***SysML v2 RFP Working Group Meeting Summary***

***Brussels, Belgium***

***June 6, 2017***

The following is a summary and the follow-up actions from our 1 day face-to-face Working Group meeting at the OMG meeting in Brussels, Belgium on June 6, 2017. My thanks to all who contributed. This meeting summary is posted on the [Brussels meeting page](http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-roadmap:brussels_june_2017_meeting) and the OMG site (syseng/2017-06-01).

Hedley provided the web and dial up information for our next SysML v2 RFP WG telecon on Wednesday, June 14, at 11:00 AM ET. We will review the meeting results and discuss the status of the follow-up actions and plans to prepare for the next OMG meeting in New Orleans the week of September 25.

At the Brussels meeting, we presented an overview of the SysML v2 Requirements Review Document that is available on the [Brussels meeting page](http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-roadmap:brussels_june_2017_meeting). Some of the key feedback is included below. We are on target to present the draft SysML v2 RFP at the September OMG meeting, with the goal of issuing the final RFP at the December OMG meeting. Our focus for this next quarter is to obtain review feedback, and refine the requirements and the supporting information (e.g., concept model, glossary, and examples). I request your continued support to help meet this next milestone.

**ACTIONS**

* All Working Group members are asked to review the SysML v2 RFP Requirements Review Document and provide comments to Sandy regarding their section by Tuesday, June 9
* Ed to draft the language arch req’ts and work with Jonathan to integrate the formalism req’ts
* Sandy and John to update the model, regenerate the document, and post to the Wiki and the OMG
* Sandy to initiate broader review of the document
* Sandy and John to initiate development the draft SysML v2 RFP

**The following sections are included below:**

* Meeting objectives and agenda
* SysML v2 Requirements Review Document
* SysML v2 Requirements Review Feedback
* Presentation of SysML v2 Requirements Status to the ADTF
* SysML v2 RFP planning
* SysML v2 RFP Working Group agenda for the New Orleans meeting
* Other Topics
  + SysML v1.5
  + SysML v1.4.1 released as ISO standard
  + SysML/FMI Integration Approach
  + Model Management/PLM Concept demonstration
* SysML v2 RFP Background

Sanford Friedenthal

SysML v2 Working Group Chair

[safriedenthal@gmail.com](mailto:safriedenthal@gmail.com)

**MEETING SUMMARY**

The Brussels meeting is the fourth dedicated SysML v2 RFP Working Group meeting at the OMG following the RFP kickoff in Orlando in June, 2016. The objectives and agenda for the Working Group meeting on June 6, 2017 in Brussels Belgium are included below.

***Meeting Objectives***

* Present Overview of Draft SysML v2 Requirements for SysML v2 RFP
* Other
  + Presentation on potential SysML/FMI integration standard
  + Demonstration of PLM/MBSE Concept

***Meeting Agenda***

*Tuesday, June 6, 2017*

**09:00 – 12:00**

09:00 – 09:45 Introduction and Overview - Sandy Friedenthal

09:45 – 10:30 SECM requirements

* Common Core – Sandy Friedenthal
* Properties, Values, & Expressions - Hans Peter deKoning
* Structure - Hans Peter deKoning

10:30 – 11:00 Break

11:00 – 12:00 SECM requirements (cont.)

* Interfaces - Sandy Friedenthal/Marc Sarrel – *skipped*
* Behavior – Sandy Friedenthal/Chas Galey - *skipped*
* Requirements & Verification – Sandy Friedenthal
* Model Construction services – Sandy Friedenthal/Ron Williamson - *skipped*

**13:00 – 17:30**

13:00 – 13:30 Formalism Requirements –Jonathan Partick/Ed Seidewitz

13:30 – 14:00 API requirements - Manas Bajaj/Ed Seidewitz

14:00 – 14:30 Service requirements

* Model Analysis concepts – Manas Bajaj
* Analysis services – Manas Bajaj

14:30 – 15:00 Break

15:00 – 16:00 Service requirements (cont.)

