

## ➤ Webinar rules:

- You'll be muted all along the Webinar
- There's a *Question* section to ask your questions or send your comments whenever you want
- If you have any technical issue, please use the chat box (not the *Question*)
- The Webinar will be recorded. A link to the recording will be sent to you in few days

# ENSURING CONSISTENCY BETWEEN TEXTUAL REQUIREMENTS AND



**José M. Fuentes**

The REUSE Company

Chief Operating Officer

[jose.fuentes@reusecompany.com](mailto:jose.fuentes@reusecompany.com)

# MODELS:

## KEY TO A SUCCESSFUL SYSTEMS



THE

# REUSE

COMPANY

## ENGINEERING DISCIPLINE

# CONTENTS

- Introduction to The REUSE Company and the speaker
- The CCC Approach
- Requirements and Models
- Requirements consistency
- Live demo
- Q&A

# ABOUT THE REUSE COMPANY (TRC)



WHEN?

01 The company was established in 1999

As a spin-off of a University in Madrid



WHO?

02 System + Software Engineers

Smart combination between Company staff and R&D from Academia



WHERE?

03 Headquarters: Madrid (Spain)

International offices:  
Miami (USA)  
Stockholm (Sweden)  
Tokyo (Japan) Delegation



WHY?

04 To promote a **reusable, scalable** and global solution to a **smart** and **interoperable** Systems Engineering environment, by offering a **semantic knowledge centric** approach.

# THE REUSE COMPANY

Is a tool vendor specialized in the application of  
**SEMANTIC TECHNOLOGIES** and  
**ARTIFICIAL INTELLIGENCE** to improve the  
digitalization of the Systems Engineering life cycle.



## > **The Systems ENGINEERING Suite:**

- > RQA – QUALITY Studio
- > RAT – AUTHORIZING Tool
- > TRACEABILITY Studio
- > V&V Studio
- > KM – Knowledge Manager

## > **SES ENGINEERING Studio:**

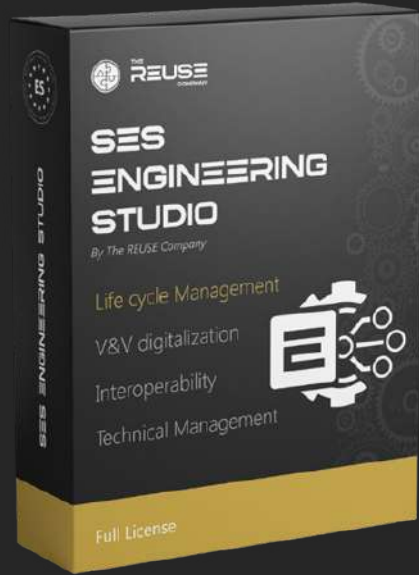
- > TMx
- > HUBx
- > REx
- > KMx
- > SLCMx

# THE PRESENTERS

José Fuentes



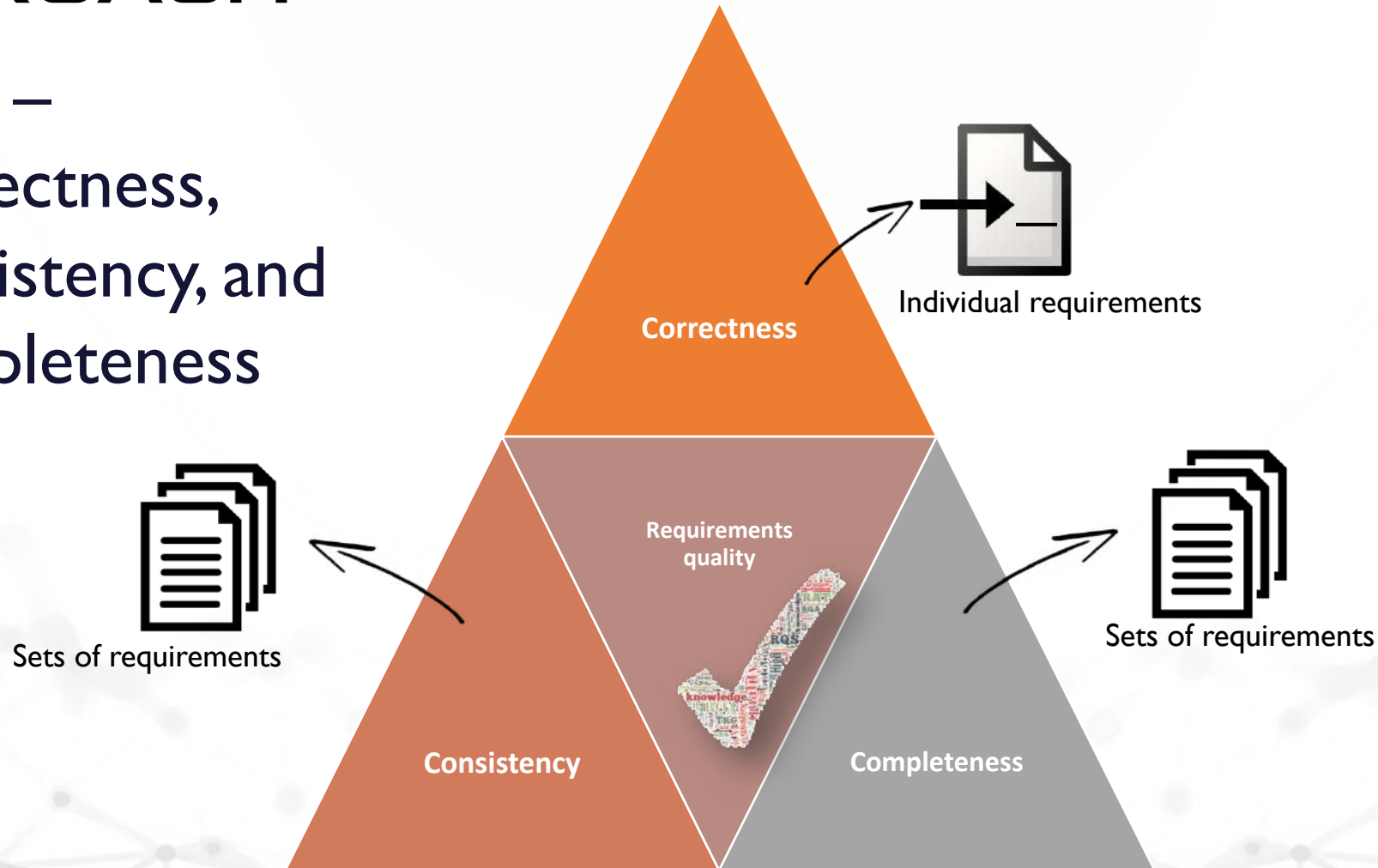
- **Current Position:** Chief Sales Manager of The REUSE Company
- Former Product Manager of RQA and the Systems Engineering Suite
- INCOSE CSEP Certified
- Graduated in the INCOSE Institute for Technical Leadership
- Member of the board of AEIS – The Spanish chapter of INCOSE
- Active contributor to the INCOSE Guide to Writing Requirements
- Other certifications: ITIL
- Other interests: Project Management, Business Analysis, Risk Management



