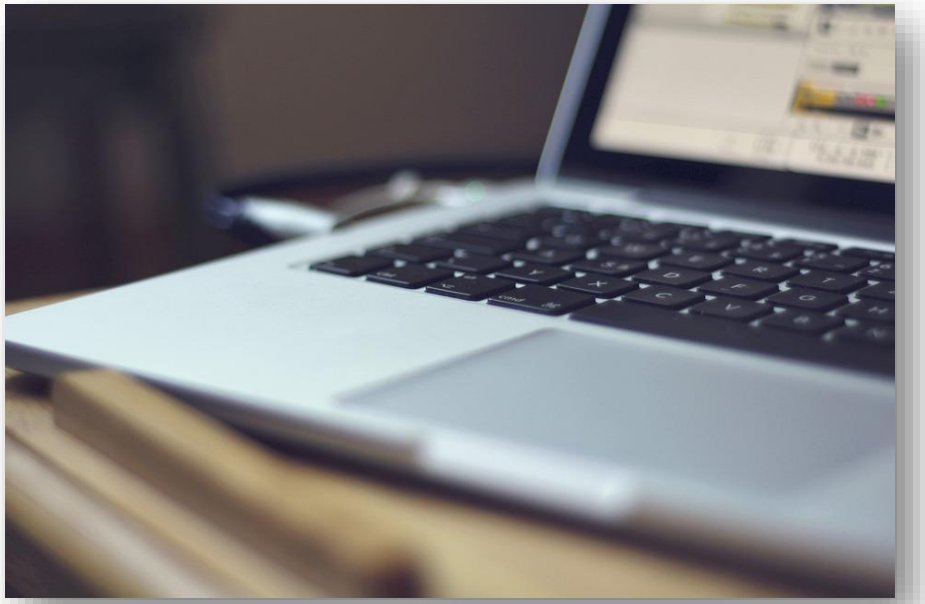
TRC WEBINARS 2018

# Knowledge and Quality management milestones in a Systems Engineering organization

- Webinar rules:
  - The Webinar will start in few minutes
  - You'll be muted throughout the Webinar
  - There's a **chat box** for you to ask questions at any time during the webinar
  - Please address **comments and questions** to the user "The REUSE Company" and not to the presenter directly
  - If you have any **technical issues** please use this chat box, or mail us at: support@reusecompany.com
  - The Webinar will be **recorded**. A link to the recording will be sent to you in few days time



# The REUSE Company – TRC Worldwide

- Local partners: France, Germany, Italy, Spain and Japan
- Customers in different countries along United States, Europe and Asia

- TRC Headquarters is based on Madrid (Spain)
- United Kingdom TRC office
- Scandinavian TRC office (Sweden)

AIRBUS · AIRBUS HELICOPTERS · AIRBUS DEFENCE & SPACE · SAFRAN Snecma · SAFRAN Sagem · MBDA · THALES · RENAULT · ALSTOM

FUSION FOR ENERGY · REPSOL · indra · SHERPA · BCR Banco de Costa Rica · Santander · THINK SURGICAL · Health Net · sage · SIEMENS · ENSTA ParisTech · tirant lo blanch

# The REUSE Company (TRC)

**Tools and solutions for knowledge Traceability, Reuse and Quality management**

Specialized in the application of **Semantic Analysis Technologies** to a wide range of industries (Aerospace, Defense, Automotive, Railway, Energy…)

*Focus:* System/Software **Reuse, Traceability and Quality**. Integration of tools and technology from The REUSE Company facilitates the representation, analysis and exploitation of knowledge and enables a knowledge-centric systems engineering approach.

*Mission:* promoting system/software and knowledge reuse within any organization, by offering **processes**, **methods**, **tools** and **services**. Technology fully integrated within the organization production chain.

ITEA 3

Celtic-Plus
Smart Connected World

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION
HORIZON 2020

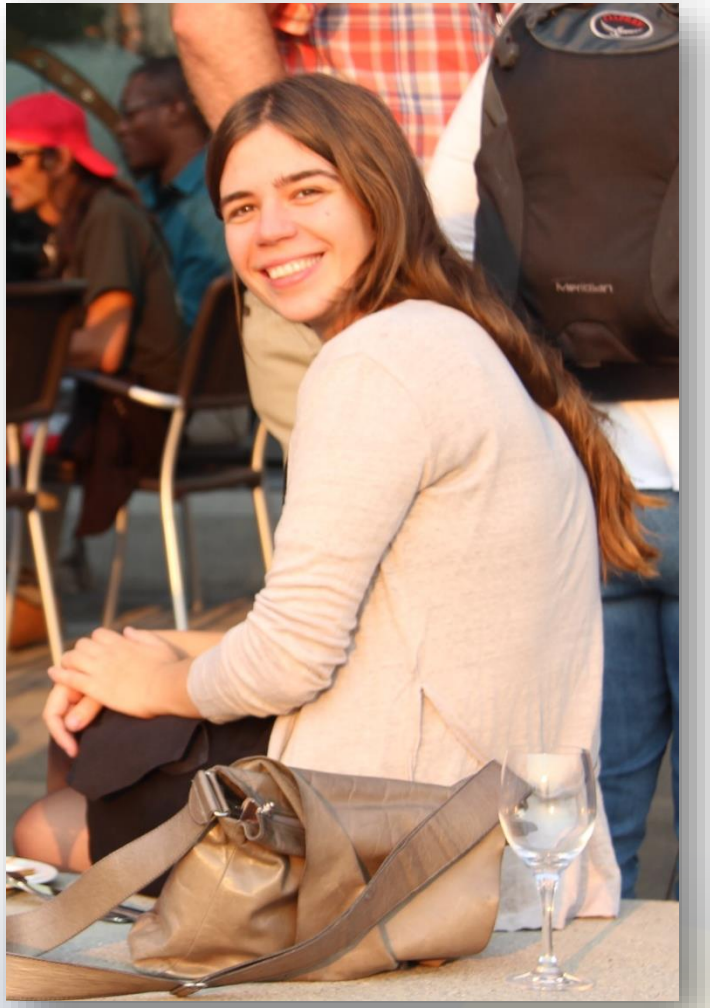
REVaMP²

AMASS
Assurance and Certification of CPS

CRYSTAL

**Innovative technologies applied to Knowledge Reuse**

# Elena Gallego Palacios



- **Consulting Director** at The REUSE Company.
- Elena has experience in Systems Engineering in the aerospace, defense, railway and automotive industries.
- Her topics of interest include **requirements** engineering, **knowledge** management, software engineering and domain architectures.
- She is also the author of some **research papers publications** in topics such as reuse of physical system models and improvement of the quality of requirements.
- Furthermore, Elena is participating as a **researcher** in different EU projects, **leading** the work package (WP2) for Industrial Use Cases in the **REVaMP2** (ITEA3 Call 2 2016) project, and has **contributions** in **AMASS** (H2020/ECSEL) and **CRYSTAL** (ART Call 2012: 332830).

+34 673 59 79 11

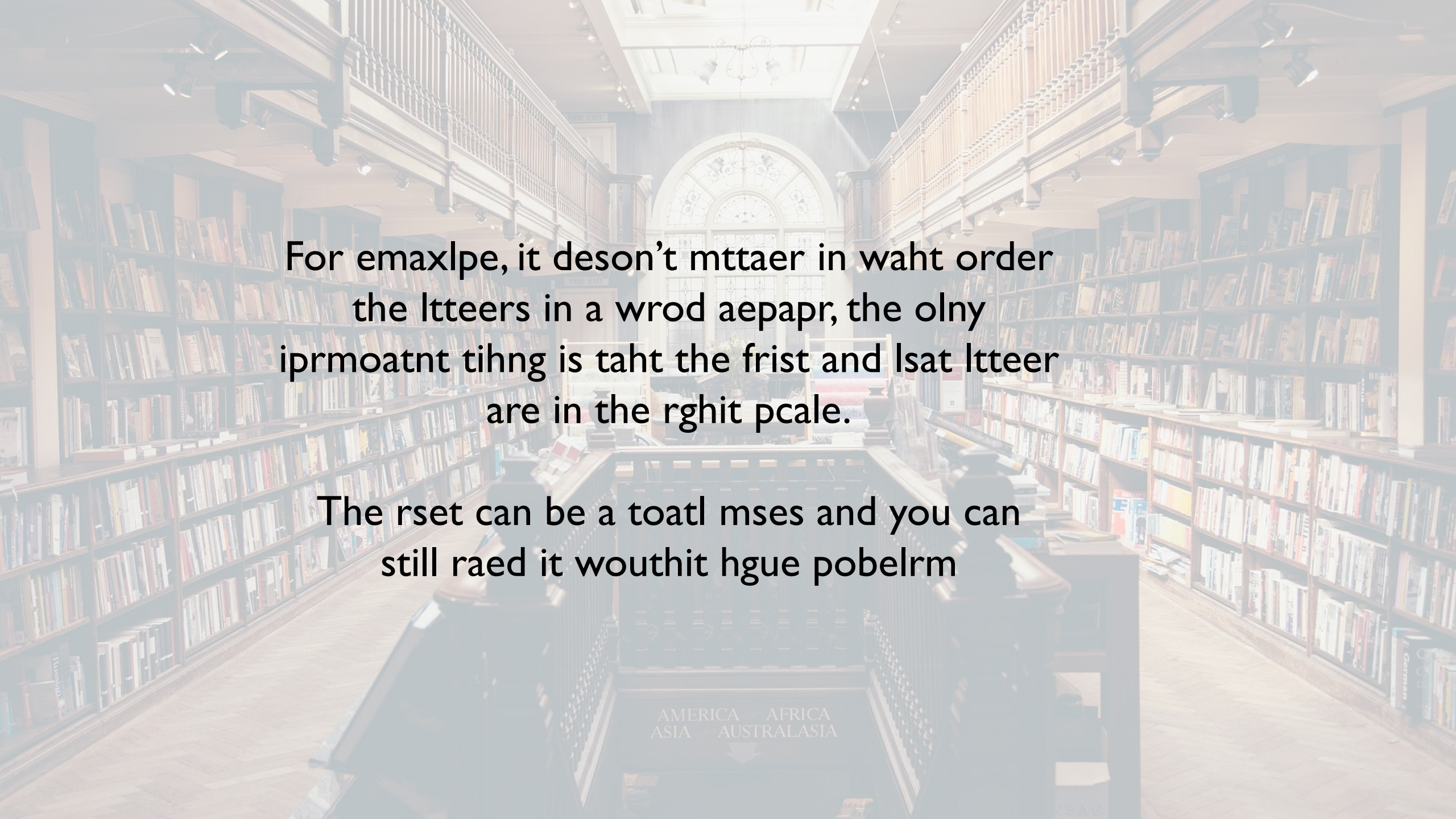
TRC

# WEBINARS 2018

## Knowledge and Quality management milestones in a Systems Engineering organization

Elena Gallego
*Consulting Director*

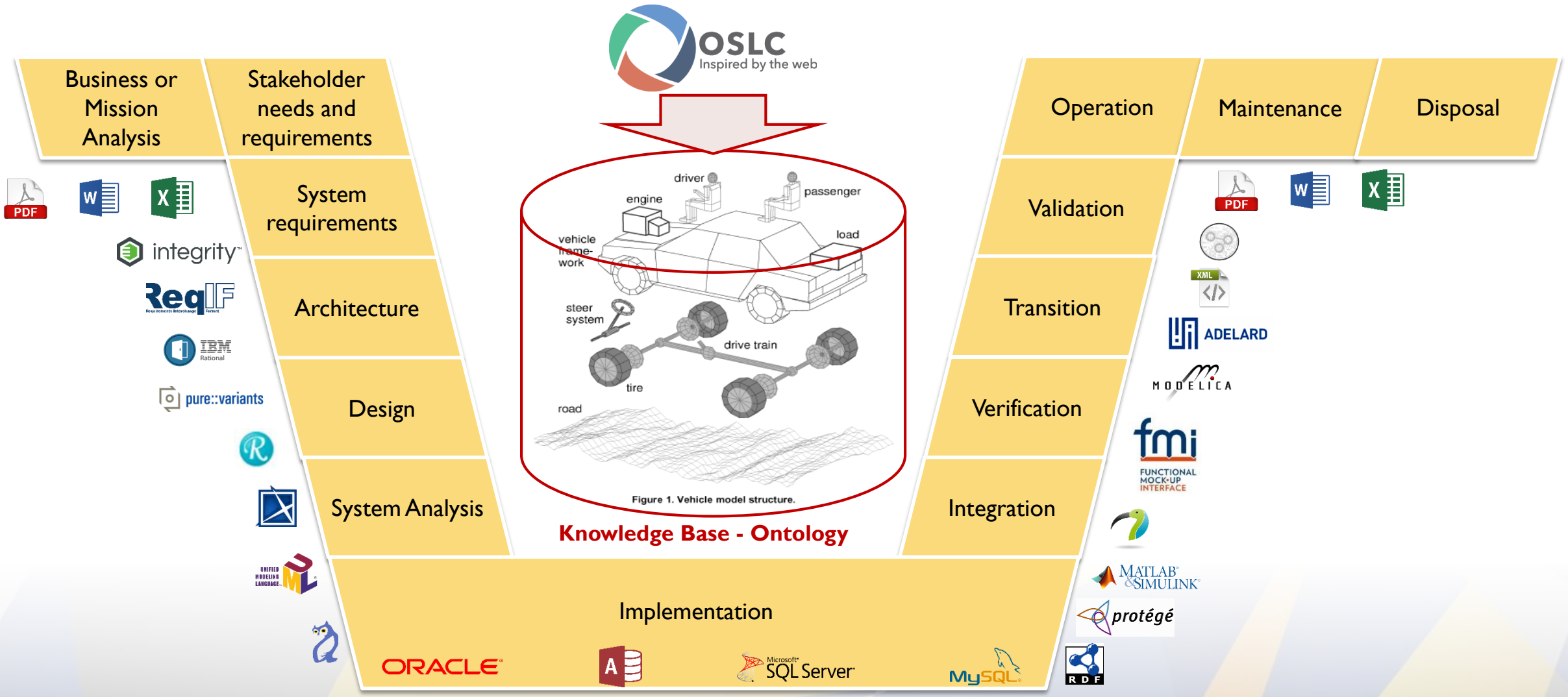
Wednesday, 31 October 2018




For emaxlpe, it deson't mttaer in waht order the ltteers in a wrod aepapr, the olny iprmoatnt tihng is taht the frist and lsat ltteer are in the rghit pcale.

