/31/2021 2:04 PM	Adobe Acrobat Docu...	762 KB
9 - 2021 Small Sat Conf - Mission Engineering a...	6/1/2021 12:15 PM	Adobe Acrobat Docu...	100 KB
10 - 2022 Small Sat Conf - Mission Engineering...	6/6/2022 9:54 AM	Adobe Acrobat Docu...	684 KB
11 - 2023 INCOSE IW - CSRM Role and Purpose	3/6/2023 3:21 PM	Adobe Acrobat Docu...	157 KB
12 - 2023 Small Sat Conf - CubeSat System Ref...	5/27/2023 3:06 PM	Adobe Acrobat Docu...	260 KB
CSRM Papers and Presentations - List - 2023-12...	12/22/2023 7:05 PM	Microsoft Word Doc...	63 KB
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CSRM GitHub

github.com/ObjectManagementGroup/CSRM?search=1

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Files

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- CSRM Documentation - Overvie...
- CSRM Memos - 2023-09-06
- CSRM Papers and Presentations - ...
- CSRM Dassault Systemes.zip
- CSRM XML.zip
- README.md

CSRM /

turbogeek Update README.md 991440b · last month History

Name	Last commit message	Last commit date
CSRM Documentation - Overview - 2023-09-06	Add files via upload	2 months ago
CSRM Memos - 2023-09-06	Add files via upload	2 months ago
CSRM Papers and Presentations - 2023-09-06	Add files via upload	2 months ago
CSRM Dassault Systemes.zip	Add files via upload	2 months ago
CSRM XML.zip	Add files via upload	2 months ago
README.md	Update README.md	last month

Next Steps

- Next steps