# THE CCC APPROACH

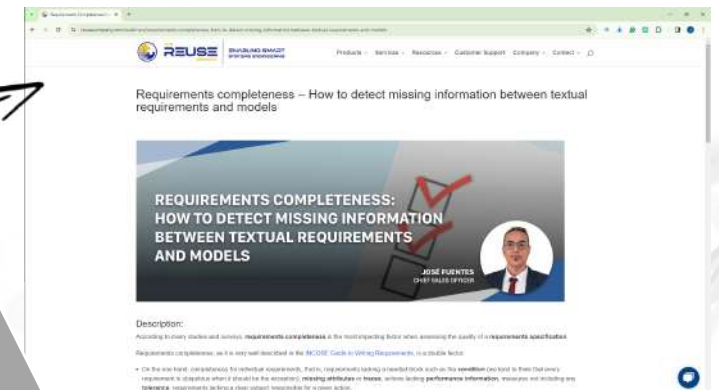
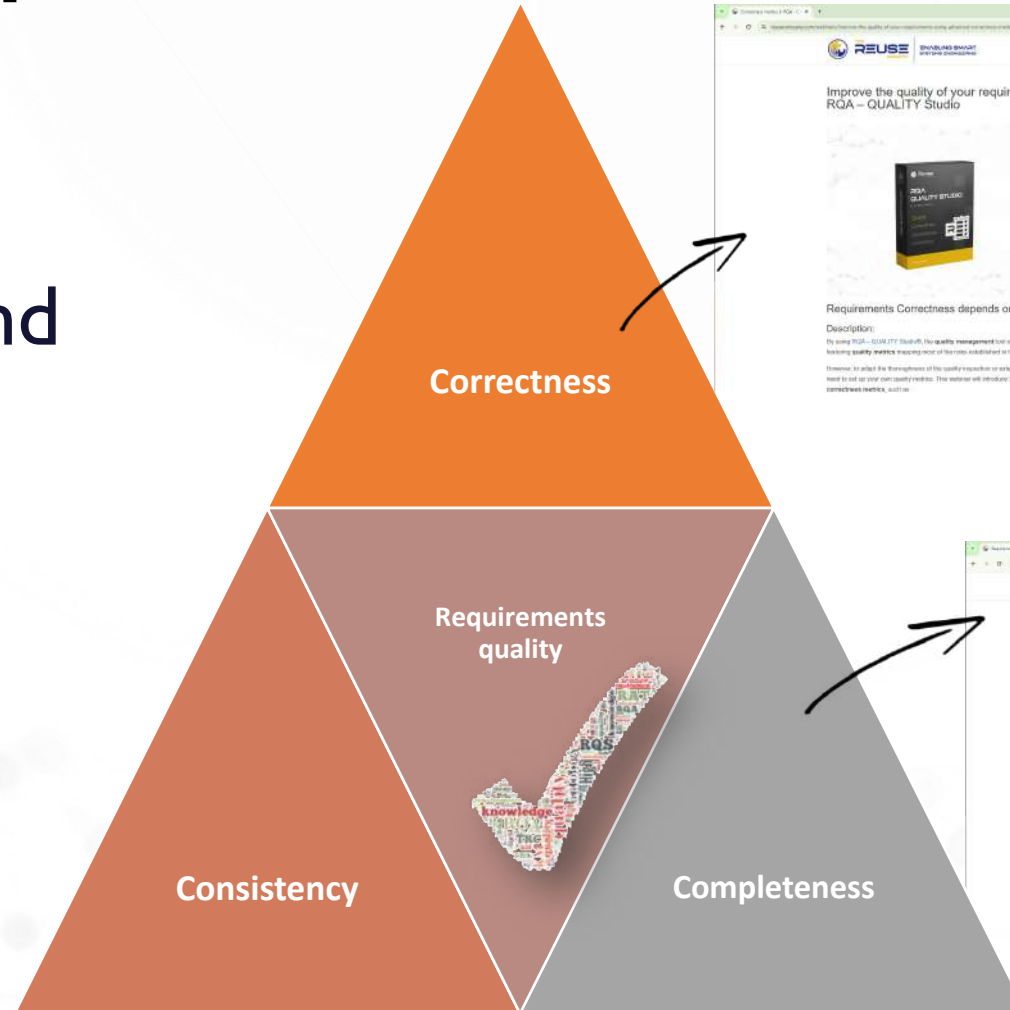
# OVERLAPPING METRIC: THE CCC APPROACH

› CCC –  
Correctness,  
Consistency, and  
Completeness



# OVERLAPPING METRIC: THE CCC APPROACH

➤ CCC –  
Correctness,  
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# CONSISTENCY IN THE INCOSE GTWR

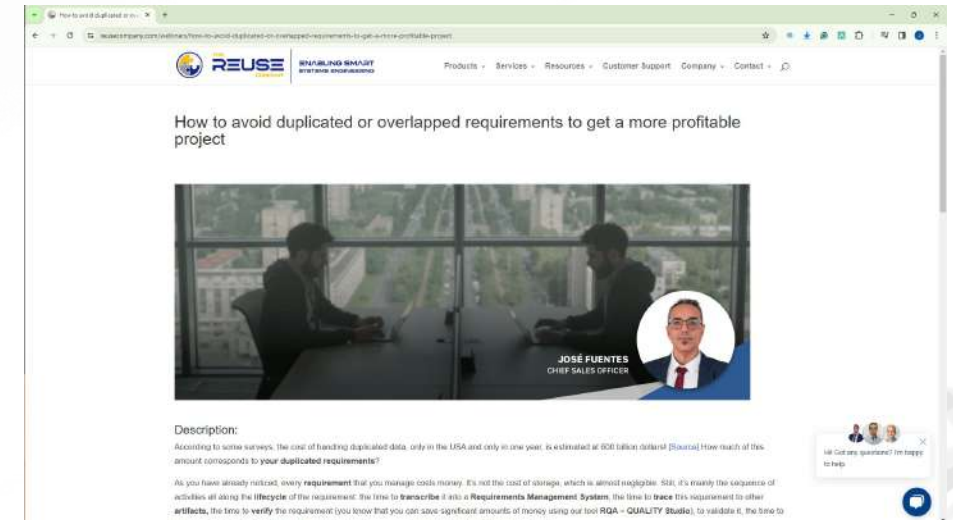
**C11 - Consistent:** A set of needs and a set of requirements is consistent if contains individual needs or requirements that are:

