TRC

WEBINARS 2019

Automatic Traceability Discovery for Systems Engineering

Monday, 13 May 2019

Presenters

José M. Fuentes

- Chief Operating Manager
- jose.fuentes@reusecompany.com

Cecilia Karlsson

- Marketing & Communication manager
- cecilia.karlsson@reusecompany.com

Agenda

01 Introduction to **TRC** and the **presenters**

02 What is **traceability**

03 Traceability in **complex systems**

04 The tool **TRACEABILITY Studio**

05 **Q&A**

Providing a **knowledge centric** approach to leverage system engineering activities in our customers

contact@reusecompany.com

@reusecompany

Calle Margarita Salas, 16 2-D
28919 – Leganés (Madrid)
SPAIN

+34 912 172 596

About The REUSE Company (TRC)

01 The company was created in **1999**

As a spin-off of a local university in Madrid (Spain)

02 **System + Software Engineers**

Smart combination between Company staff and R&D from Academia

03 **Head Quarters:** Madrid

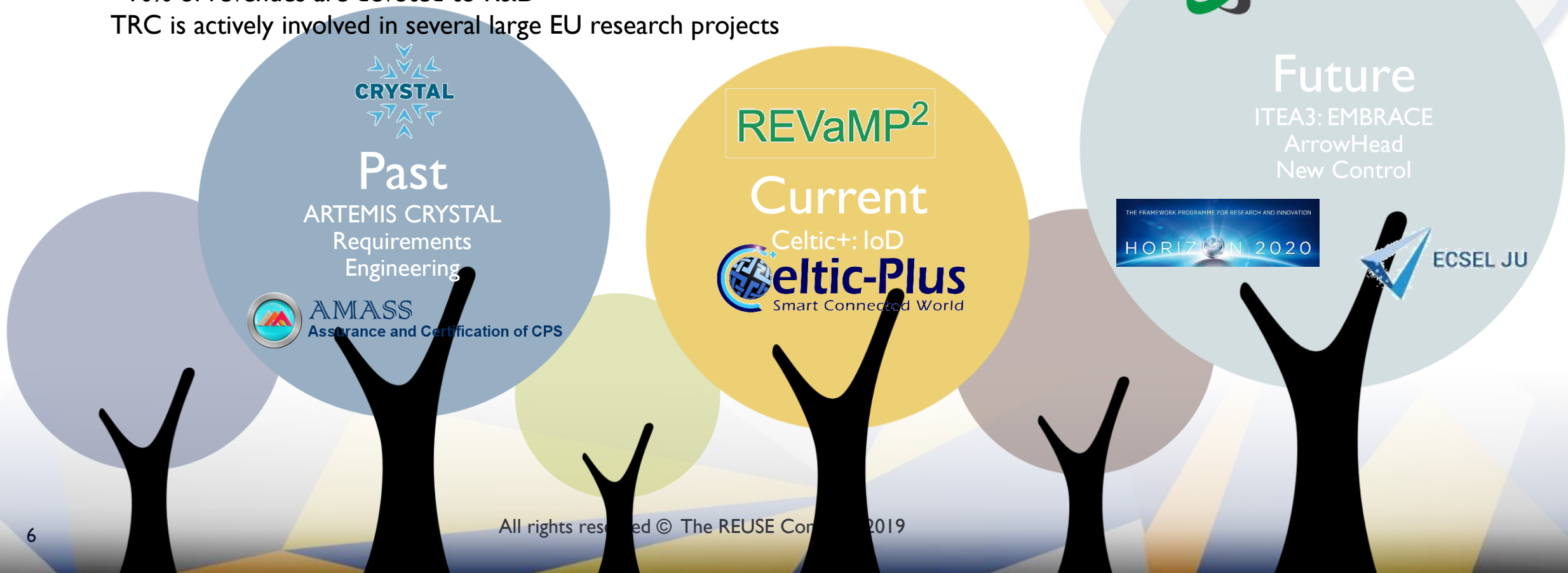
International offices:
London (UK)
Stockholm (Sweden)