The rset can be a toatl mses and you can still raed it wouthit hgue pobelrm

# Knowledge Centric Systems Engineering



# Knowledge Centric Systems Engineering

- Project Infrastructure
- Competitiveness
- Performance and Quality
- Flexibility
- Time to market

**Discovering** information in Requirements Documents

**Controlling** information to unify requirements interpretation

**Identifying** strengths and challenges in requirements documents

**Building** up the Knowledge Base or Ontology

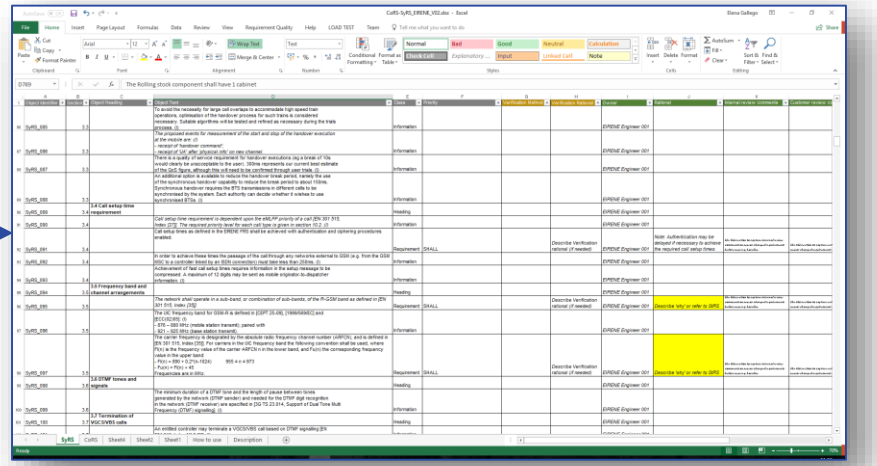
**Verifying** requirements smarter and quicker


**Discovering** information in Requirements Documents
**Controlling** information to unify requirements interpretation
**Identifying** strengths and challenges in requirements documents
**Building** up the Knowledge Base or Ontology
**Verifying** requirements smarter and quicker

# **Discovering** information in Requirements Documents


**Automatic** requirements **elicitation** from documents

Automatic Extraction based on **patterns**

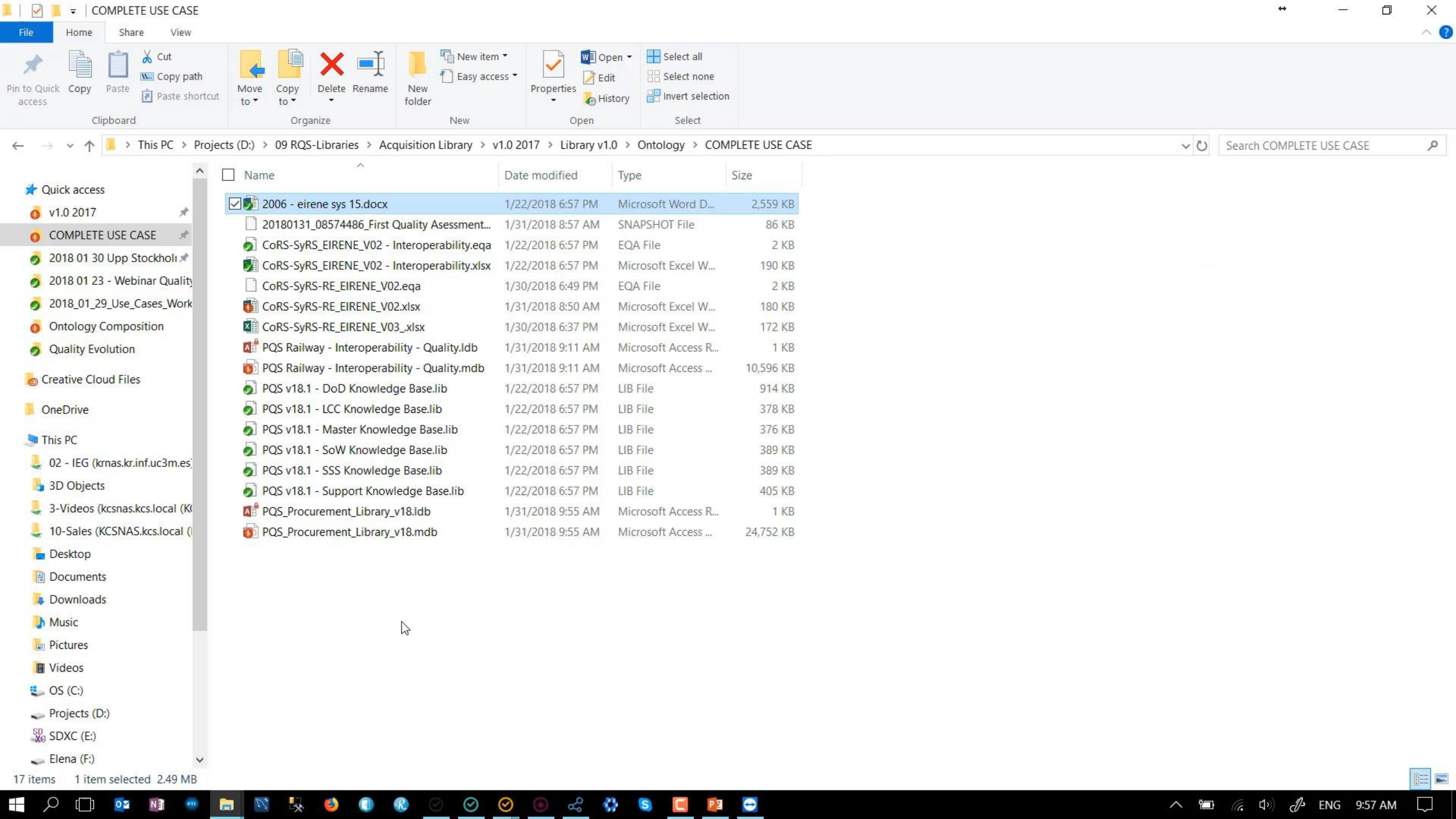


Source Requirements Documents (Word, PDF)

Simple Index Process

Knowledge - Based Index Process

Requirements Documents (Excel, DOORS, Word, …)


COMPLETE USE CASE
File
Home
Share
View
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New folder
New item
Easy access
New
Properties
Open
Edit
History
Open
Select all
Select none
Invert selection
Select
This PC
Projects (D:)
09 RQS-Libraries
Acquisition Library
v1.0 2017
Library v1.0
Ontology
COMPLETE USE CASE
Search COMPLETE USE CASE
Quick access
v1.0 2017
COMPLETE USE CASE
2018 01 30 Upp Stockholi
2018 01 23 - Webinar Quality
2018_01_29_Use_Cases_Work
Ontology Composition
Quality Evolution
Creative Cloud Files
OneDrive
This PC
02 - IEG (krnas.kr.inf.uc3m.es)
3D Objects
3-Videos (kcsnas.kcs.local (K
10-Sales (KCSNAS.kcs.local (
Desktop
Documents
Downloads
Music
Pictures
Videos
OS (C:)
Projects (D:)
SDXC (E:)
Elena (F:)
Name
Date modified
Type
Size
2006 - eirene sys 15.docx 1/22/2018 6:57 PM Microsoft Word D... 2,559 KB
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CoRS-SyRS_EIRENE_V02 - Interoperability.xlsx 1/22/2018 6:57 PM Microsoft Excel W... 190 KB
CoRS-SyRS-RE_EIRENE_V02.eqa 1/30/2018 6:49 PM EQA File 2 KB
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CoRS-SyRS-RE_EIRENE_V03_.xlsx 1/30/2018 6:37 PM Microsoft Excel W... 172 KB
PQS Railway - Interoperability - Quality.ldb 1/31/2018 9:11 AM Microsoft Access R... 1 KB
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PQS v18.1 - DoD Knowledge Base.lib 1/22/2018 6:57 PM LIB File 914 KB
PQS v18.1 - LCC Knowledge Base.lib 1/22/2018 6:57 PM LIB File 378 KB
PQS v18.1 - Master Knowledge Base.lib 1/22/2018 6:57 PM LIB File 376 KB
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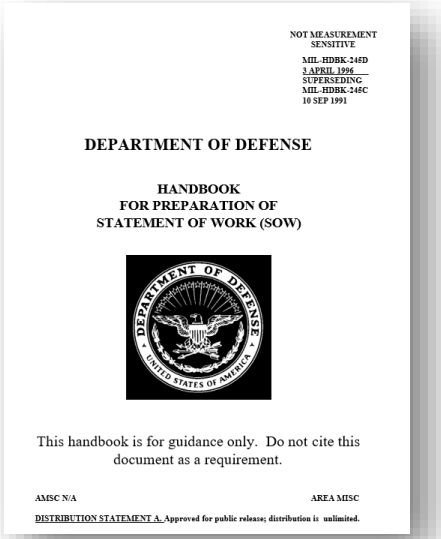
PQS v18.1 - SSS Knowledge Base.lib 1/22/2018 6:57 PM LIB File 389 KB
PQS v18.1 - Support Knowledge Base.lib 1/22/2018 6:57 PM LIB File 405 KB
PQS_Procurement_Library_v18.ldb 1/31/2018 9:55 AM Microsoft Access R... 1 KB
PQS_Procurement_Library_v18.mdb 1/31/2018 9:55 AM Microsoft Access ... 24,752 KB
17 items
1 item selected 2.49 MB
ENG
9:57 AM


**Discovering** information in Requirements Documents
**Controlling** information to unify requirements interpretation
**Identifying** strengths and challenges in requirements documents
**Building** up the Knowledge Base or Ontology
**Verifying** requirements smarter and quicker

# **Controlling** information to unify requirements interpretation


NOT MEASUREMENT SENSITIVE

MIL-HDBK-245D
3 APRIL 1996
SUPERSEDING
MIL-HDBK-245C
10 SEP 1991

DEPARTMENT OF DEFENSE

HANDBOOK
FOR PREPARATION OF
STATEMENT OF WORK (SOW)

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AMSC N/A AREA MISC

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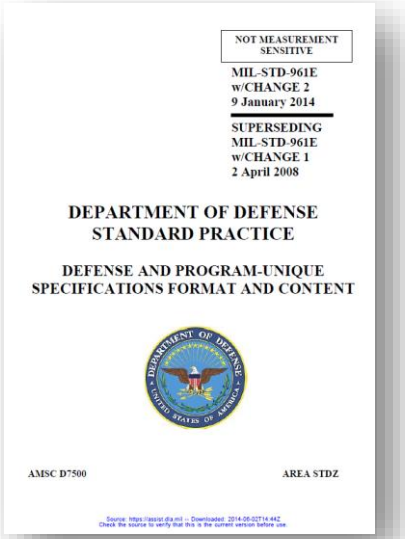
Statement of Work
SoW


NOT MEASUREMENT SENSITIVE

MIL-STD-961E
w/CHANGE 2
9 January 2014

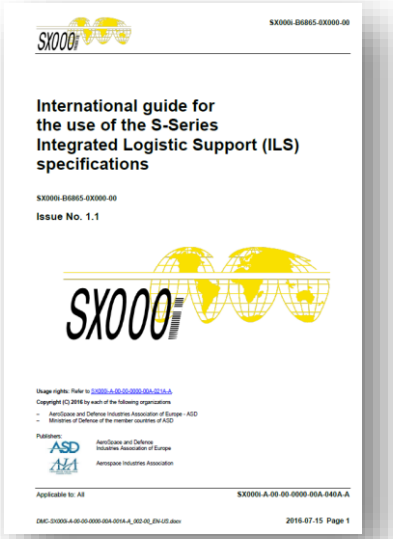
SUPERSEDING
MIL-STD-961E
w/CHANGE 1
2 April 2008

DEPARTMENT OF DEFENSE
STANDARD PRACTICE

DEFENSE AND PROGRAM-UNIQUE
SPECIFICATIONS FORMAT AND CONTENT

AMSC D7500 AREA STDZ

Defence Technical
Specification

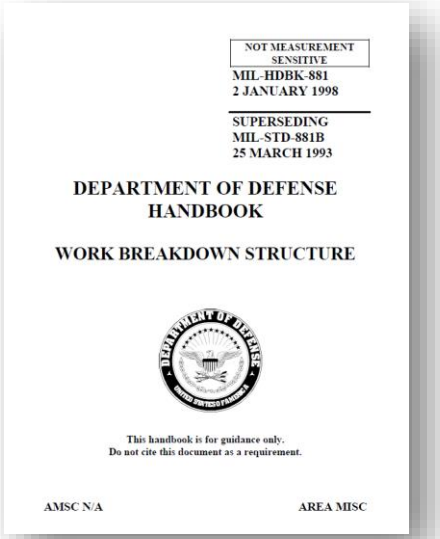

SX000i

International guide for
the use of the S-Series
Integrated Logistic Support (ILS)
specifications

Issue No. 1.1

SX000i

Support
CLS / ILS


NOT MEASUREMENT SENSITIVE

MIL-HDBK-881
2 JANUARY 1998

SUPERSEDING
MIL-STD-881B
25 MARCH 1993

DEPARTMENT OF DEFENSE
HANDBOOK

WORK BREAKDOWN STRUCTURE

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Work Breakdown
SoW


FINAL DRAFT

INTERNATIONAL STANDARD

ISO/IEC/
IEEE
FDIS
29148

Systems and software engineering —
Life cycle processes — Requirements
engineering

Technical Specification
SSS

An application to check **compliance** with standards

KNOWLEDGE Manager

File | Terminology | Conceptual Model | Patterns | Formalization | Inference | Configuration management | Extensibility | Assets store | Settings

Terms | Term suggestions | Import terms | Special sentences | Integrity | Generate terms and frequencies | Tags | Languages | Tokenization rules | Test | Rules | Affixes | Substitutes | Test | Spell checker | Rules | Bigrams rules | Tags probabilities | Test

Terminology Management | Terminology Discovery | Term Tags | Languages | Tokenization | Normalization | Disambiguation

Search fields:

Term:

Term tag:

Cluster:

Relationship type:

Identifier:
- Equals to:
- Greater than:
- Lower than:

Relationship filters:
- Belongs to domain
- Belongs to SCM
- Revised
- Synonym

Flags:
- Flag 1
- Flag 2

Advanced filters:

Search in a new window | Search

Terms:

| Identifier | Term | Term Tag | Cluster | Relationship type | Belongs to domain | Belongs to SCM | Includes content | Scope Note |
|---|---|---|---|---|---|---|---|---|
| 48,865 | A-1 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | director of manpower, personnel, and services (Air Force) |
| 48,866 | A2 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | antiaccess |
| 48,868 | A-2 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | intelligence staff officer (Air Force) |
| 48,867 | A2C2 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | Army airspace command and control |
| 48,869 | A-3 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | operations directorate (COMAFFOR staff); operations staff officer (Air Force) |
| 48,870 | A-4 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | director of logistics (Air Force) |
| 48,564 | A4A | ACRONYMS | --- Locked --- | --- Locked --- | ☑ | ☑ | ☐ | Airlines for America [Source: SX000i-B6865-0X000-00] |
| 48,871 | A-5 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | plans directorate (COMAFFOR staff) |
| 48,872 | A-6 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | communications staff officer (Air Force) |
| 48,873 | A-7 | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | director of installations and mission support (Air Force) |
| 48,874 | AA | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | assessment agent; avenue of approach |
| 48,875 | AA&E | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | arms, ammunition, and explosives |
| 48,876 | AAA | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | antiaircraft artillery; arrival and assembly area; assign alternate area |
| 48,877 | AABB | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | American Association of Blood Banks |
| 48,878 | AABWS | ACRONYMS | < No «Cluster» > | < No «Relationship type» > | ☑ | ☐ | ☐ | amphibious assault bulk water system |

16096 term(s)

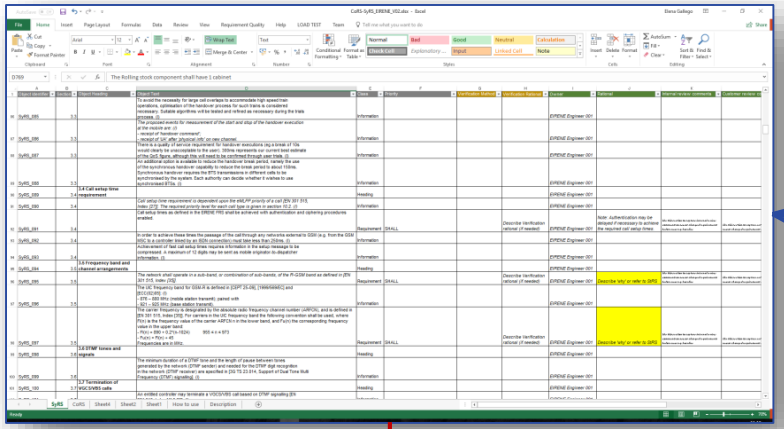
Ready

Connected to 'D:\09 RQS-Libraries\Acquisition Library\v1.0 2017\Library v1.0\Ontology\COMPLETE USE CASE\PQS_Procurement_Library_v18.mdb'

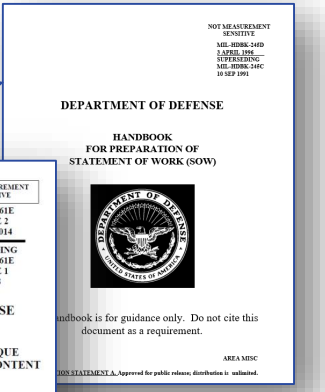
ENG 2:55 PM

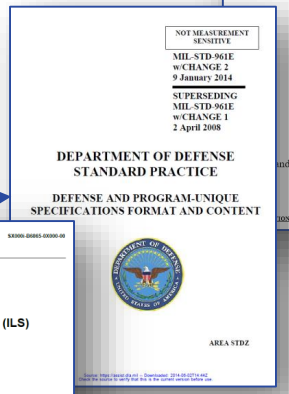

**Discovering** information in Requirements Documents
**Controlling** information to unify requirements interpretation
**Identifying** strengths and challenges in requirements documents
**Building** up the Knowledge Base or Ontology
**Verifying** requirements smarter and quicker

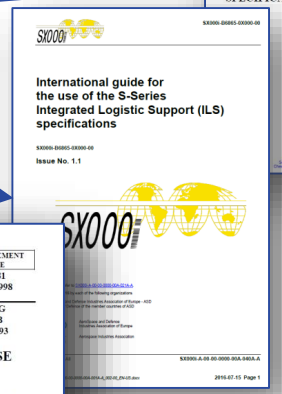
# **Identifying** strengths and challenges in requirements documents

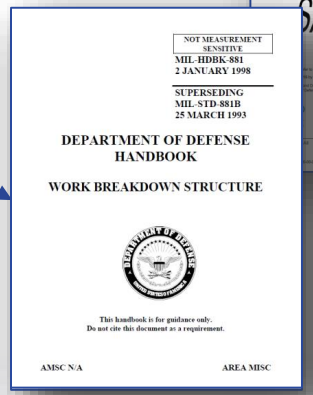


Completeness
Consistency

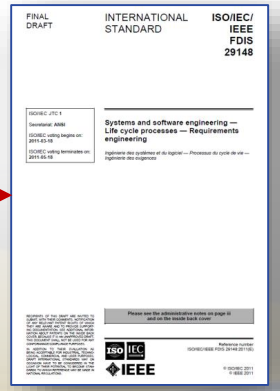


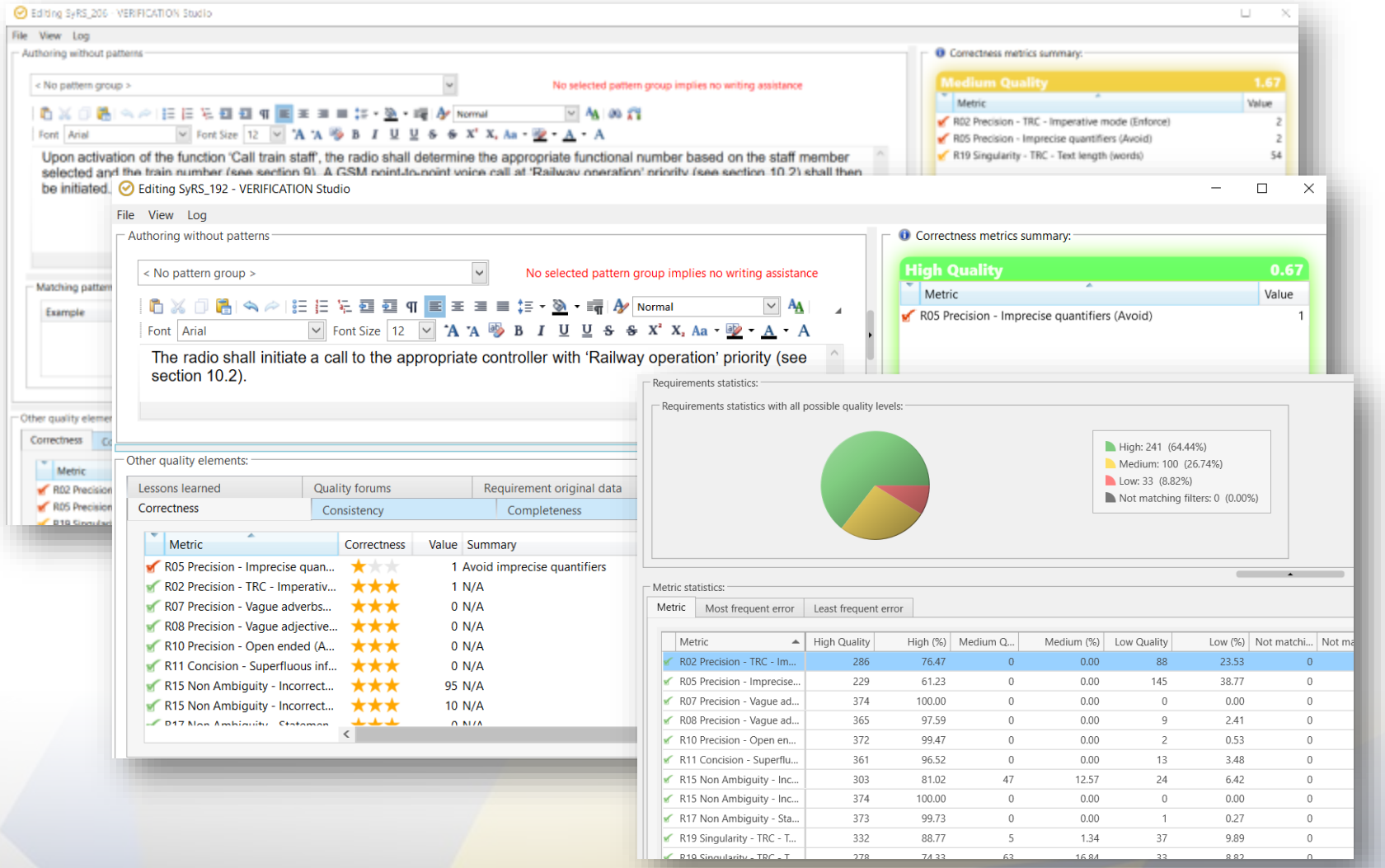




Correctness
Completeness
Consistency




**Automatic** identification of challenges in requirements

# Correctness Quality Check



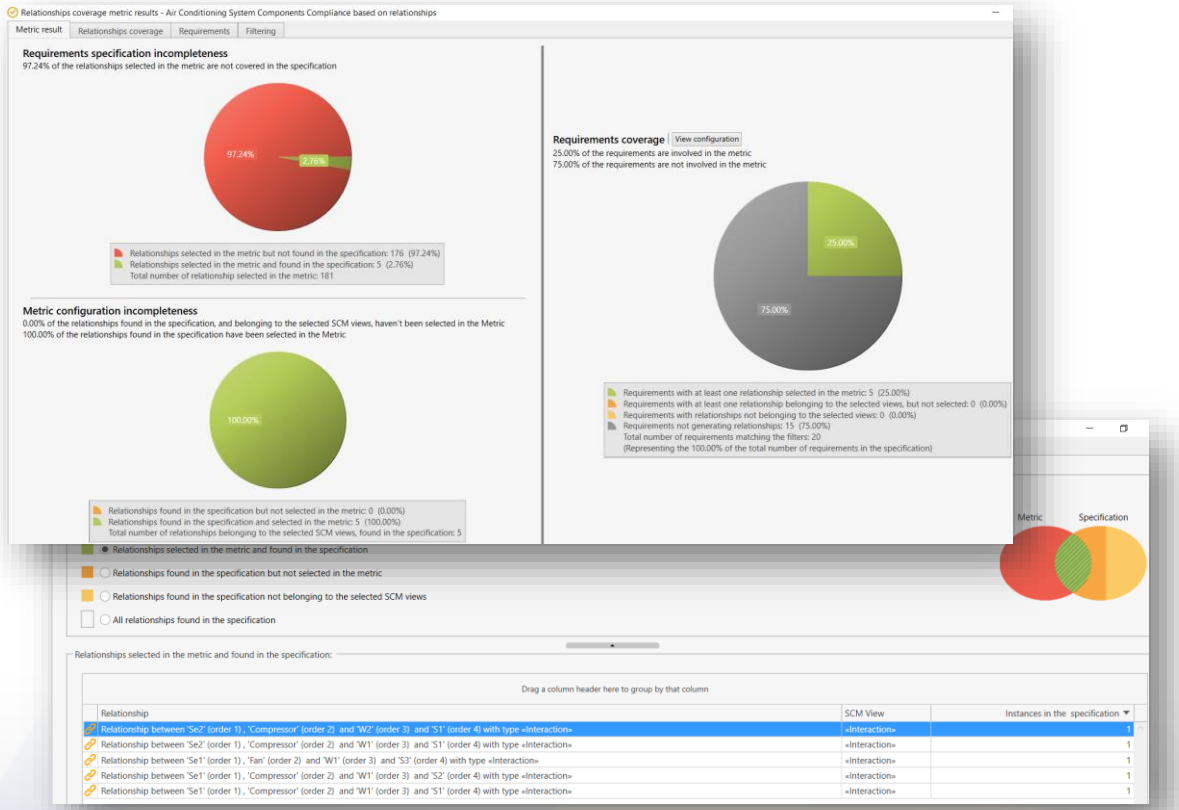

Quality Analysis applied to single requirements

The Correctness Quality Set:

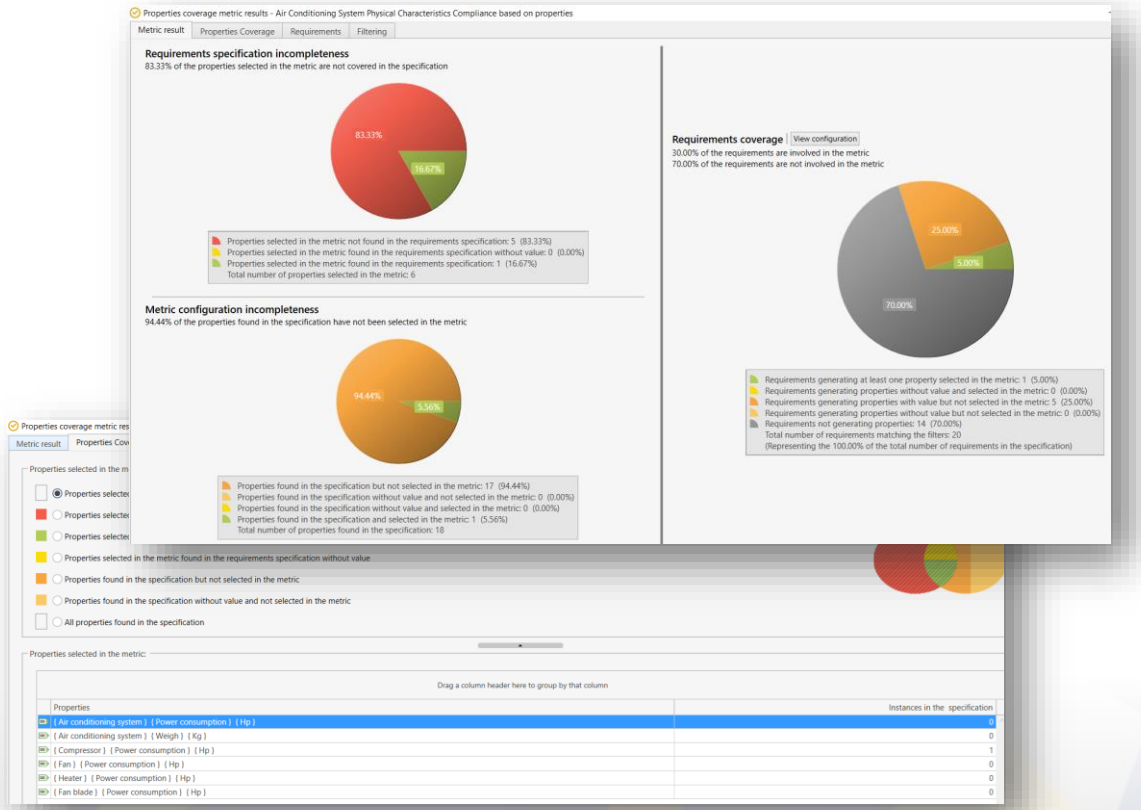
- Characteristics coverage
- Ontology dependency
- Effort needed to fix identified error