- unique;
- do not conflict with or overlap with others in the set;
- makes use of homogeneous units and measurement systems; and
- are developed using a consistent language (that is, the same words are used throughout the set to mean the same thing); and use terms that are consistent with the architectural model, project glossary, and project data dictionary.

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The screenshot shows a webpage from REUSE (Requirements Engineering User Society) with the title "How to avoid duplicated or overlapped requirements to get a more profitable project". The page features a video player with a circular inset of José Fuentes, Chief Sales Officer. Below the video, there is a "Description" section that discusses the cost of handling duplicated data and the benefits of using a Requirements Management System (RMS) to trace requirements and verify them. A chat window is visible in the bottom right corner.

# CONSISTENCY IN THE INCOSE GTWR

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**R6 - Common Units of Measure:** When stating quantities, all numbers should have appropriate and consistent units of measure explicitly stated using a common measurement system in terms of the thing the number refers.

**R40 - Decimal Format:** Use a consistent format and number of significance digits for the specification of decimal numbers.



When writing textual requirements, why is it more difficult to choose the correct numbers than to choose the correct words?

**15'**  
Webinar

Writing rules for numbers in textual requirements

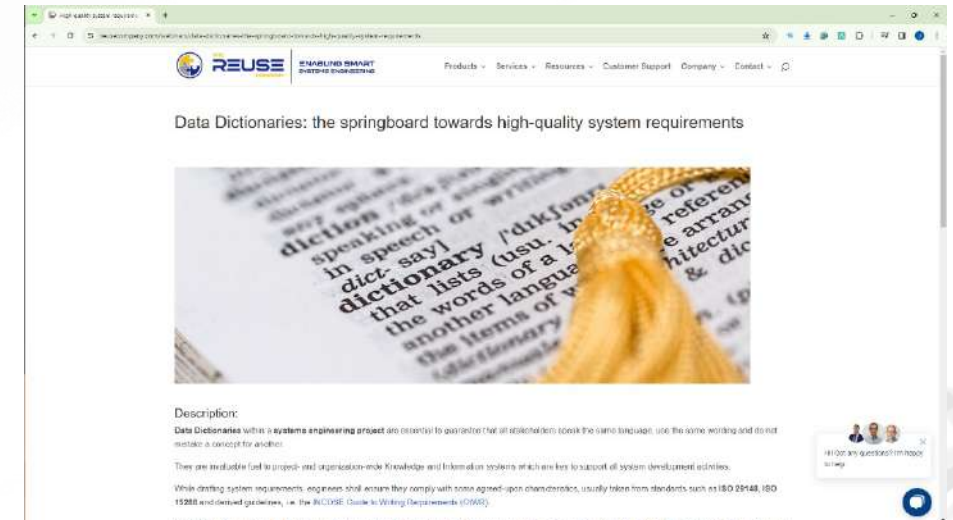
**Description:**  
Either if you choose the **INCOSE Guide for Writing Requirements** or any other guideline, the art of writing a good requirement demands the correct selection of the words to use (avoid ambiguity, selection of the proper modal verbs, avoid passive voice in the main clause of the requirement, use of the specific subjects that will bear the responsibility of the defined activities. ) However, writing numbers either is not easy. Not only because certain values need to be carefully selected, using engineering and often easy visualization methods, but also these numbers have always to refer quantity a property or to quantify the number of actions required, never go with adjectives (e.g. "approximately"...) or be replaced by subjectives (e.g. "heavy" vs. a plain quantified mass), and when necessary these values have to be completed with references.

Follow us in this Express Webinar to learn more about these kinds of **writing rules for numbers** and, beyond that, to see how a tool can do the routine work for you in just 10 minutes. After that there will be 5 minutes for Q&A.

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Data Dictionaries: the springboard towards high-quality system requirements

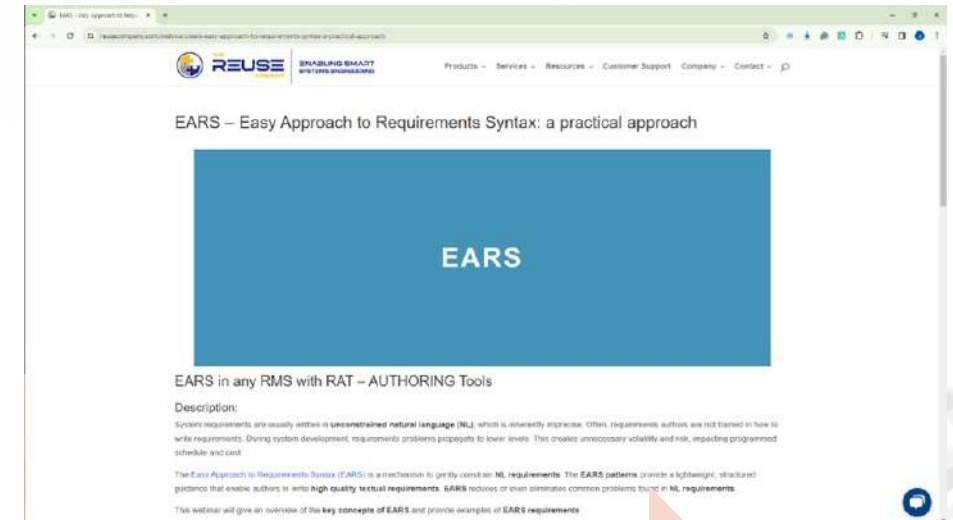
**Description:**  
Data Dictionaries within a **system engineering project** are essential to guarantee that all stakeholders speak the same language, use the same wording and do not mistake a concept for another.  
They are invaluable tool to project and organization-wide Knowledge and Information systems which are key to support all system development activities.  
When drafting system requirements, engineers shall ensure they comply with some agreed-upon characteristics, usually taken from standards such as ISO 29148, ISO 15288 and related guidelines, i.e. the INCOSE Guide to Writing Requirements (GWR5).