* Model Visualization - Chris Schreiber/Josh Feingold
* Model Management – Pawel Chadzynski
* Workflow & Collaboration - Hedley Apperly
* Other requirements (Usability, Interoperability) - Sandy Friedenthal

16:00 - 16:45 Model Management Demo using ARAS - Pawel Chadzynski

16:45 - 17:15 SysML and FMI - Etienne Brosse

17:15 - 17:30 Next Steps – Sandy Friedenthal

**SysML v2 Requirements Review Document.** This meeting provided an overview of the initial draft SysML v2 Requirements Review Document dated June 4, 2017 that is available from the [Brussels meeting page](http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-roadmap:brussels_june_2017_meeting). The goal was to introduce the requirements and the context for the requirements to facilitate a more detailed review, but there was limited time for detailed discussion. A cleaned-up version of this document will be posted prior to the end of June that is intended to incorporate any additional comments from the SysML v2 RFP Working Group members. The updated version will then be made available for broader review and feedback.

The document organization is shown below. The Mandatory Requirements in section 3 was the focus for the review. Each subsection contains a logical grouping of requirements, and includes an overview and a table with the text requirements that will be incorporated into the RFP. The requirements are also captured in a separate excel table with additional supporting information. This document was auto-generated from the model that contains the text requirements, concept models, glossary of terms, and examples. The document is approximately 125 pages long and includes approximately 280 requirements and 218 glossary terms that are contained in the model.

This document is organized into the following sections.

*1.****Introduction.*** This section includes the purpose, background, and organization of this document.

*2.* ***System Modeling Environment (SME) Overview.*** This section provides an overview of the System Modeling Environment.

*3.* ***Mandatory Requirements.*** This section is organized into the following subsections for each logical grouping of requirements. Each subsection includes relevant concepts that reflect systems modeling needs to motivate the requirements, and a summary of key issues with SysML v1 in terms of its support for these concepts. The requirements are then included in tables at the end of each subsection. In some cases, motivating examples are provided to further illustrate the concept and/or highlight SysML v1 issues.

    3.1   Formalism

    3.2   Data Model

        3.2.1 Common Core

        3.2.1 Properties, Values, and Expressions

        3.2.2 Structure

        3.2.3 Interfaces

        3.2.4 Behavior

        3.2.5 Requirements

        3.2.6 Verification

        3.2.7 Analysis

    3.3 Concrete Syntax

    3.4 API

    3.5 Services

        3.5.1 Model Construction Services Introduction

        3.5.2 Model Visualization Services Introduction

        3.5.3 Model Analysis Services Introduction

        3.5.4 Model Management Services Introduction

        3.5.5 Workflow and Collaboration Services Introduction

        3.5.6 Services Requirements

    3.6 Other

        3.6.1 Interoperability Introduction

        3.6.2 Execution Languages Introduction

        3.6.3 Usability Introduction

        3.6.4 Reference Model Introduction

        3.6.5 Other Requirements

    3.7 Conformance

*4.* ***References & Glossary Specific to Document.*** This section includes a glossary of terms that are used to represent the concepts and requirements in this document, related standards, and a list of references used in this document.

*5.* ***General Reference and Glossary.*** This section includes a glossary of more general terms that apply to OMG standards, and references to other more general OMG standards that may have been used or are intended to be used in support of these requirements.

**SysML v2 Requirements Review Feedback.** The following feedback came out of the discussion.

1. Formalism requirements. The formalism requirements will require refinement to clarify their intent. In addition, several requirements were identified as language features. We will revisit the organization of these requirements and consider how they may be better integrated into the requirements for the language architecture.
2. Properties, Values, & Expressions. Some missing requirements were identified that are needed to express geometric concepts related to shape and coordinate systems.
3. Usability requirements. There was considerable pushback on the need to incorporate usability requirements on the SysML v2 implementations. The proposed approach will be revisited with the intent of specifying usability criteria on the SysML v2 specification rather than on the implementations of the specification.
4. General transition. There were additional concerns expressed particularly from tool vendors regarding how to manage the risk in transitioning from SysML v1 to SysML v2.