04 Offering a **knowledge centric** approach to leverage system engineering activities in our customers

Research and innovation in our DNA. Public projects

Research and Innovation in our DNA

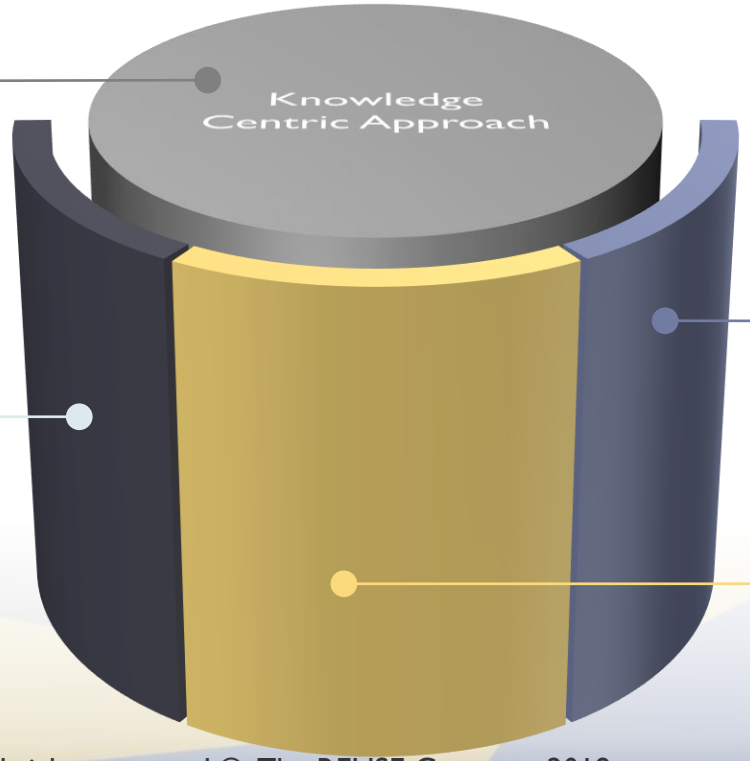
- Spin-off of Carlos III University of Madrid
- TRC's headquarter is in the Legatec Technology Park of the University
- ≈10% of revenues are devoted to R&D
- TRC is actively involved in several large EU research projects



Introduction to The REUSE Company

T (he) R (euse) C (ompany)

To leverage Systems Engineering activities in our customers

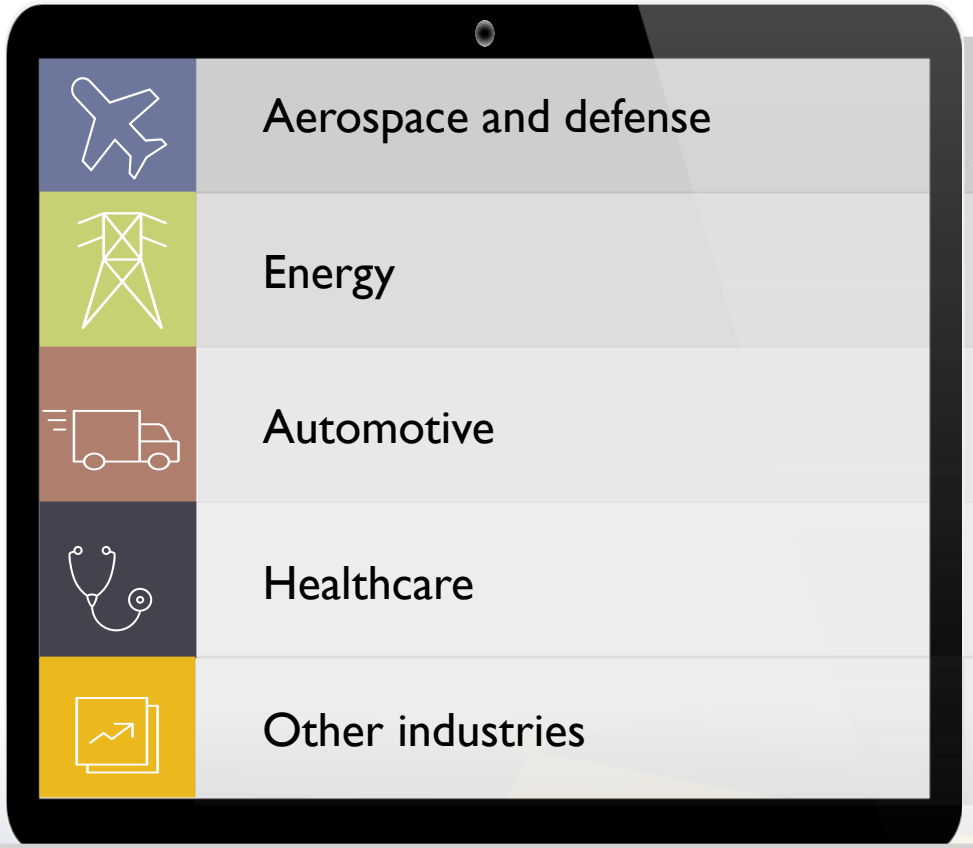


TRACEABILITY

QUALITY

REUSABILITY

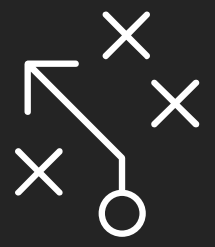
Who is using our technology?