# CONSISTENCY IN THE INCOSE GTWR

R39 - Style Guide: Use a project-wide style guide for individual need statements and requirement statements.

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While

<pre-  
condition /  
context>

,

When

&lt;trigger&gt;

,

the

&lt;System&gt;

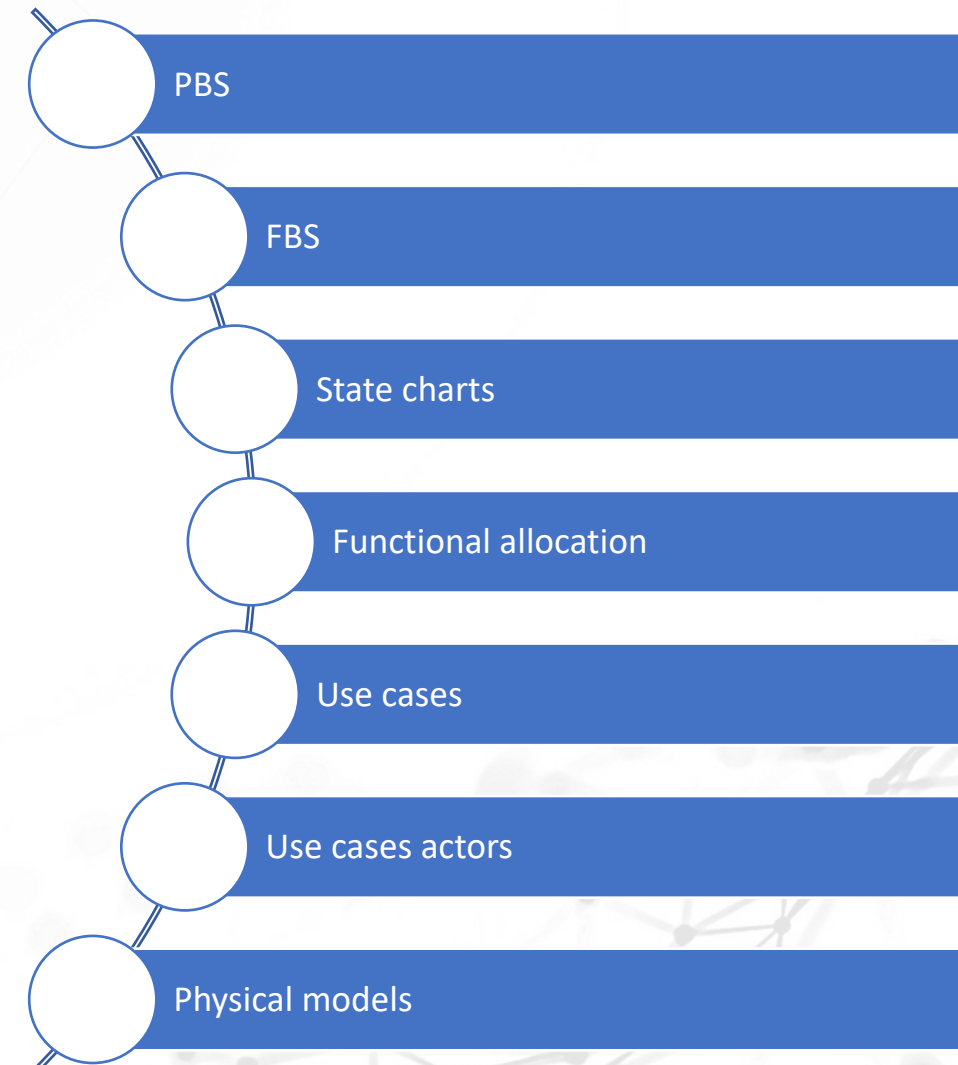
Shall

<System  
response>

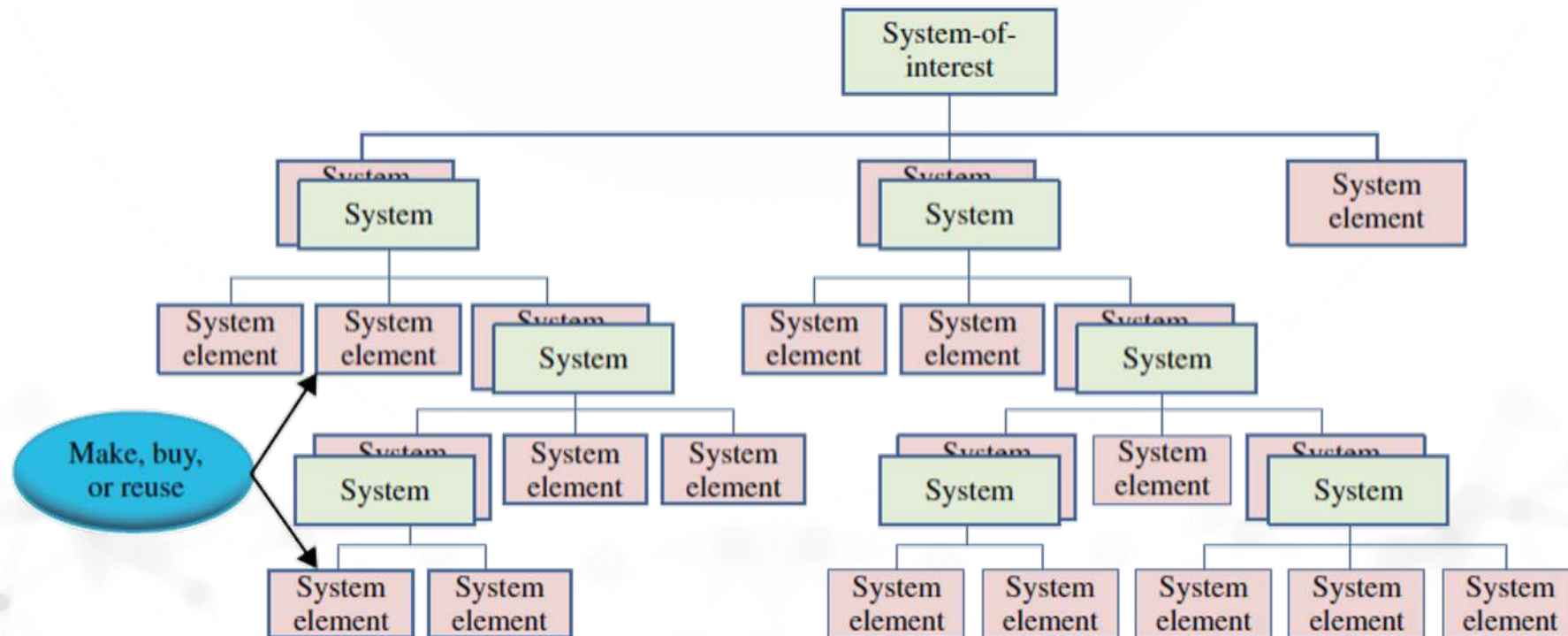
# CONSISTENCY BETWEEN REQUIREMENTS AND MODELS