# Completeness Quality Check

## **Specification** viewpoint

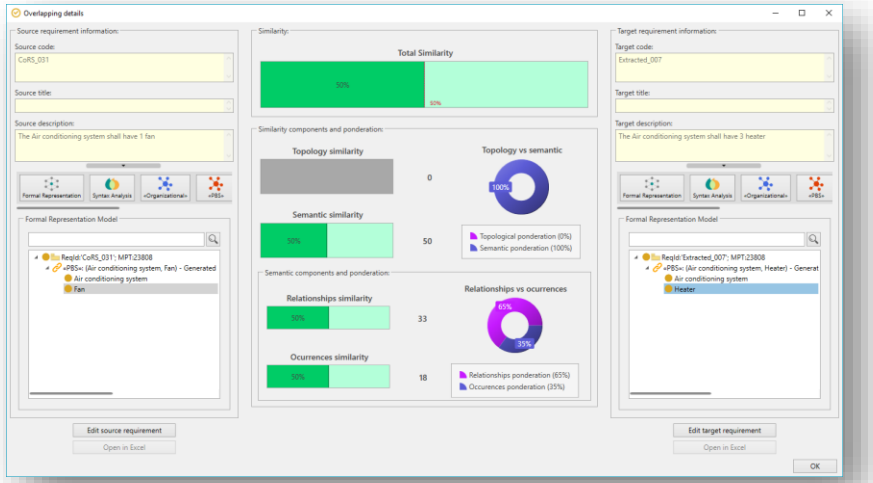



## **Ontology** viewpoint

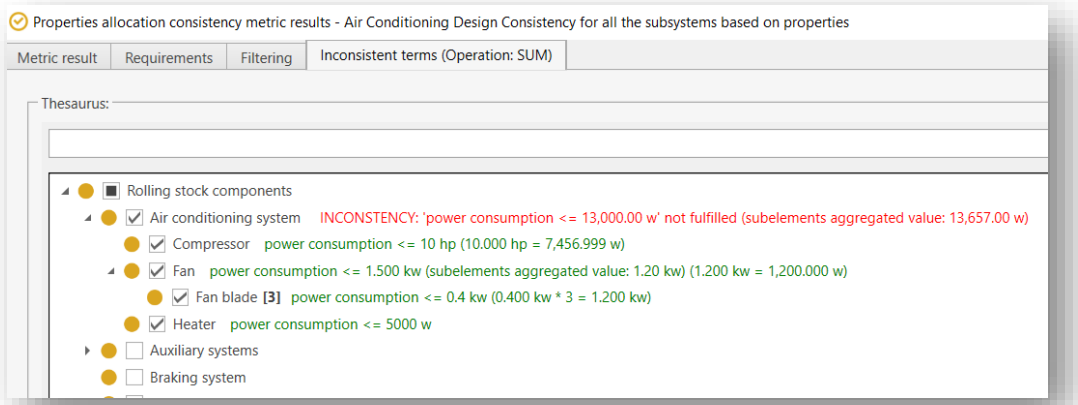


# Consistency Quality Check

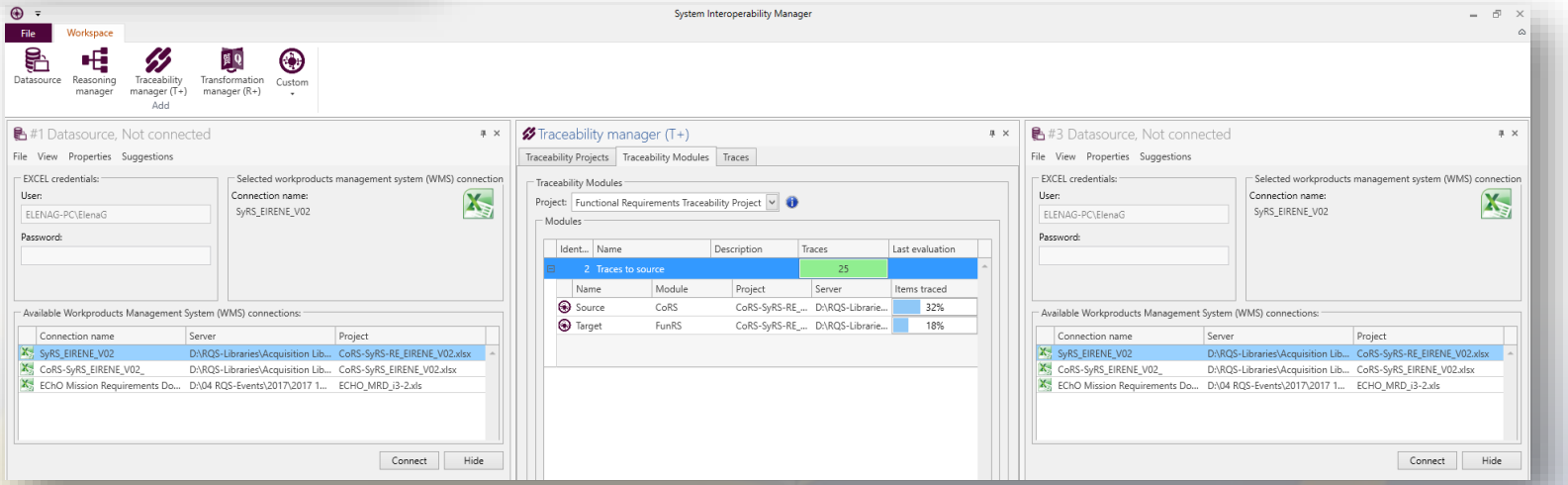
## **Specification** Inconsistency




## **Ontology** Inconsistency




## **Traces** Inconsistency



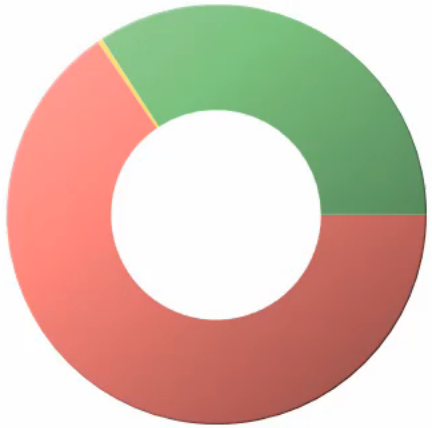
VERIFICATION Studio

File | Quality Control | Workbook configuration | Quality Assurance

Worksheet selector | CoRS (+2) | Scoreboard | Snapshot | Quality evolution | Requirements | Simple view | Quality view | Full view | Metrics | Users | Charts | Metrics | Metrics | Suggestions

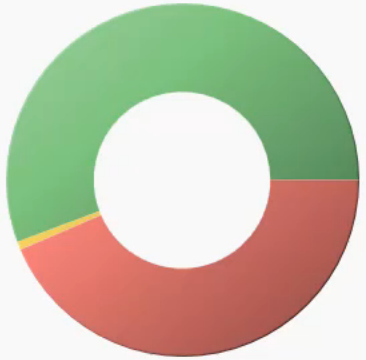
Worksheet selector | Quality scoreboard and evolution | Requirements | Correctness | Consistency | Completeness | Knowledge base

## Overall quality



'High' quality average rate: 34.17%
'Medium' quality average rate: 0.38%
'Low' quality average rate: 65.44%

## Requirements quality



Requirements with 'High' quality: 73 (55.73%)
Requirements with 'Medium' quality: 1 (0.76%)
Requirements with 'Low' quality: 57 (43.51%)

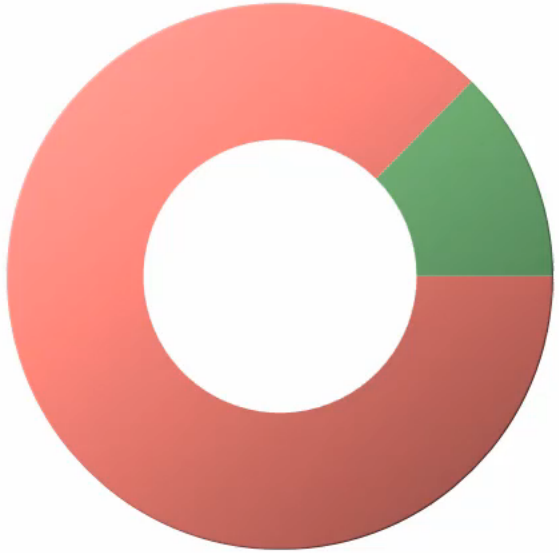
## Correctness

High: 130 (99.24%) | Medium: 1 (0.76%)
Low: 0 (0.00%) | Not matching filters: 0 (0.00%)
N/A: 0 (0.00%)

## Consistency

High: 33 (25.19%)
Low: 57 (43.51%)
No quality: 41 (31.30%)

## Completeness



Completeness elements - expected and found: 89 (12.6
Completeness elements - expected but NOT found: 616

Change layout | Scoreboard report

RMS Repository: Ontology; Project: CoRS-SyRS_EIRENE_V02.xlsx | RMS User: EGALLEGO-LAPTOP\Elena Gallego | Connected to 'D:\09 RQS-Libraries\Acquisition Library\v1.0 2017\Library v1.0\Ontology\Ontology Composition\PQS_Procurement_Library_v18_Quality_Ontology.mdb'

ENG 2:02 PM


**Discovering** information in Requirements Documents
**Controlling** information to unify requirements interpretation
**Identifying** strengths and challenges in requirements documents
**Building** up the Knowledge Base or Ontology
**Verifying** requirements smarter and quicker

# **Building** up the Knowledge Base or Ontology

## 01 Vocabulary

Controlled Organizational and Project Vocabulary for a common understanding among stakeholders

## 02 Architectures

Recreate and capture the system architectures represented in views and models. Stablish relationships among system and system elements

## 03 Patterns

Represent requirements similarities and enable formal representation, automatic recognition and aid authors

## 04 Formalization

Representation of assets semantic through SRL – System Representation Language

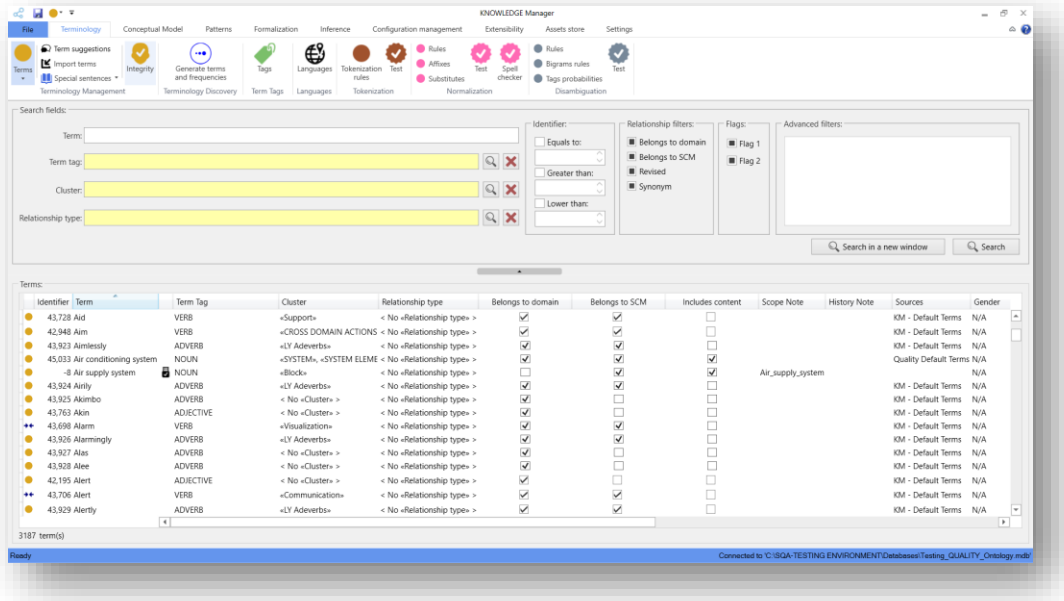
## 05 Reasoning

A combination of rules, tasks and groups to infer information from valuable assets

01

# Vocabulary

Controlled Organizational and Project Vocabulary for a common understanding among stakeholders