AIRBUS
AIRBUS DEFENCE & SPACE
AIRBUS GROUP INNOVATIONS
SAFRAN AIRCRAFT ENGINES
THALES
HENSOLDT
THALES Communications & Security S.A.S.
ariane GROUP
FUSION FOR ENERGY
iter the way to new energy
eDF
REPSOL
Shell
RENAULT
THINK SURGICAL
Health Net
SIEMENS
Santander
BCR Banco de Costa Rica
rtve
ELRA European Land Registry Association
tirant lo blanch

José Fuentes

- Current position: Chief Operating Officer at The REUSE Company
- Product manager of the Systems Engineering Suite tools during the last 5 years.
- INCOSE CSEP Certified
- Member of the board of AEIS – the Spanish chapter of INCOSE
- Active contributor to the INCOSE Guide for Writing Requirements



What is

Traceability

What is traceability?

- The capacity to find where a product was made
- What raw material and added components were used
- How it was produced
- Where it was stored
- How it has been released
- All along the logistic chain
- …
- From beginning to end

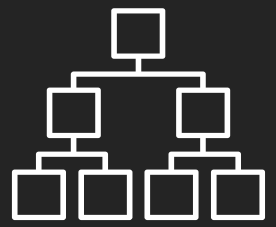
Basic approach

Sample traceability matrix

Requirement Identifiers	Reqs Tested	REQ1 UC 1.1	REQ1 UC 1.2	REQ1 UC 1.3	REQ1 UC 2.1	REQ1 UC 2.2	REQ1 UC 2.3.1	REQ1 UC 2.3.2	REQ1 UC 2.3.3	REQ1 UC 2.4	REQ1 UC 3.1	REQ1 UC 3.2	REQ1 TECH 1.1	REQ1 TECH 1.2	REQ1 TECH 1.3
Test Cases	321	3	2	3	1	1	1	1	1	1	2	3	1	1	1
Tested Implicitly	77														
1.1.1	1	x													
1.1.2	2		x	x											
1.1.3	2	x											x		
1.1.4	1			x											
1.1.5	2	x												x	
1.1.6	1		x												
1.1.7	1			x											
1.2.1	2				x		x								
1.2.2	2					x		x							
1.2.3	2								x	x					
1.3.1	1										x				
1.3.2	1										x				
1.3.3	1											x			
1.3.4	1											x			
1.3.5	1											x			
etc....															
5.6.2	1														x

What is traceability?

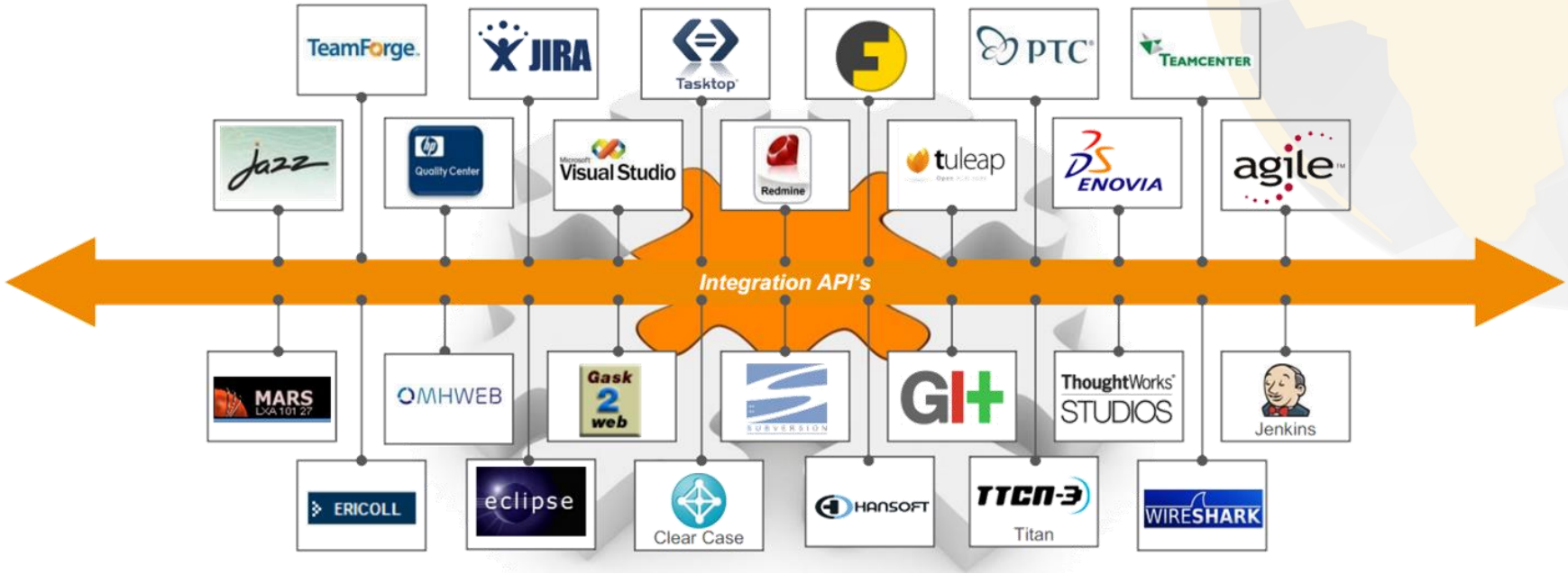
- ✓ Might be good as a first step
- ✓ Allows you to check completeness of tests
- ✓ Ensures that implementation meets specification
- ✓ Enough for some projects (e.g. SW)
- ✗ Not enough in complex projects
- ✗ No support to req. decomposition or design
- ✗ Doesn't satisfy standards like: DO-174, DO-254, ISO26262…