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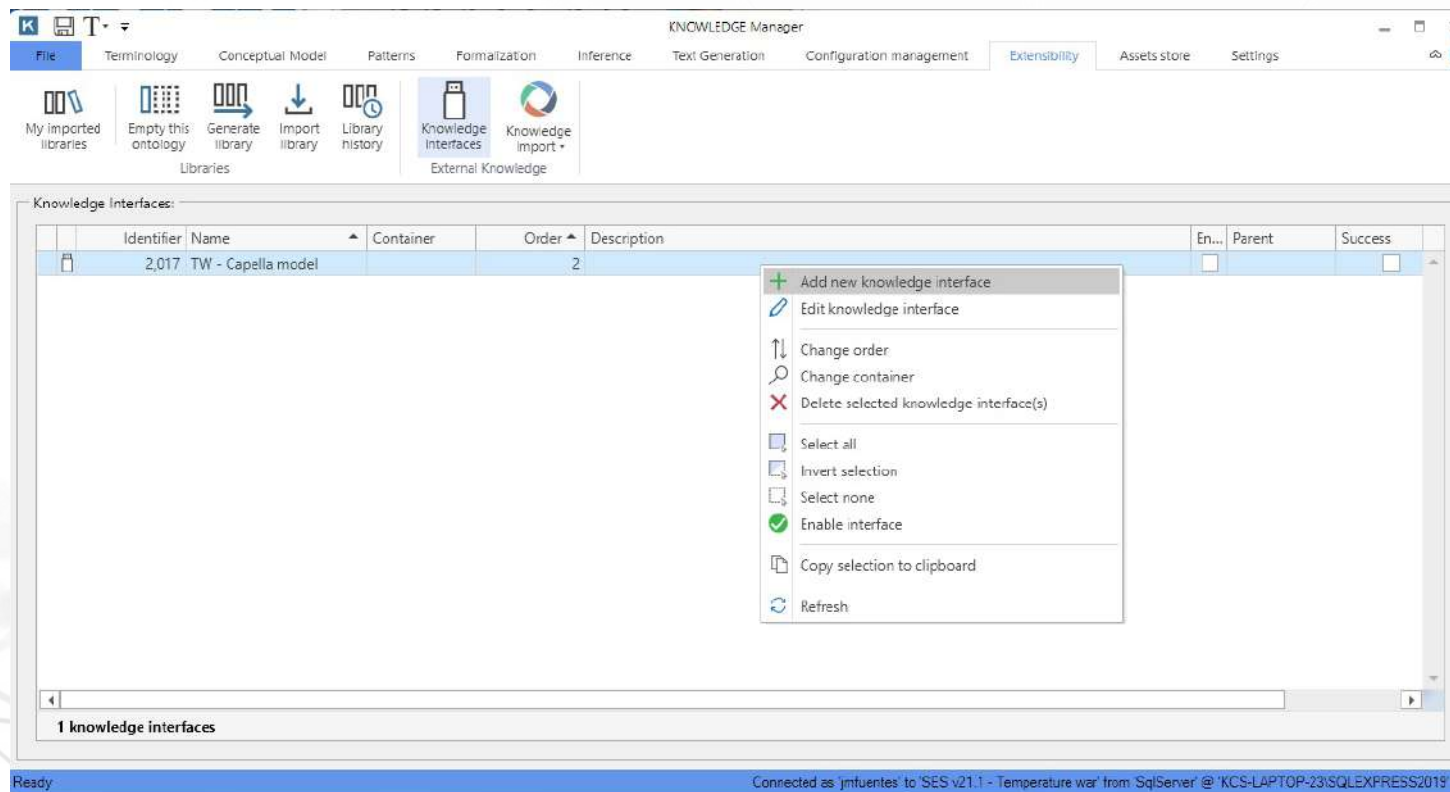
# CONSISTENCY BETWEEN REQUIREMENTS AND MODELS