We will respond to the above feedback as well as other feedback from the reviews between now and the next meeting. We will plan to freeze the input to prepare the draft RFP by mid to late August.

**Presentation of SysML v2 Requirements Status to the ADTF.** Sandy and Ed presented the updated status of the SysML v2 RFP requirements effort to the ADTF on June 7, and scheduled presentation of the draft RFP for the next meeting. No outstanding issues were identified. The document number is ad/2017-06-04.

**SysML v2 RFP planning.** Sandy reviewed the milestones below for development of the SysML v2 RFP. Based on the progress to date, we are on schedule to support the development of the Draft SysML v2 RFP and present this draft to the ADTF at the September OMG meeting. Barring any significant issues, we anticipate the ADTF to vote to issue the RFP at the December, 2017 OMG meeting.

Aug 2015 Driving Requirements (INCOSE MBSE Themed Insight Article)

June 2016 RFP Objectives, Scope, and Outline (Draft)

Dec 2016 SME Concept (INCOSE INSIGHT Article)

Jan 2017 Presentation at INCOSE IW

Mar 2017 Initial Draft Requirements (SECM, API, Formalism)

June 2017 Draft Requirements Review Document

Sept 2017 Draft RFP and Presentation to ADTF

Dec 2017 Reviews Complete

Dec 2017 Issue SysML v2 RFP

Dec 2017 Form SysML v2 Submission Teams

**SysML v2 RFP Working Group agenda for New Orleans meeting.** The SysML v2 RFP Working Group meeting will be held in New Orleans, Louisiana on Tuesday and Thursday, September 26 and 28. The goal will be to review the draft SysML v2 RFP and conduct additional working sessions to address specific issues. Sandy will update the following agenda as we get closer to the meeting:

**Tentative Agenda for New Orleans Meeting on September 26, 28**

**Tuesday AM**

* SE DSIG meeting – general topics

**Tuesday PM**

* Overview of SysML v2 RFP
* Plan for next Quarter

**Thursday**

* Working sessions to address specific issues

**OTHER TOPICS**

The following topics were either presented at our Brussels meeting or represent related OMG topics.

**SysML/FMI Integration.** Etienne Brosse from Modelio presented an approach to integrate SysML with FMI. The goal was to explore potential interest in standardizing the integration between them. The general approach included using ibd’s to represent FMI Units as black boxes and integrate the units to support co-simulation. Several of the vendor representatives including IBM, PTC, and No Magic noted that they are working on similar approaches, and expressed strong interest in pursuing a standardization effort. It was also noted that the synergy with the specification for the SysML Extension for Physical Interaction and Signal Flow Simulation (SysPISF) should be explored. Etienne agreed to coordinate this effort.

**MBSE/PLM Integration Concept for Model Management.** Pawel Chadzynski presented a demonstration of an approach that ARAS PLM is pursuing to integrate MBSE with PLM. PLM provides the overarching environment to manage system models and other engineering artifacts across the system life cycle. The approach demonstrated how logical components from a system model in SysML that are abstractions of actual part numbers in the bill of materials can be used to manage traceability between the system model and other detailed design artifacts.

Other PLM vendors have presented their MBSE/PLM integration approach at previous OMG meetings to the SE DSIG and to MANTIS, which is serving as the focal point for the PLM/MBSE integration.