Traceability in complex S.E. projects

Complex ecosystems

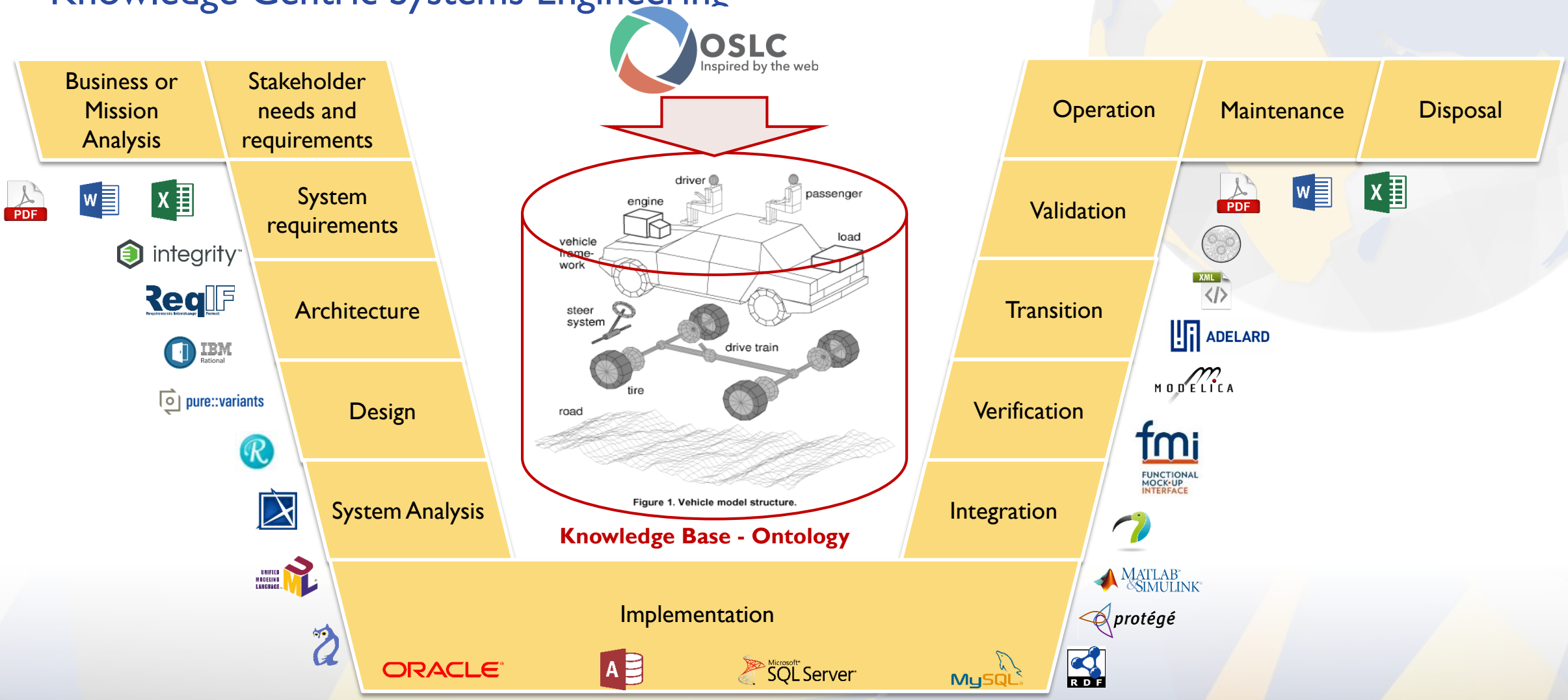
Mats Berglund (Ericsson) http://www.ices.kth.se/upload/events/13/84404189f85d41a6a7d1cafd0db4ee80.pdf