# CONSISTENCY BETWEEN REQUIREMENTS AND MODELS

- Models merged with domain vocabularies



CAMEO  
SYSTEMS MODELER™

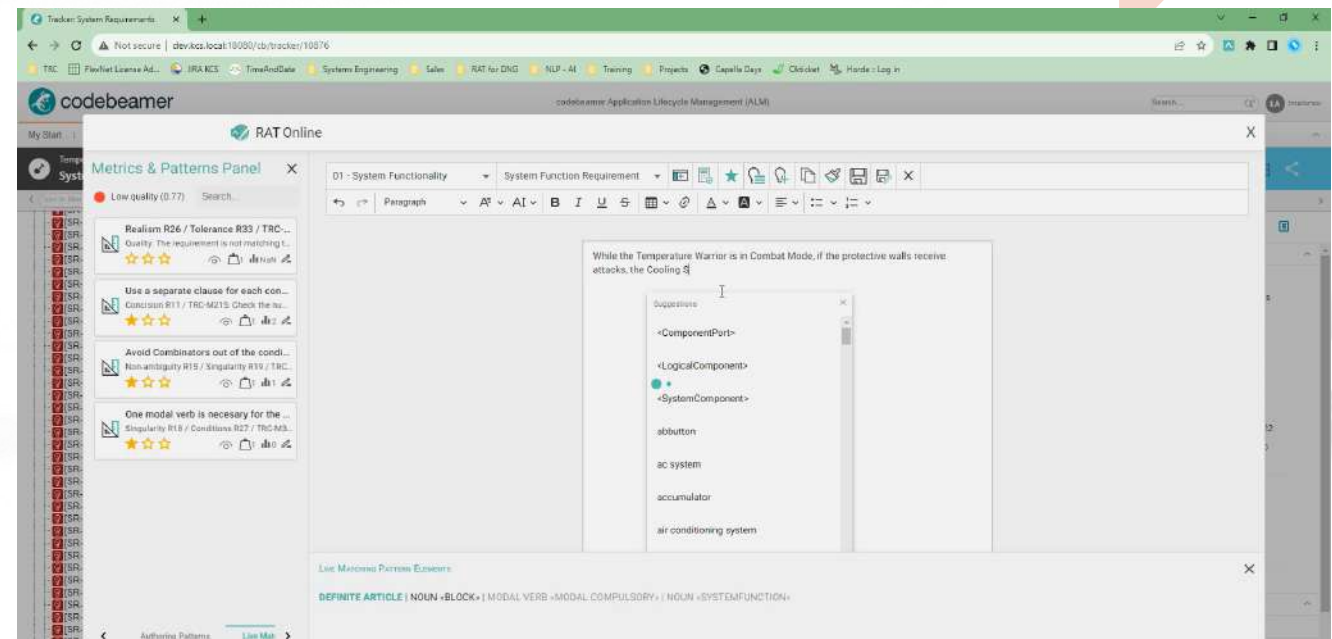
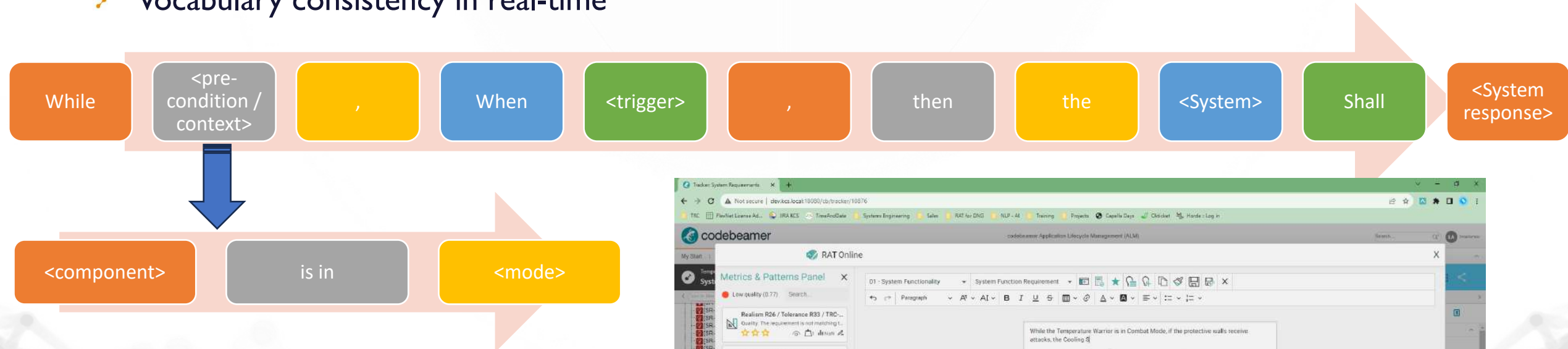
Capella



MATLAB®  
& SIMULINK®

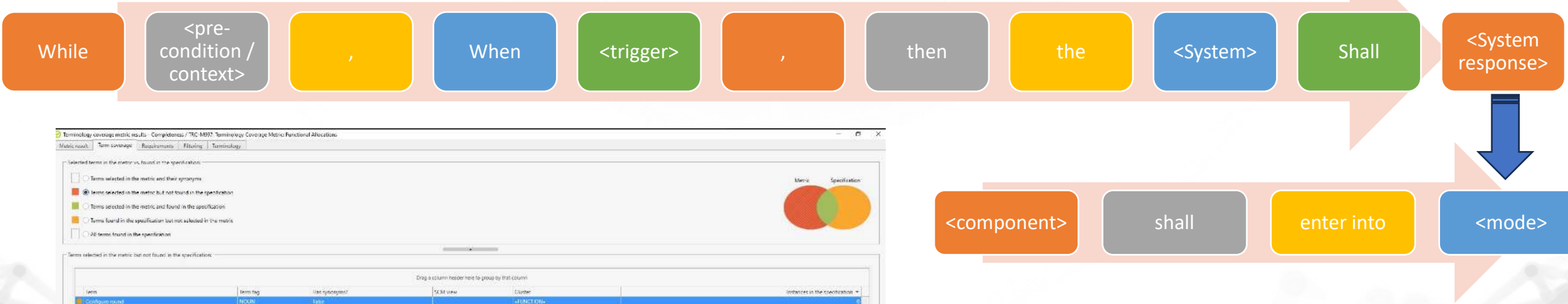
# CONSISTENCY BETWEEN REQUIREMENTS AND MODELS

➤ Vocabulary consistency in real-time



# CONSISTENCY BETWEEN REQUIREMENTS AND MODELS

## Semantic consistency



Terminology coverage matrix results - Completed / TRC 4037 - Terminology Coverage Matrix Functional Allocation

Selected terms in the matrix, found in the specification:

- Terms selected in the matrix and their synonyms
- Terms selected in the matrix but not found in the specification
- Terms selected in the matrix and found in the specification
- Terms found in the specification but not selected in the matrix
- All terms found in the specification

Term	Term tag	Use synonyms?	SEM view	Cluster	Instances in the specification
Configure journal	NOJRN	False		FUNCTIONS	0
Display information	NOJRN	False		FUNCTIONS	0