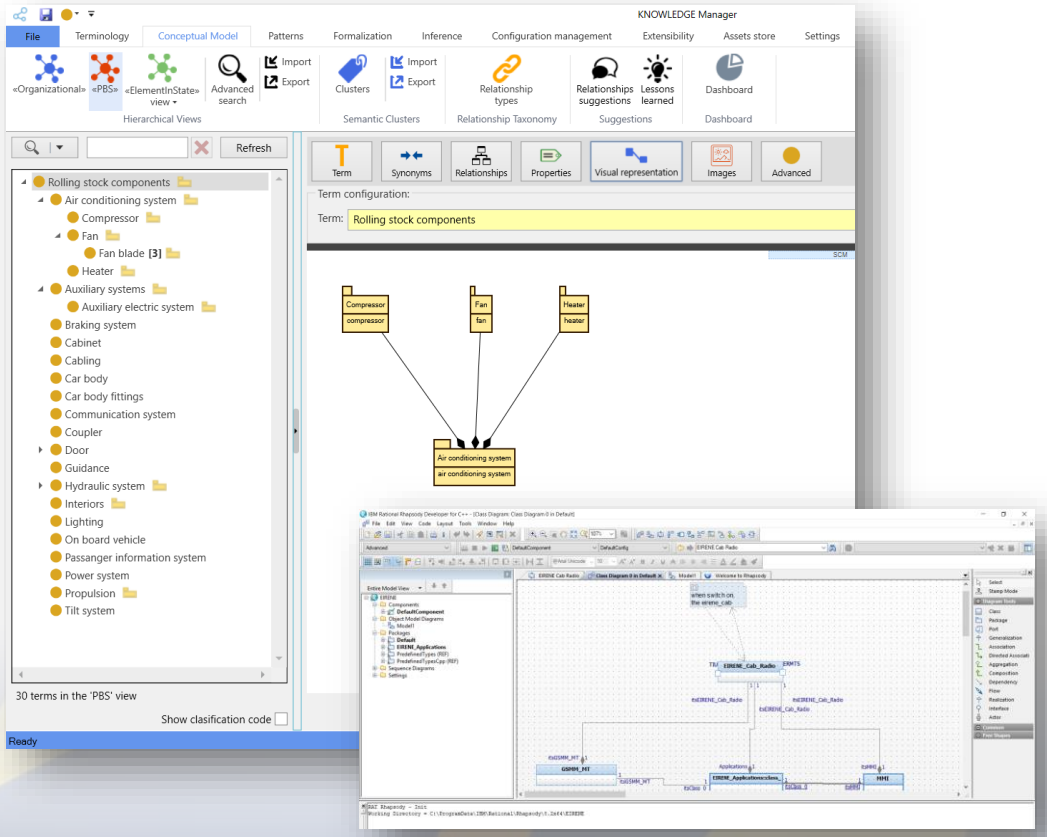

Vocabulary

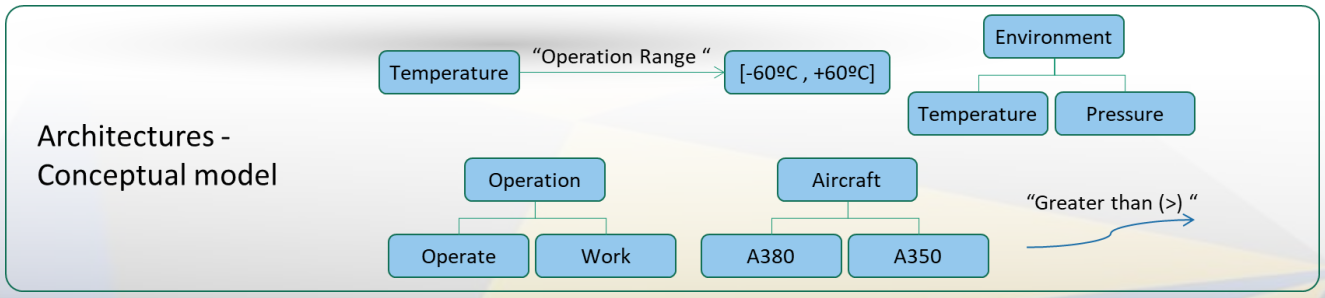
A380 | A350 | System | Operate | Temperature | Environment | Pressure

# 02

# Architectures

Recreate and capture the system architectures represented in views and models. Stablish relationships among system and system elements

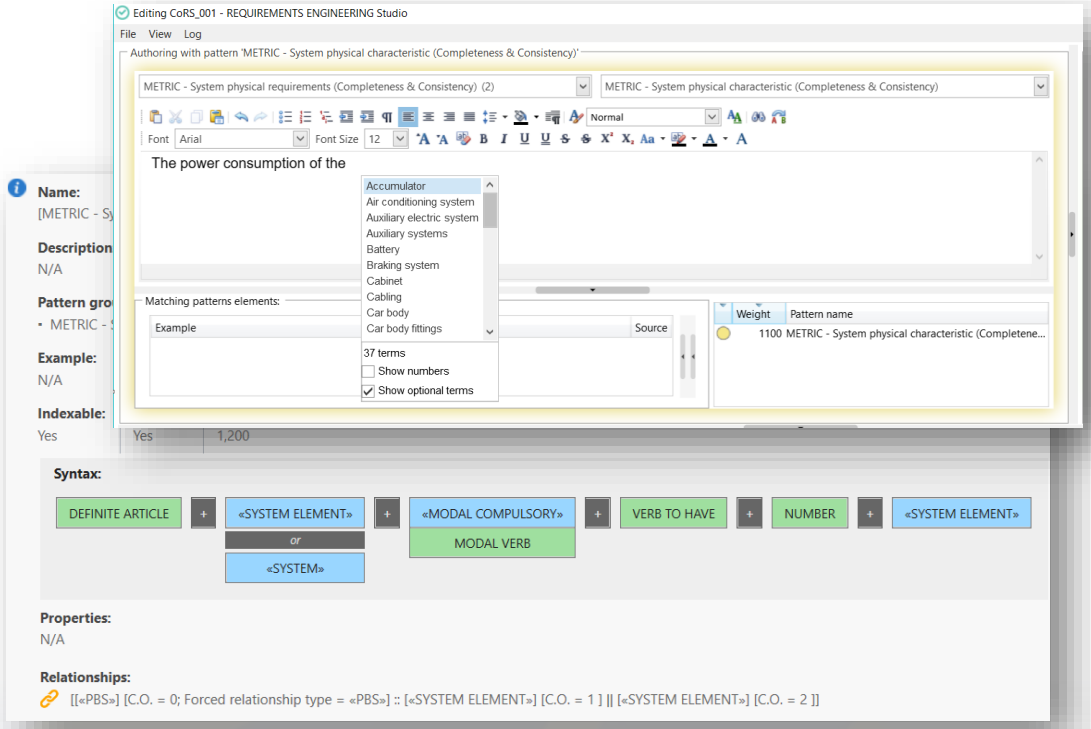


# 03

## Patterns

Represent requirements similarities and enable formal representation, automatic recognition and aid authors

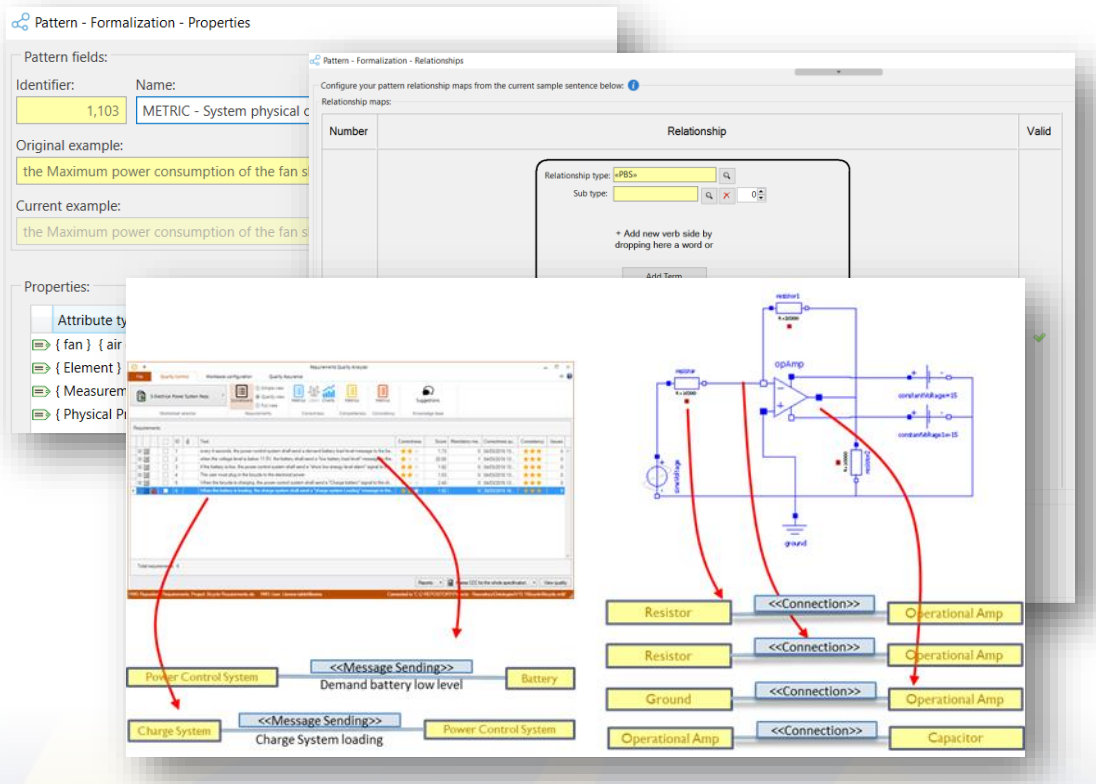



| Patterns | Aircraft (*) | Shall | Operation (*) | At | «Minimum» | Environment (*) | Of | NUMBER | MEASUREMENT UNIT |
|---|---|---|---|---|---|---|---|---|---|

04

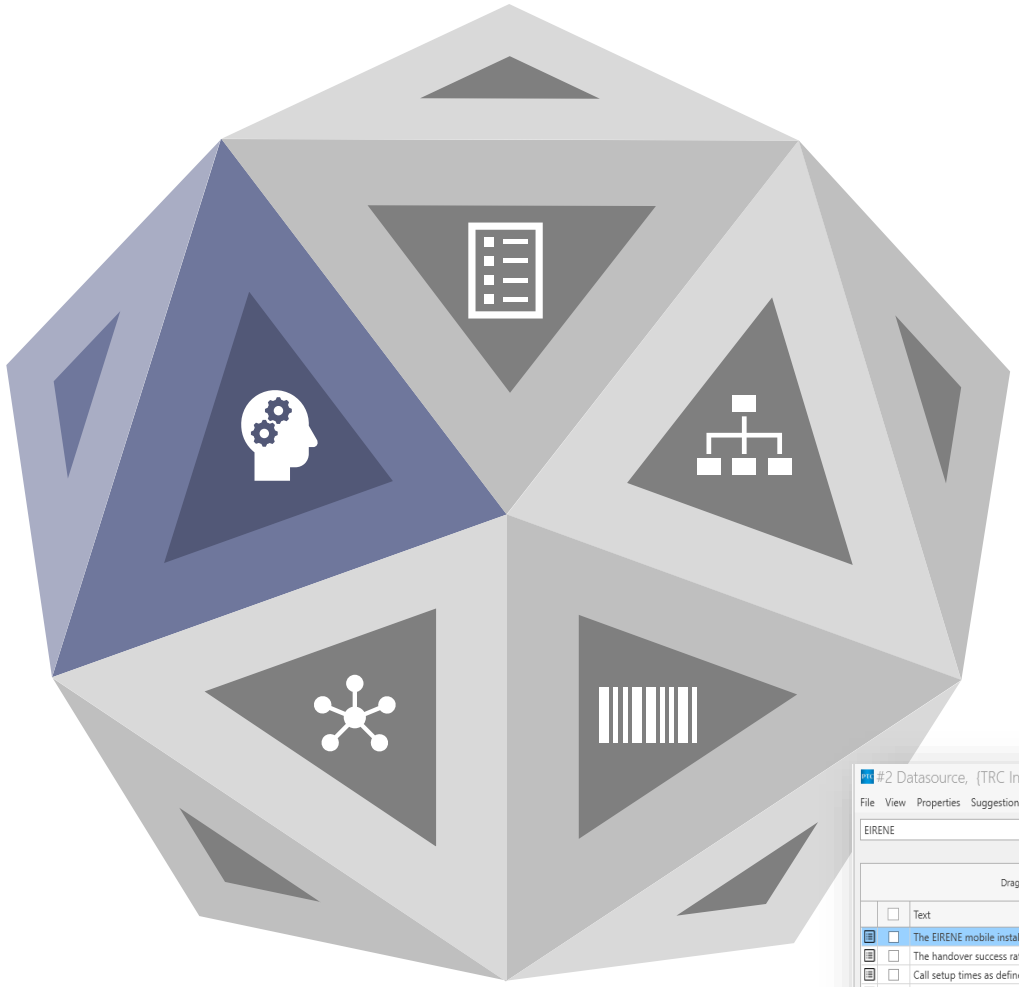
# Formalization

Representation of assets semantic through SRL – System Representation Language




Formalization

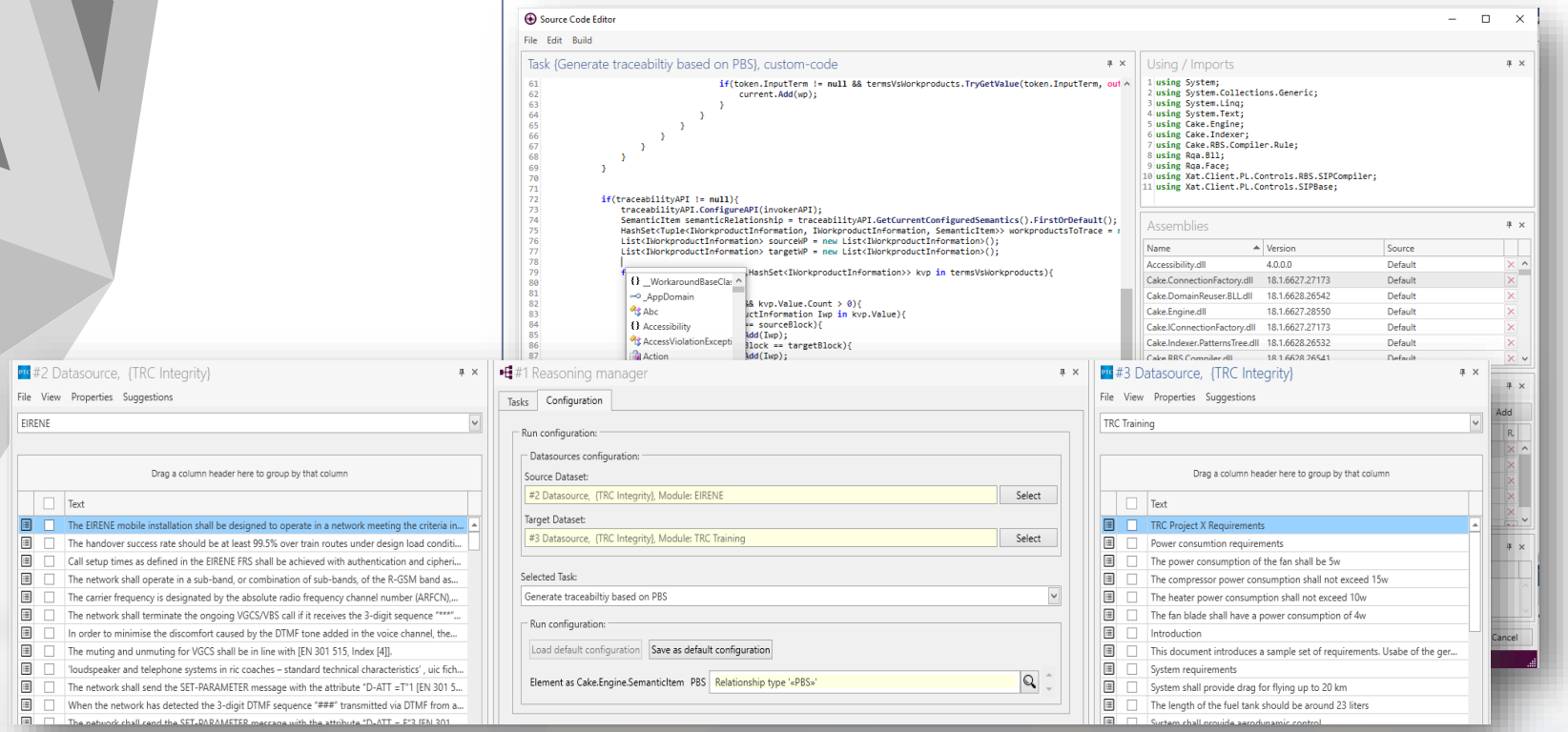
The aircraft shall be able to operate at a minimum temperature of -70º C → Temperature → “Greater than (>)” → -70 → ºC