- Multiple **domains**
  - Different **types of artifacts**
- Need of **intra-operability**
  - Intra-domain
- Need of **interoperability**
  - Inter-domain

Traceability

Knowledge Centric Systems Engineering



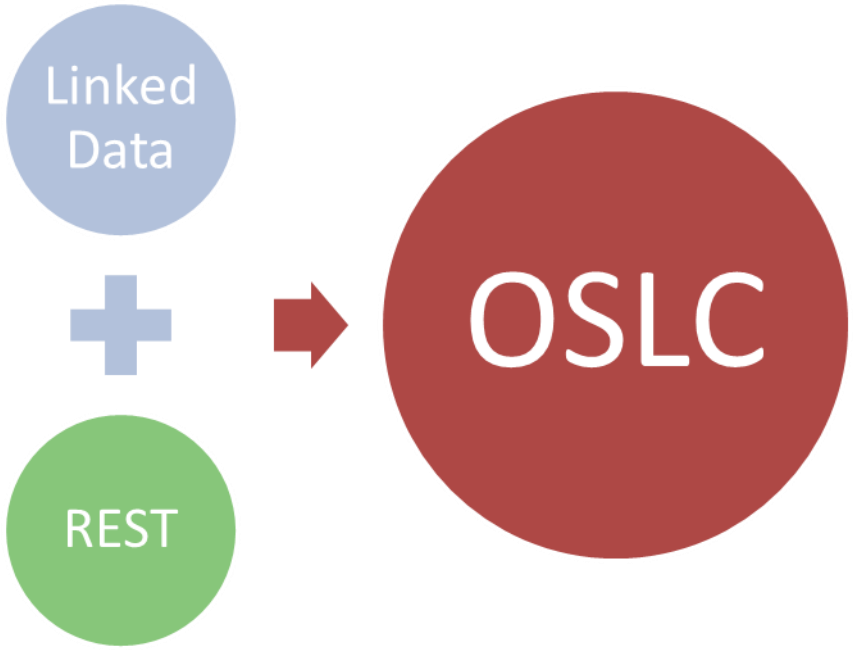
Traceability in large projects

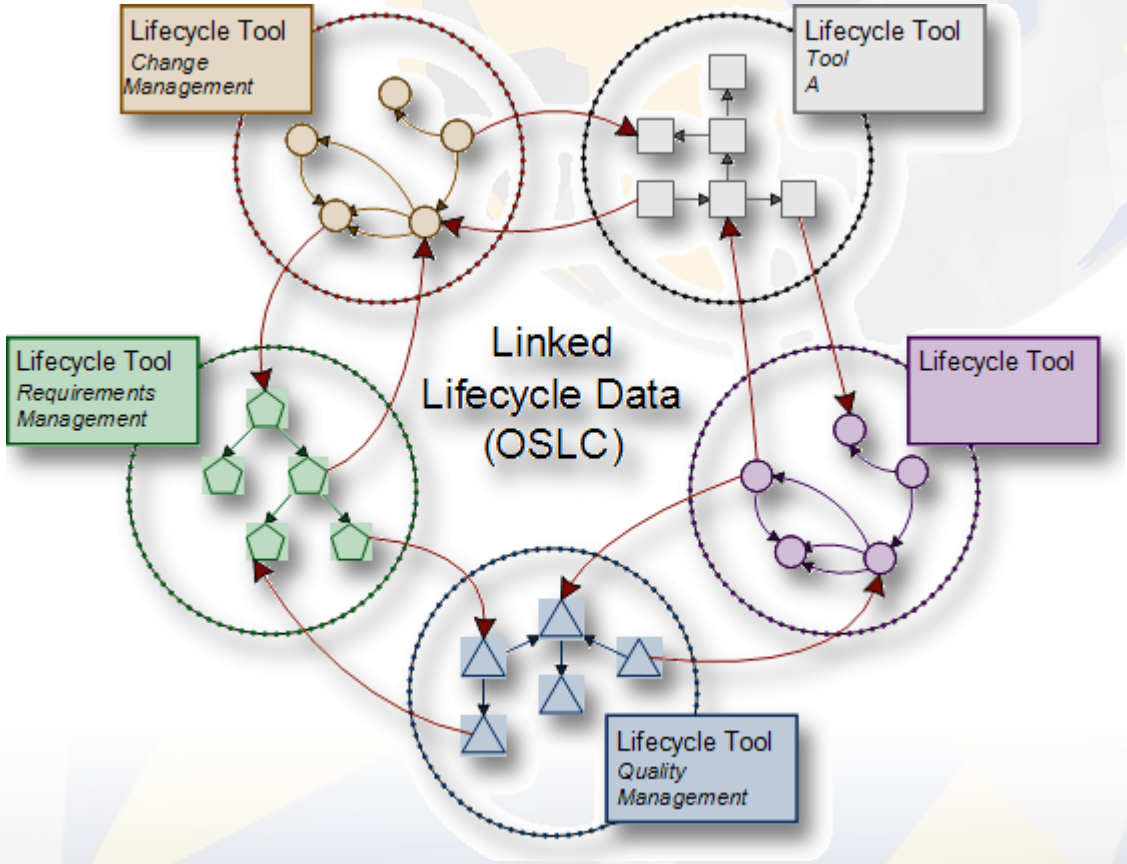
- Project quality:
  - Are all the requirements properly tested?
  - Completeness:
    - Have we considered every high level requirement?
    - Have we created all the expected work products following requirements
- Scope management (project control):
  - Gold plating / scope creep
- Visibility:
  - Impact analysis
- Collaboration:
  - Among different roles: requirements manager, architects, designers, testers and… above all, Project manager