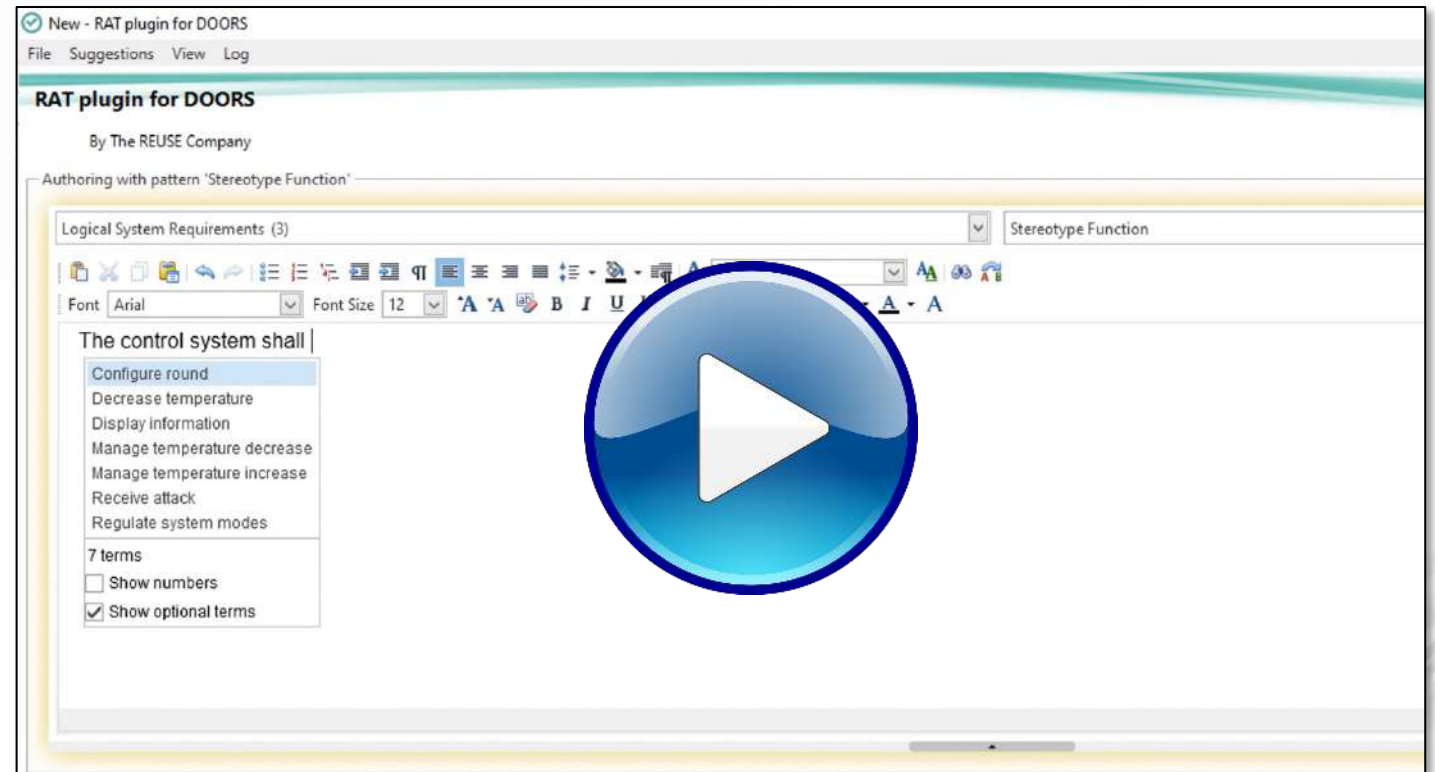


**DEMO**

# DEMO

## Steps:

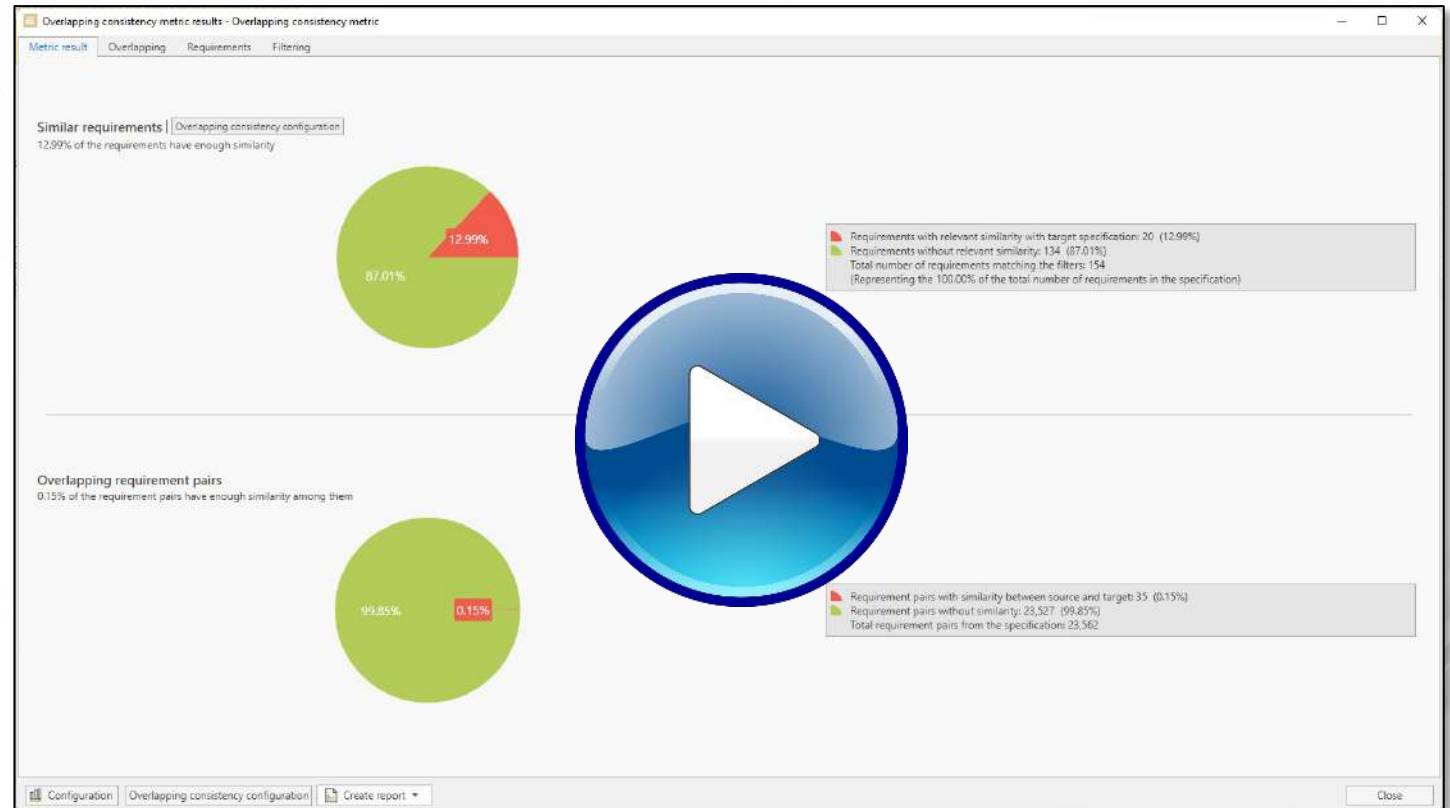
1. Open a model in Cameo
2. Show the Cameo content in KNOWLEDGE Manager
3. Show the pattern and pattern formalization
4. Open a requirements document in IBM DOORS
5. Create a new requirement and check consistency in real-time