05

# Reasoning

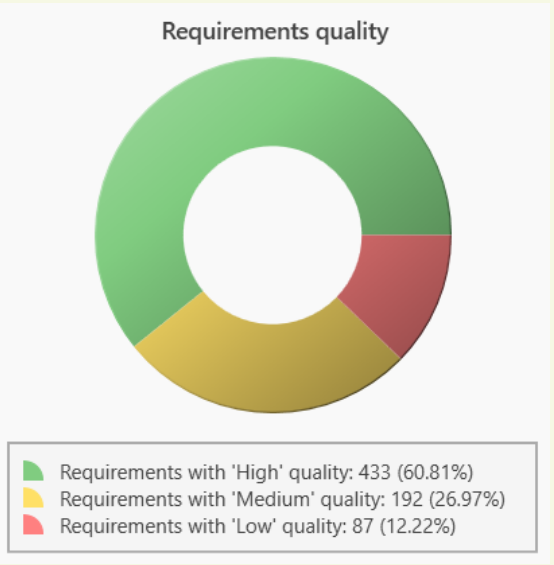
A combination of rules, tasks and groups to infer information from valuable assets



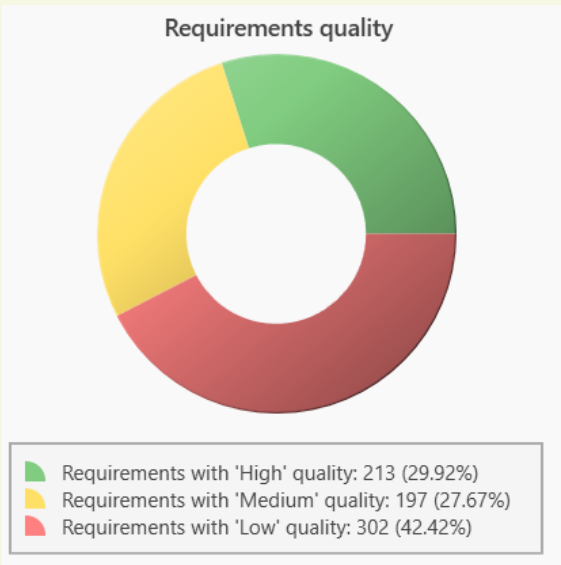

Reasoning If NUMBER“ Lower than (<) -70º ºC Or NUMBER “Greater than (>)“ +65º ºC →


**Discovering** information in Requirements Documents
**Controlling** information to unify requirements interpretation
**Identifying** strengths and challenges in requirements documents
**Building** up the Knowledge Base or Ontology
**Verifying** requirements smarter and quicker

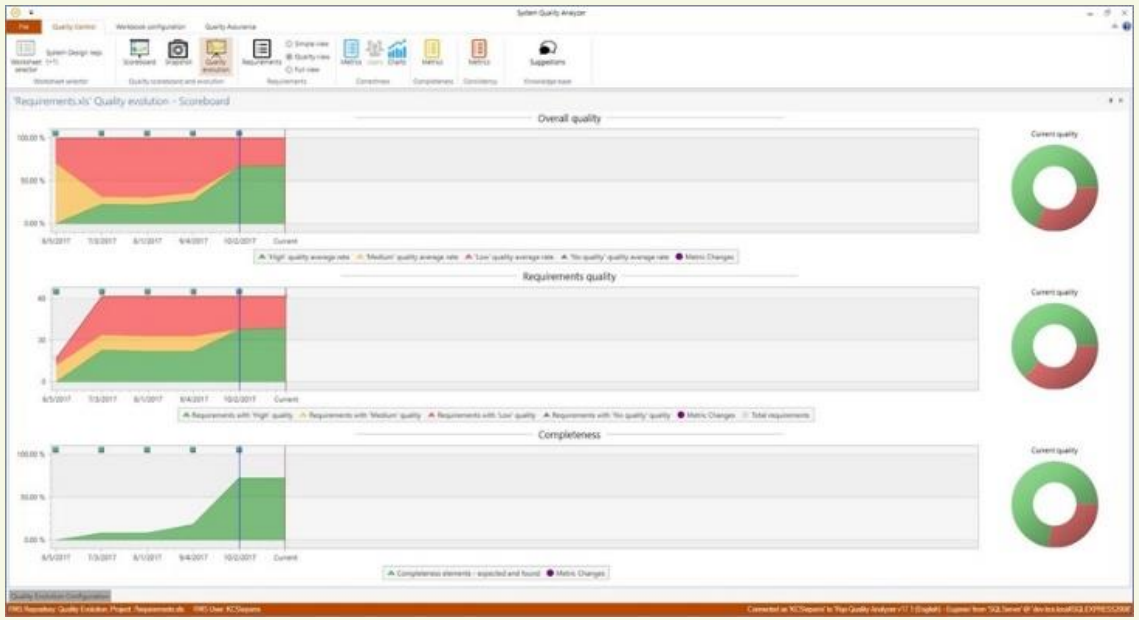
# **Verifying** requirements smarter and quicker




First Assessment




Second Assessment

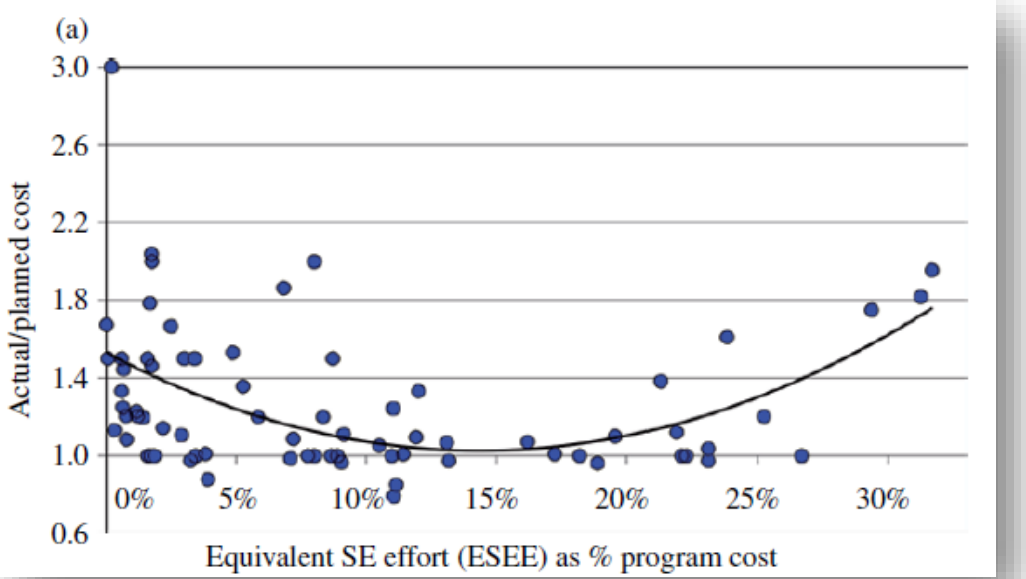



Quality Evolution

Keep the performance under control

# How do we apply KCSE milestones?

# Efforts to apply KCSE milestones




Systems Engineering Handbook. INCOSE-TP-2003-002-2015

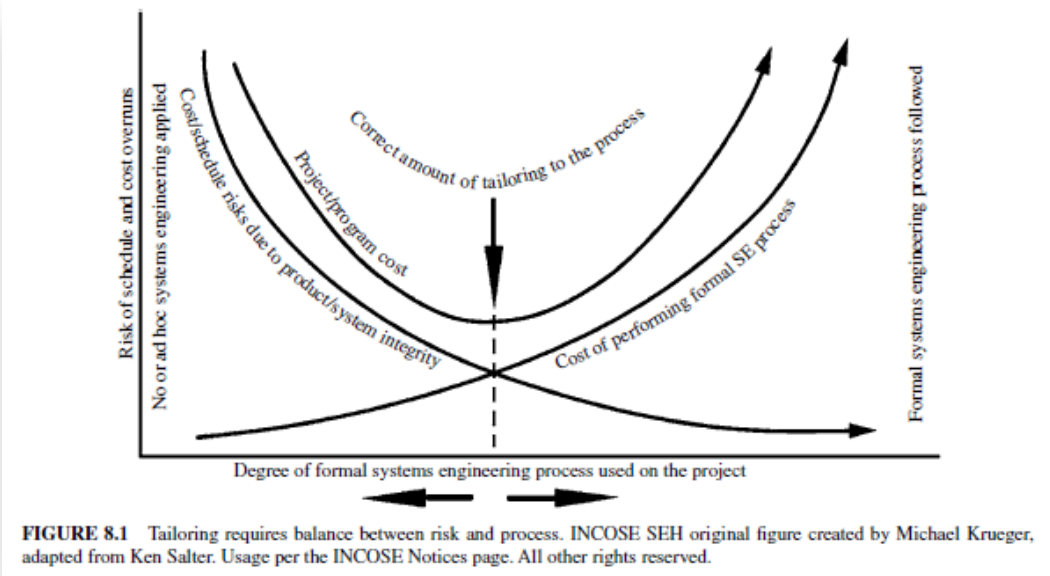



**FIGURE 8.1** Tailoring requires balance between risk and process. INCOSE SEH original figure created by Michael Krueger, adapted from Ken Salter. Usage per the INCOSE Notices page. All other rights reserved.