Visibility

- Traceability provides visibility in large projects:

Open Services for Lifecycle Collaboration (OSLC)

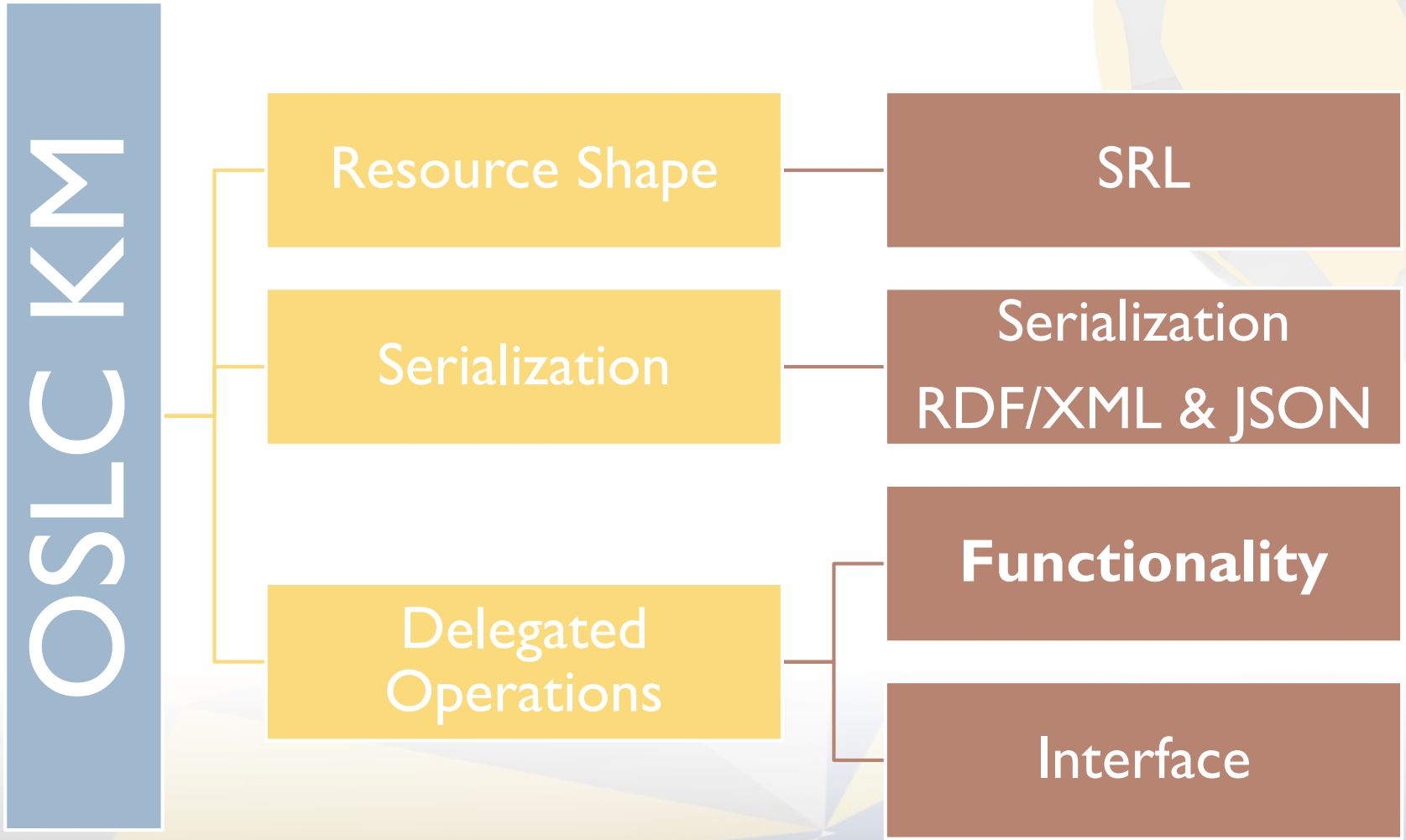




Source: http://upload.wikimedia.org/wikipedia/en/7/7e/OSLC_diagram.png

Traceability

The approach…



SRL

System Representation Language

New Domain

New Resource Shape

http://trc-research.github.io/spec/km/

Traceability in complex projects

Main capabilities of the

TRACEABILITY Studio

TRACEABILITY Studio

Connections

Connection to data sources

- Connection to multiple types of sources
- Graphical definition of a project map

Click Here

Traceability

Traceability management

- Management of types of traces
- Management of traces
- Impact analysis
- Graphical representation of work items

Click Here