# DEMO

## Steps:

1. Open the SES ENGINEERING Studio
2. Connect to a requirements document
3. Add a new overlapping metric
4. Execute CCC
5. Review overlapping results

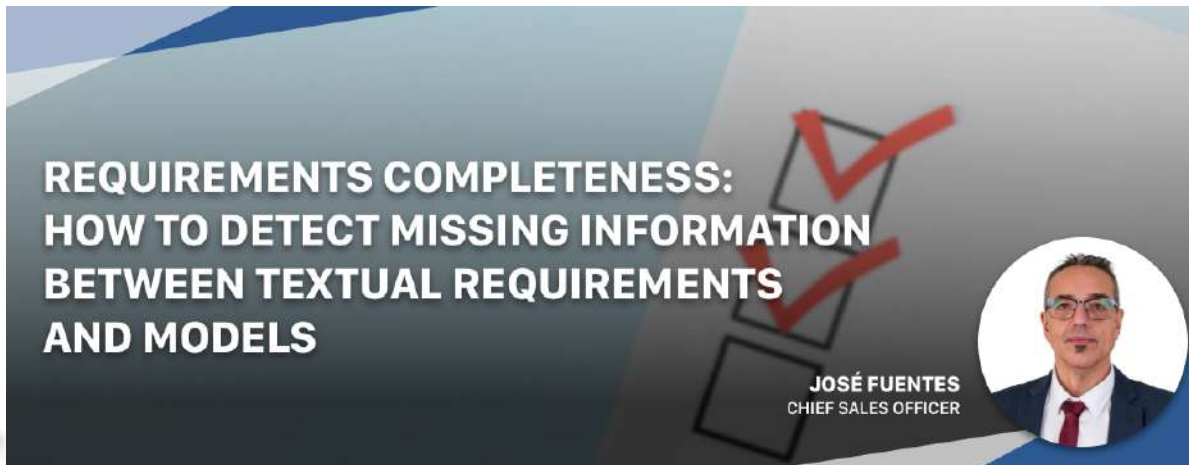


Requirements Consistency



## **Requirements Completeness:**

***How to detect missing information between textual requirements and models***



### **Dates:**

Wednesday, April 17<sup>th</sup> 2024, 5:00 PM CET (Madrid)/  
5:00 PM JST (Tokyo)/ 7:00 PM AEDT (Sydney)

Thursday, April 18<sup>th</sup> 2024, 9:00 AM CET (Madrid)/  
8:00 AM PST (Los Angeles)/11:00 AM EST (Detroit)

According to many different studies and surveys, **requirements completeness** is the most impacting factor when it comes to assessing the quality of a requirements specification.

Requirements' completeness, as it's very well described in the INCOSE Guide to Writing Requirements, is a double factor:

- Completeness for individual requirements
- Completeness for sets of requirements

Requirements Consistency



## CONTACT INFORMATION



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@ReuseCompany



<https://www.linkedin.com/in/josemiguel Fuentes/>



# LEARN MORE! TRC WEBSITE

- [www.reusecompany.com](http://www.reusecompany.com)
- Resources -> Webinars (15' and 1hr)
- Services
- Support Forum

## Requirements Consistency

Enabling SMART Systems Engineering

THE REUSE COMPANY


Products ▾ Services ▾ Resources ▾ TRC Forum Support Company ▾ Contact ▾

The screenshot displays a grid of 12 webinar cards. Each card features a thumbnail image, a title, and a duration. The cards are arranged in three rows and four columns.

Thumbnail Description	Title	Duration
Person at a desk with a mug	Requirements management through AIG Contracts	15'
Computer monitors displaying data	Connecting the Dots: Interoperability between your favourite Systems Engineering tools	
Person pointing at a screen	Semantic traceability: how to keep the digital thread all along the SE lifecycle	
Podcast cover with three people	The MBSE Podcast: MBSE around the world. Spain with Juan Llorens	
Person at a desk with crumpled paper	Passive voice requirements: Why "passive voice" actually can become a nightmare	15'
Podcast cover with a person	(In Spanish) Invitados al podcast 'Sistemistas': V&V ¿Qué es qué?	
Person at a desk with a laptop	Connecting textual requirements and Capella models (Invited presenters)	
Person at a whiteboard	Requirements Management: Managing data over entire life cycles	
Person at a desk with a laptop and a book	How to kick off your KM – KNOWLEDGE Management project	
Puzzle pieces	Taming the System Engineering Life cycle using Connectivity and Interoperability: the SES ENGINEERING Studio	
Person pointing at a screen	Raise the ante: high-quality models is the only way forward after high-quality requirements	
Person at a desk with a laptop	Digitalizing the V&V process on both sides of the V-Model	15'

# THE REUSE COMPANY IN YOUTUBE: Requirements Consistency

[HTTPS://WWW.YOUTUBE.COM/USER/THER  
EUSECOMPANY](https://www.youtube.com/user/therusecompany)



The REUSE Company  
265 prenumeranter

PRENUMERERAR

HEM VIDEOR SPELLISTOR KANALER OM

RQA - QUALITY Studio ▶ SPELA UPP ALLA

RQA - QUALITY Studio allows you to define, measure, manage and improve the quality of your requirements, models, documents etc.

Thumbnail	Title	Duration	Views	Time since upload
	SES ENGINEERING Studio for Requirements	1:41	89 visningar	för 4 månader sedan
	Raise the ante: high-quality models is the only way...	1:00:20	45 visningar	för 5 månader sedan
	How to generate a quality report of your requirements...	12:53	72 visningar	för 10 månader sedan
	Why Challenging the INCOSE Consistency metrics might...	47:57	66 visningar	för 11 månader sedan
	Completeness: tips and tricks for high-quality...	1:12:01	113 visningar	för 11 månader sedan
	Improve the quality of your requirements using advanc...	1:12:53	116 visningar	för 1 år sedan



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**REUSE**  
COMPANY



Requirements Consistency