Systems Engineering Handbook. INCOSE-TP-2003-002-2015

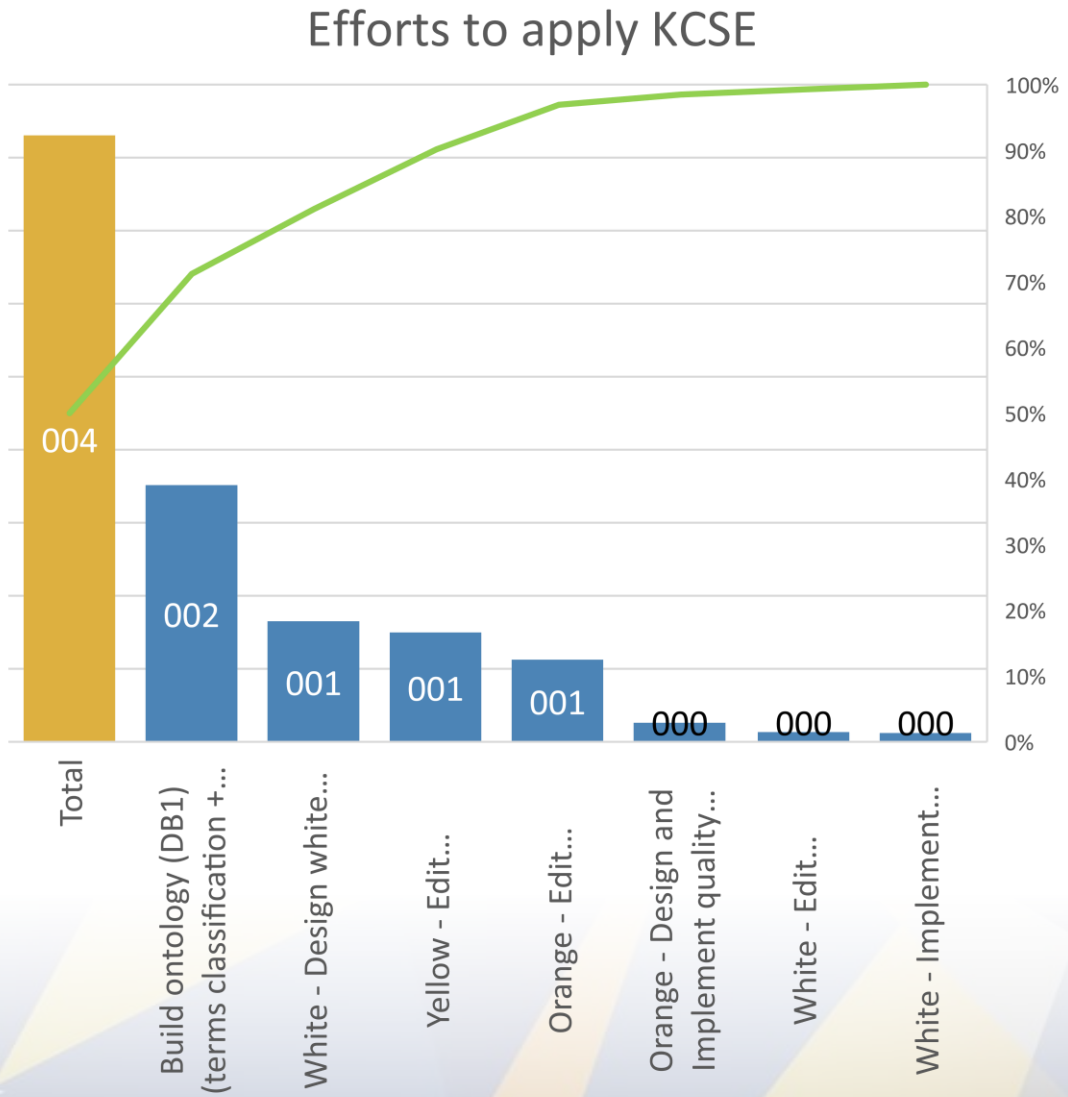
**Make it simple**

KCSE application purpose →

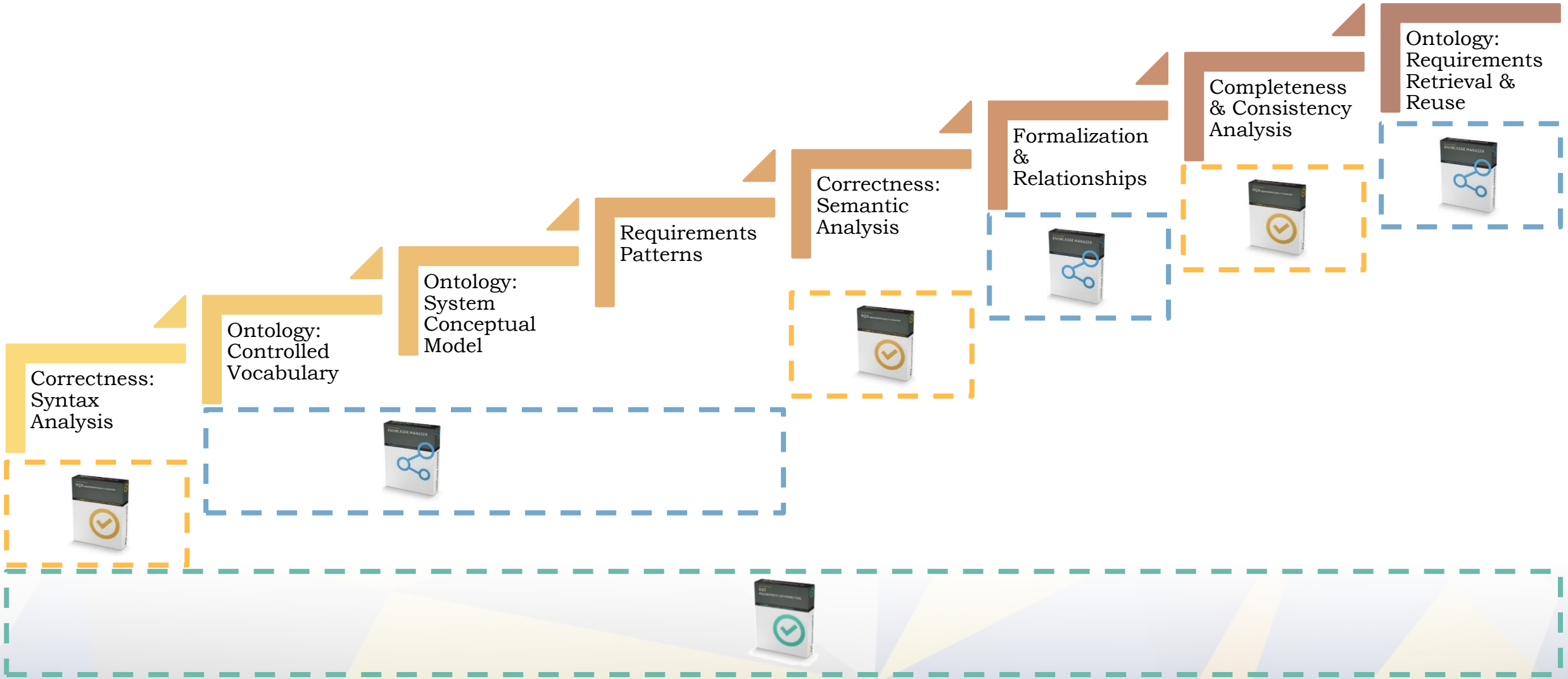
- Process Automation
- User's Support
- Both

# Efforts to apply KCSE: Best Practices

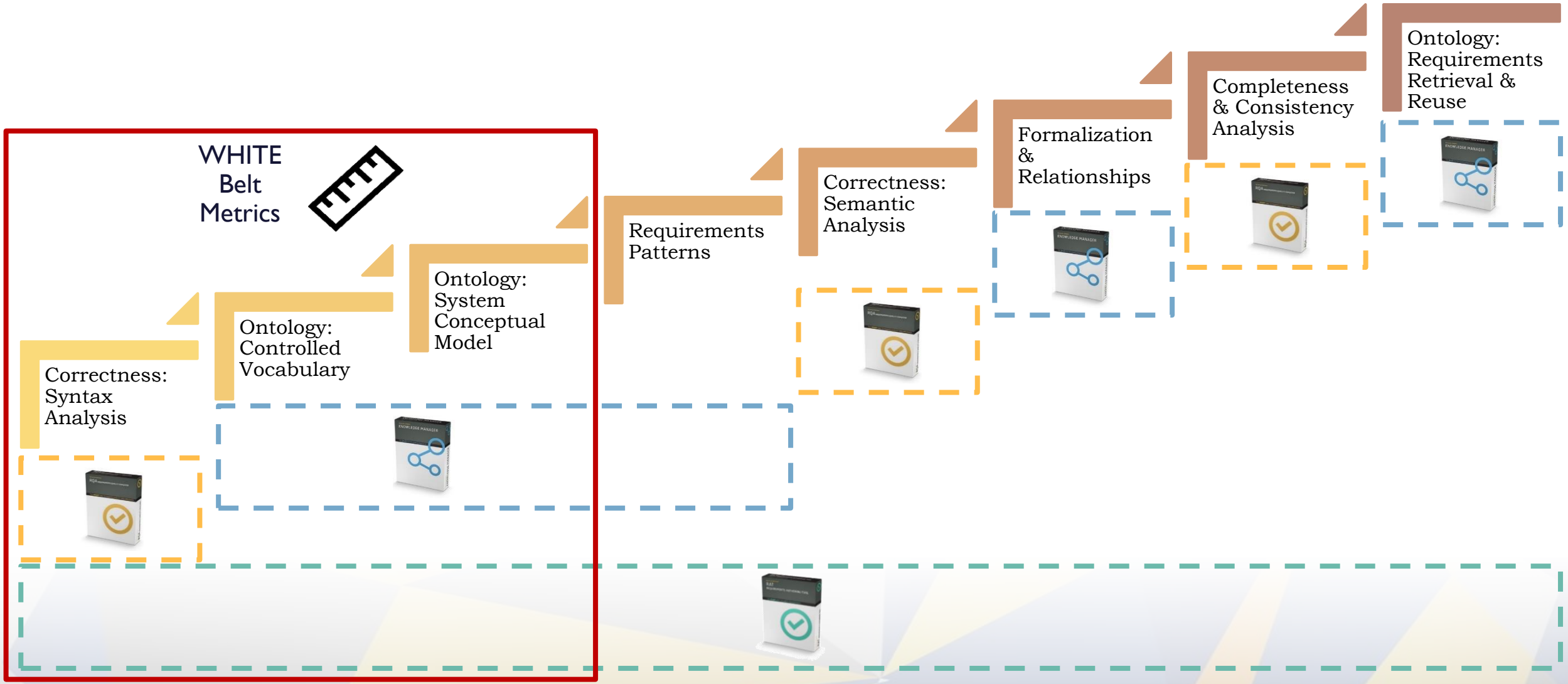
| Task | Hours | Person Month |
|---|---|---|
| Build **Ontology** (DB1) (terms classification + PBS + patterns) | 281.20 | 1.76 |
| White - Edit **Requirements** (approx. 350 req.) | 10.60 | 0.07 |
| White - Design **Quality** configuration | 132.00 | 0.83 |
| White – Implement **Quality** configuration (metrics elaboration + quality assessment) | 9.64 | 0.06 |
| Yellow - Edit **Requirements** | 120.00 | 0.75 |
| Orange – Design and Implement **quality** configuration | 20.98 | 0.13 |
| Orange - Edit **Requirements** | 90.00 | 0.56 |
| **Total** | **664.43** | **4.15** |



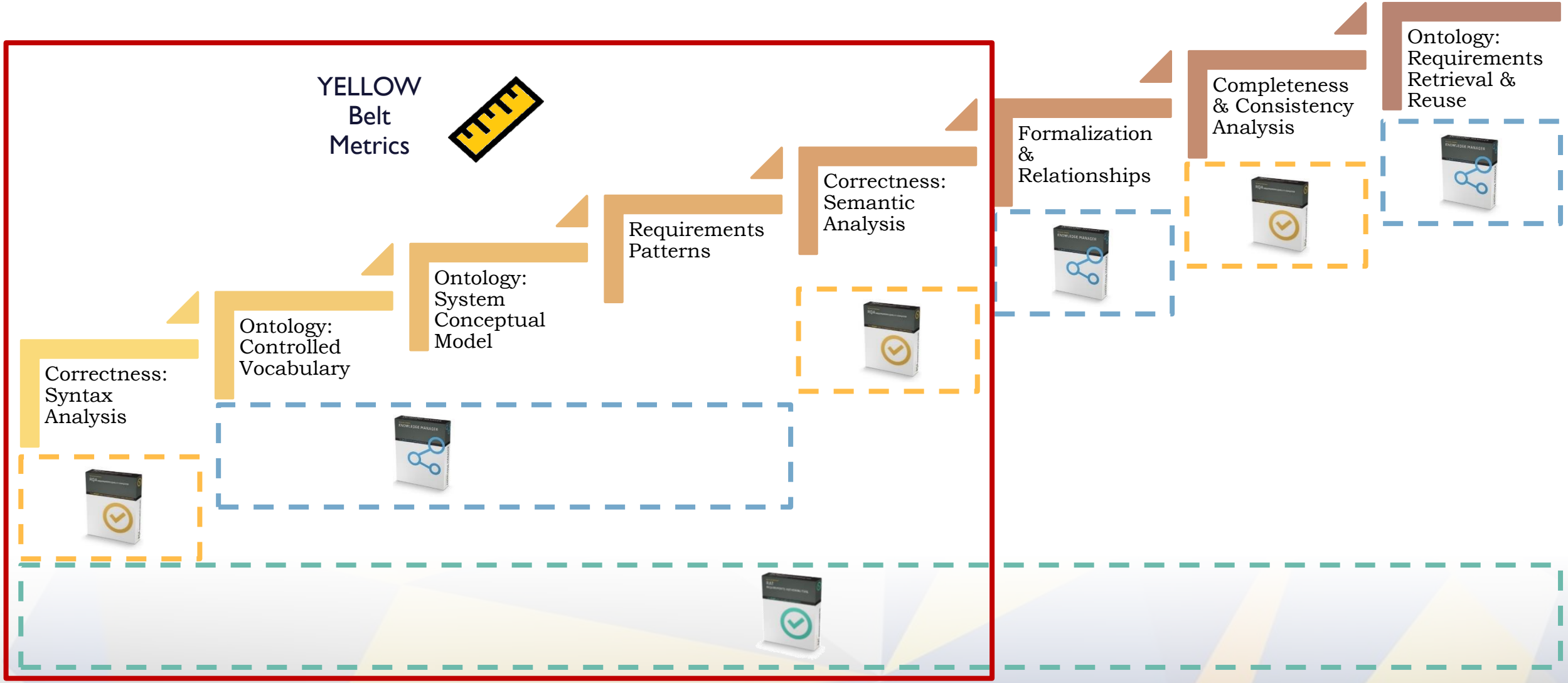
# Efforts to apply KCSE: Best Practices



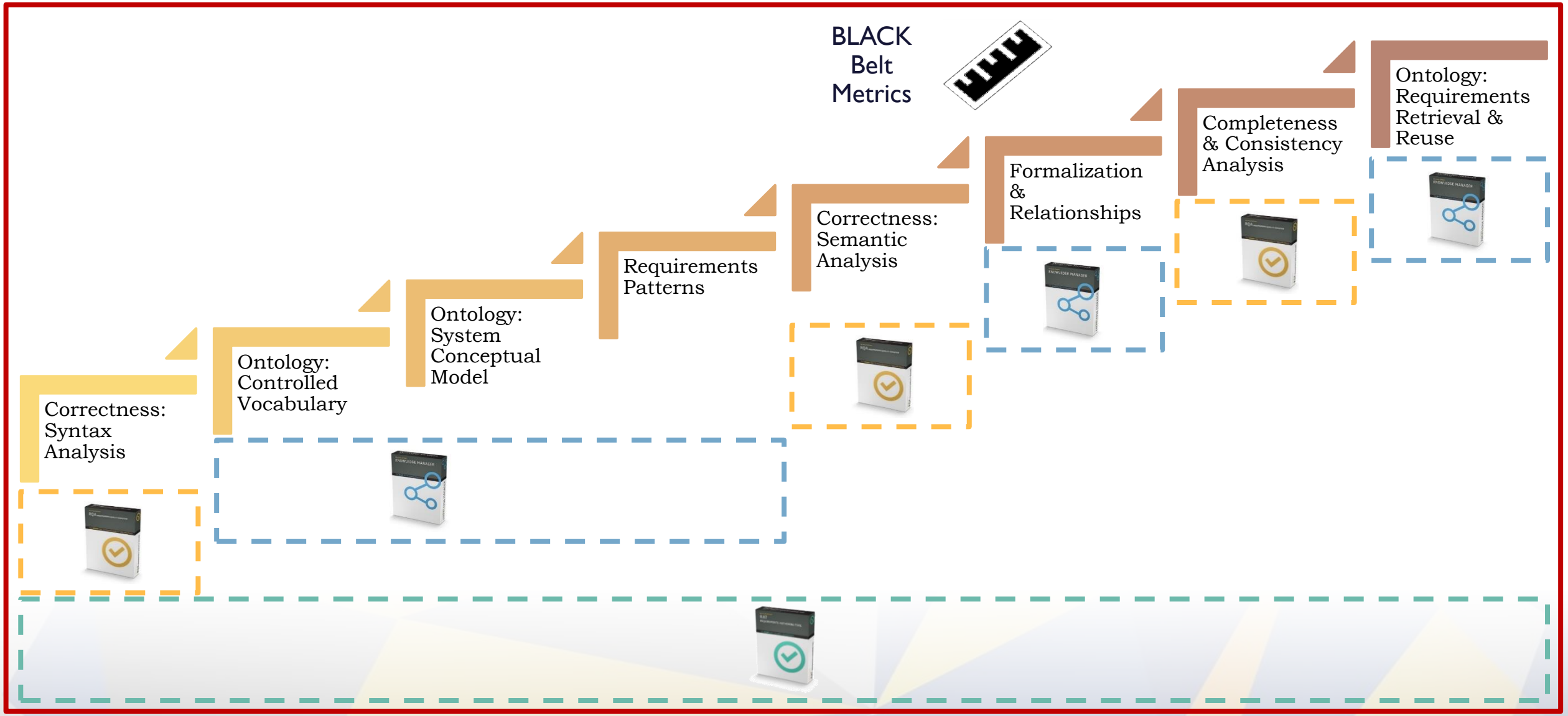
# Efforts to apply KCSE: Best Practices



# Efforts to apply KCSE: Best Practices



# Efforts to apply KCSE: Best Practices



# How does KCSE milestones enhance SE activities?

## 40% Cost Saving

(Average Value)

# Constructive Systems Engineering Model - COSYSMO

- COSYSMO computes **effort (and cost)** as a function of system **functional size** and adjusts it based on a number of environmental factors related to **systems engineering.**