Semantics

Semantic approach

- Automatic suggested links
- Suspect links management

Click Here

Reporting

Our qualifications

- OOTB reports
- Custom reports in MS Word

Click Here

TRACEABILITY Studio in the SES Suite

KCSE areas and tools

Knowledge Management

Capture, creation, **representation**, and **exchange of knowledge** across targeted groups of **stakeholders**

Traceability

Supports **traces** among heterogeneous work items, including: **impact** analysis, trace **discovery**, custom **reporting**…

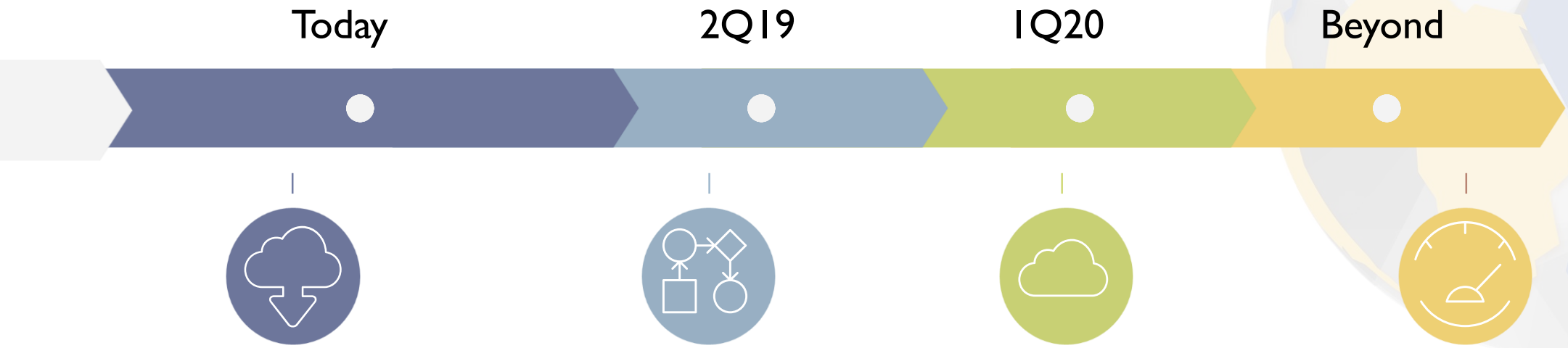
Quality Analysis

Automatic analysis of the **quality** for the items in the left-hand side of the "V"

V&V

Support to the **Verification and Validation** processes according to ISO15288 and INCOSE Handbook