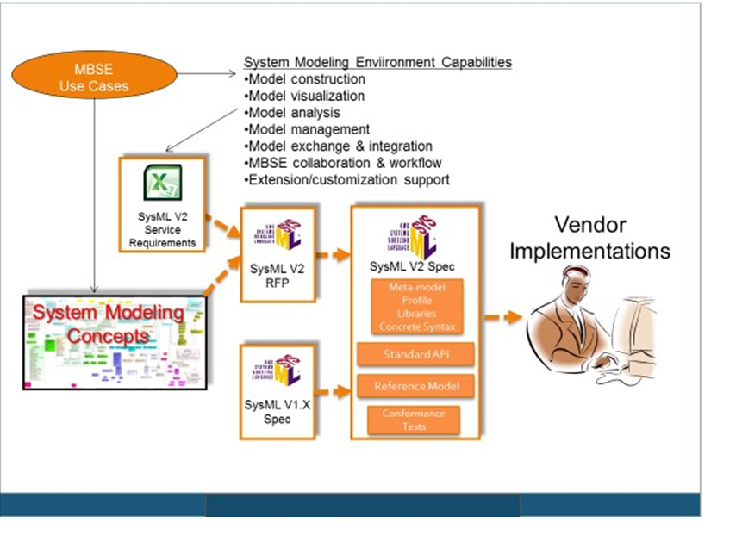
**SysML v1. 5 release.** The OMG Systems Modeling Language™ Version 1.5 (formal specification formal/2017-05-01) was released in May 2017.  The specification is available at <http://www.omg.org/spec/SysML/1.5/>. A primary change from SysML v1.4 is the introduction of an Abstract Requirement that can be extended to support other kinds of requirements such as property-based requirements (refer to Annex E.8).

**SysML published as an ISO Standard.** SysML has been published by the International Organization for Standardization (ISO) as a full International Standard (IS). The short title is “ISO/IEC 19514:2017” and the full title is "ISO/IEC 19514:2017, Information technology -- Object management group systems modeling language (OMG SysML®)". The direct catalogue reference is <https://www.iso.org/standard/65231.html>, and a preview of the IS is available at <https://www.iso.org/obp/ui/#iso:std:iso-iec:19514:ed-1:v1:en>

**SysML v2 RFP BACKGROUND (from the SysML v2 RFP Requirements Review Document dated June 4)**

The OMG SysML v2 RFP Working Group was initiated on July 23, 2016 in Orlando, Florida to begin work on the requirements for SysML v2. This concluded an approximate year-long effort to establish a baseline concept for a System Modeling Environment (SME). The SME is the environment that systems engineers interact with to perform model-based systems engineering activities, and the SME concept is used to help derive requirements for SysML v2 as shown in the figure below.

**Figure 1.1. SysML v2 Approach Diagram**

The initial high-level requirements for the SME are documented in the August 2015 edition of the INCOSE INSIGHT. The article is entitled 'Evolving SysML and the System Modeling Environment to Support MBSE' and defines 7 capabilities, 8 measures of effectiveness (moe's), and 11 driving requirements for the SME to support the specification, design, analysis, and verification of systems. A second article was published in the December, 2016 edition of the INCOSE INSIGHT entitled 'Evolving SysML and the System Modeling Environment to Support MBSE - Part 2'. This article summarizes the baseline SME Concept in response to the requirements in the earlier article. Both articles are available in final draft form under the Articles section of the SysML v2 RFP Working Group Wiki at:

<http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-roadmap:sysml_assessment_and_roadmap_working_group>

The SysML v2 RFP defines the requirements for the SysML v2 specification, which is then implemented by tool vendors. The overarching objectives for SysML v2 are to enhance support for MBSE by improving the precision and expressiveness, interoperability, and usability of SysML v2 over SysML v1. The SysML v2 RFP includes requirements to represent system behavior, structure, parametrics, and requirements similar to the requirements for SysML v1, along with requirements that support additional system modeling concepts not explicitly included in SysML v1. The SysML v2 RFP also includes service requirements to support model construction, model visualization, model analysis, model management, and workflow and collaboration. Service requirements were not included in the SysML v1 RFP.

Submission teams will develop the SysML v2 specification in response to the SysML v2 RFP requirements. The modeling concepts and associated requirements will be satisfied in the SysML specification by both a SysML metamodel and a profile of UML. A vendor can choose to implement the metamodel or profile or both. The combination of a metamodel and a profile enable a broader range of vendor implementations. The metamodel supports implementation of the system concepts without some of the constraints imposed by UML, while the profile supports implementation of the system concepts that is more closely aligned with SysML v1 implementations.

The service requirements in the RFP will be satisfied by a standard API specification that is part of the SysML v2 specification. The standard API specification facilitates interoperability by enabling external tools, plugins, and user interfaces to access the system model using standard service requests. Tool vendors will then implement the SysML v2 metamodel and/or profile, and the standard API specification.