TRACEABILITY Studio: Roadmap



V18.x

· Beta version of the product

V18.3

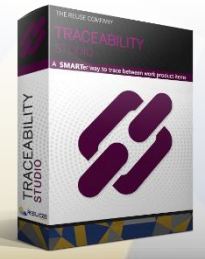
· First version of the product

v20

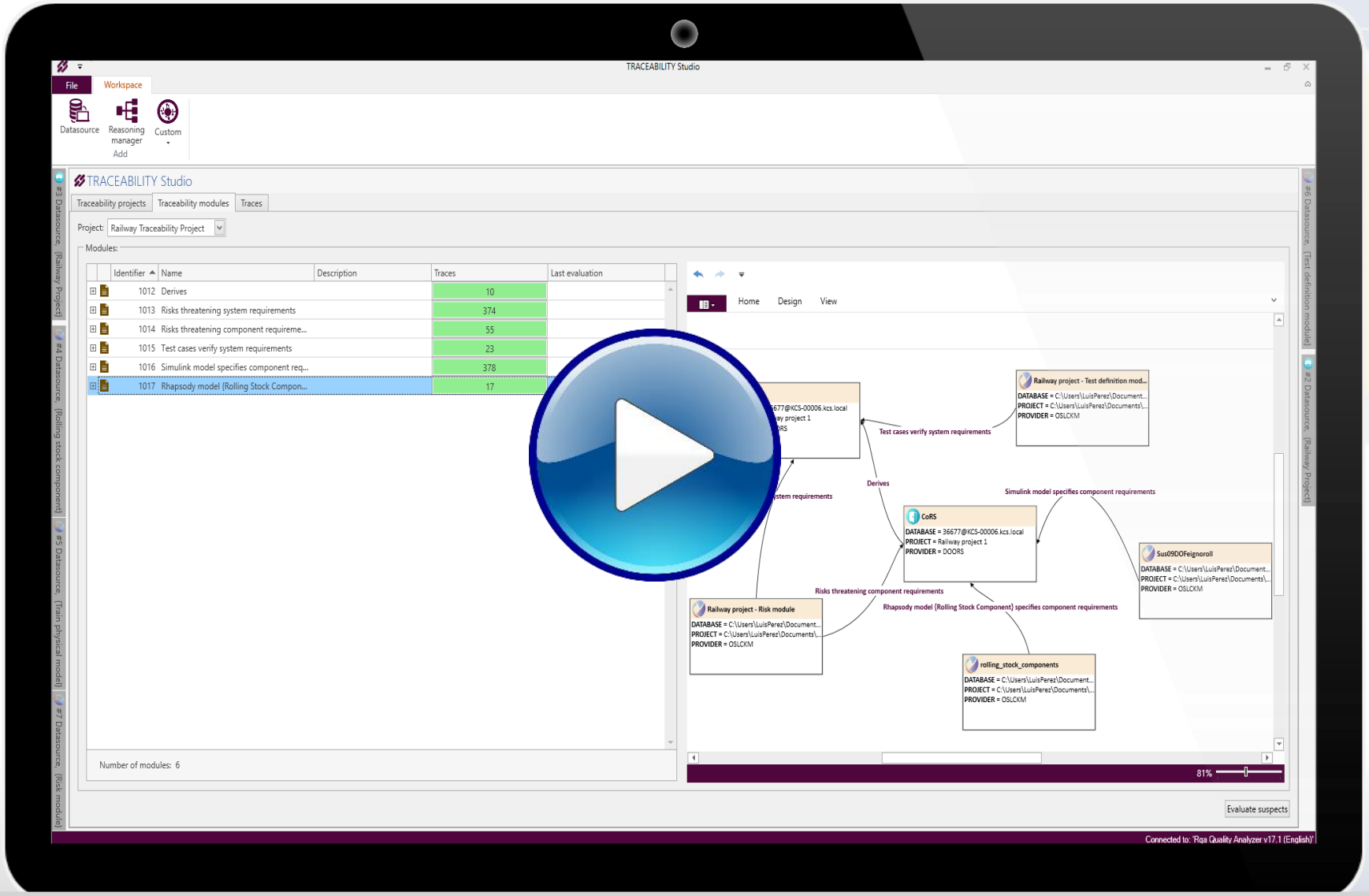
· Better integration with the SES Suite and MS Office
· Multi-column traceability matrices
· More semantics
· Integration with other tools (requirements, testing, modeling…)

Beyond

· Source code traceability
· Much more



TRACEABILITY Studio: live demo



Thank you!

Next webinar

- **Topic:**
  - **A practical way to implement ISO 15288 V&V processes: The VERIFICATION Studio**
  - The Verification and Validation processes of the ISO15288 describe in a general way how to perform V&V for a complex system. However, the standard also suggests the need to apply V&V not only to the right side of the V-Model but also to the requirements, architecture and design processes outcomes, along the left side of the V-Model. The webinar will show how you can use the Verification Studio to implement an integral and complete V&V approach for all kinds of work-products and components.
  - **Dates:**
  - May 28th and 30th, 2019


Q&A

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Thank you

Contact information

José M. Fuentes

jose.fuentes@reusecompany.com

+34 912 17 25 96

@ReuseCompany

https://www.linkedin.com/in/josemiguelfuentes/

the REUSE company