Raytheon
GENERAL DYNAMICS
NORTHROP GRUMMAN
LOCKHEED MARTIN
BAE SYSTEMS
SAIC


http://csse.usc.edu/tools/COSYSMO.php

# Constructive Systems Engineering Model - COSYSMO

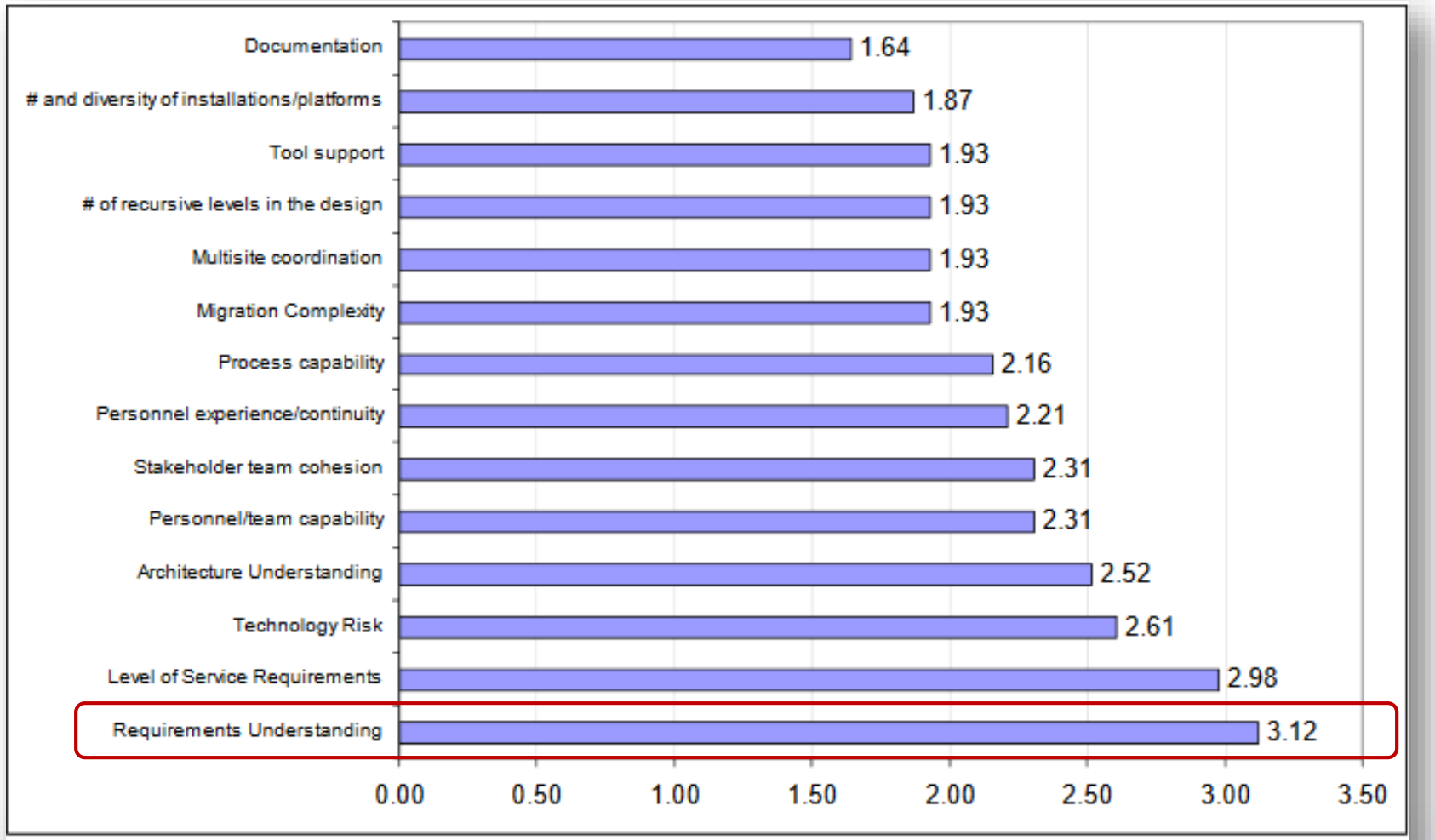
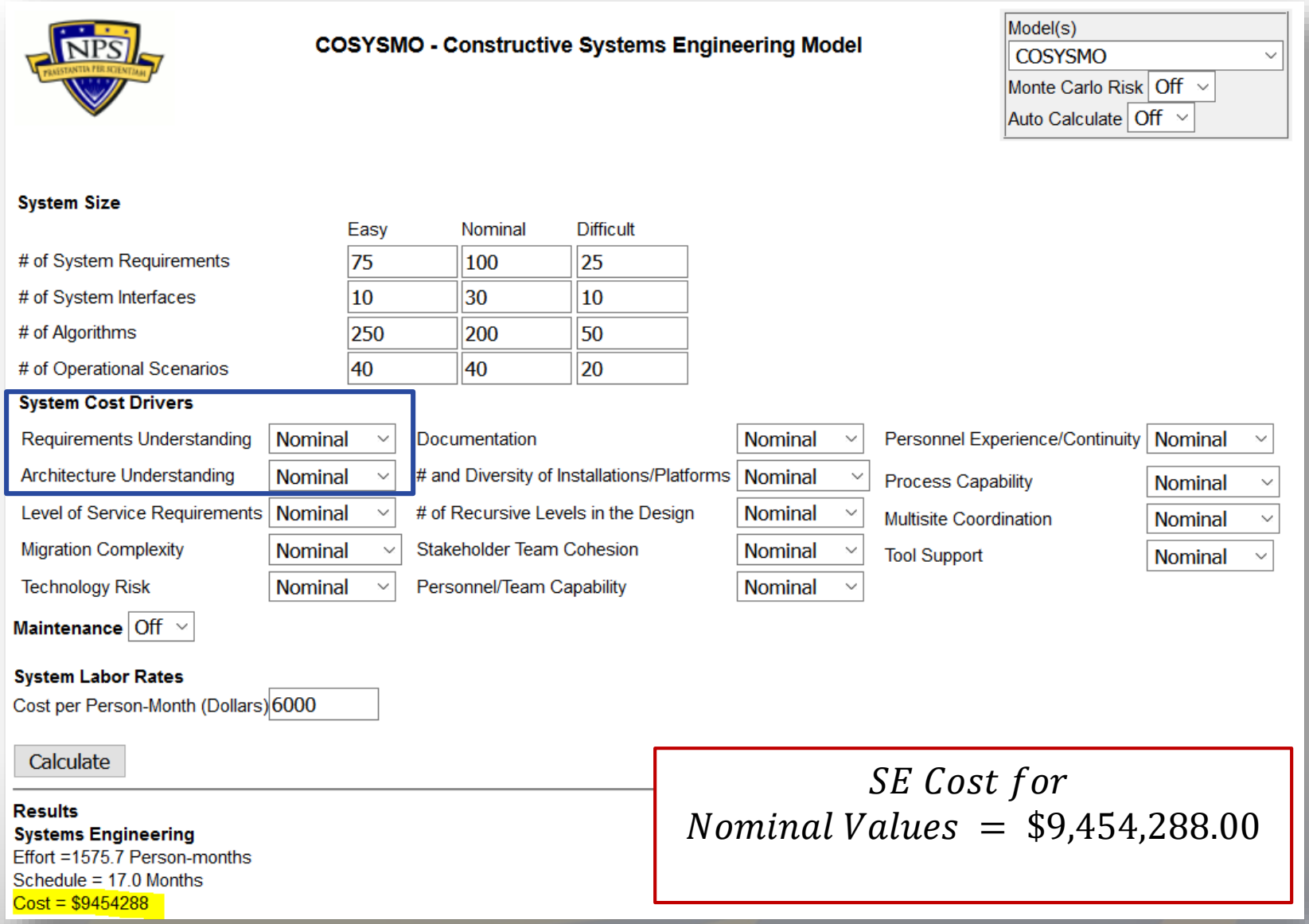



Figure 14 Cost Driver EMRs in Order of Influence from Delphi Round 3

http://csse.usc.edu/tools/COSYSMO.php

# Example of application – Nominal Values



**COSYSMO - Constructive Systems Engineering Model**

Model(s): COSYSMO
Monte Carlo Risk: Off
Auto Calculate: Off

**System Size**

| | Easy | Nominal | Difficult |
|---|---|---|---|
| # of System Requirements | 75 | 100 | 25 |
| # of System Interfaces | 10 | 30 | 10 |
| # of Algorithms | 250 | 200 | 50 |
| # of Operational Scenarios | 40 | 40 | 20 |

**System Cost Drivers**

| | | | | | |
|---|---|---|---|---|---|
| Requirements Understanding | Nominal | Documentation | Nominal | Personnel Experience/Continuity | Nominal |
| Architecture Understanding | Nominal | # and Diversity of Installations/Platforms | Nominal | Process Capability | Nominal |
| Level of Service Requirements | Nominal | # of Recursive Levels in the Design | Nominal | Multisite Coordination | Nominal |
| Migration Complexity | Nominal | Stakeholder Team Cohesion | Nominal | Tool Support | Nominal |
| Technology Risk | Nominal | Personnel/Team Capability | Nominal | | |

**Maintenance** Off

**System Labor Rates**

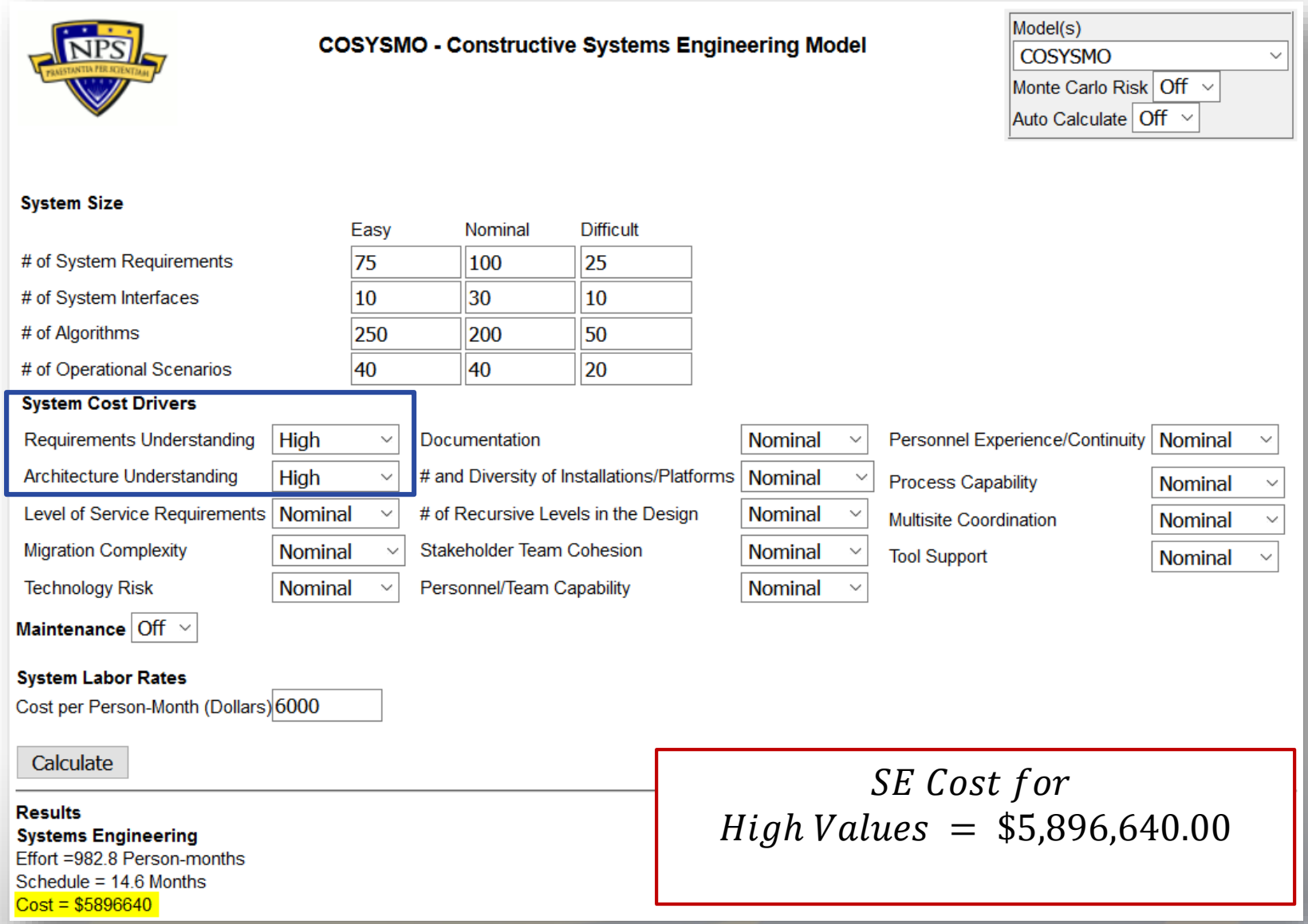
Cost per Person-Month (Dollars) 6000

Calculate

**Results**
**Systems Engineering**
Effort =1575.7 Person-months
Schedule = 17.0 Months
Cost = $9454288

$$SE\ Cost\ for\ Nominal\ Values = \$9{,}454{,}288.00$$

# Example of application – High Values



**COSYSMO - Constructive Systems Engineering Model**

Model(s): COSYSMO
Monte Carlo Risk: Off
Auto Calculate: Off

**System Size**

| | Easy | Nominal | Difficult |
|---|---|---|---|
| # of System Requirements | 75 | 100 | 25 |
| # of System Interfaces | 10 | 30 | 10 |
| # of Algorithms | 250 | 200 | 50 |
| # of Operational Scenarios | 40 | 40 | 20 |

**System Cost Drivers**

| | | | | | |
|---|---|---|---|---|---|
| Requirements Understanding | High | Documentation | Nominal | Personnel Experience/Continuity | Nominal |
| Architecture Understanding | High | # and Diversity of Installations/Platforms | Nominal | Process Capability | Nominal |
| Level of Service Requirements | Nominal | # of Recursive Levels in the Design | Nominal | Multisite Coordination | Nominal |
| Migration Complexity | Nominal | Stakeholder Team Cohesion | Nominal | Tool Support | Nominal |
| Technology Risk | Nominal | Personnel/Team Capability | Nominal | | |

**Maintenance** Off

**System Labor Rates**

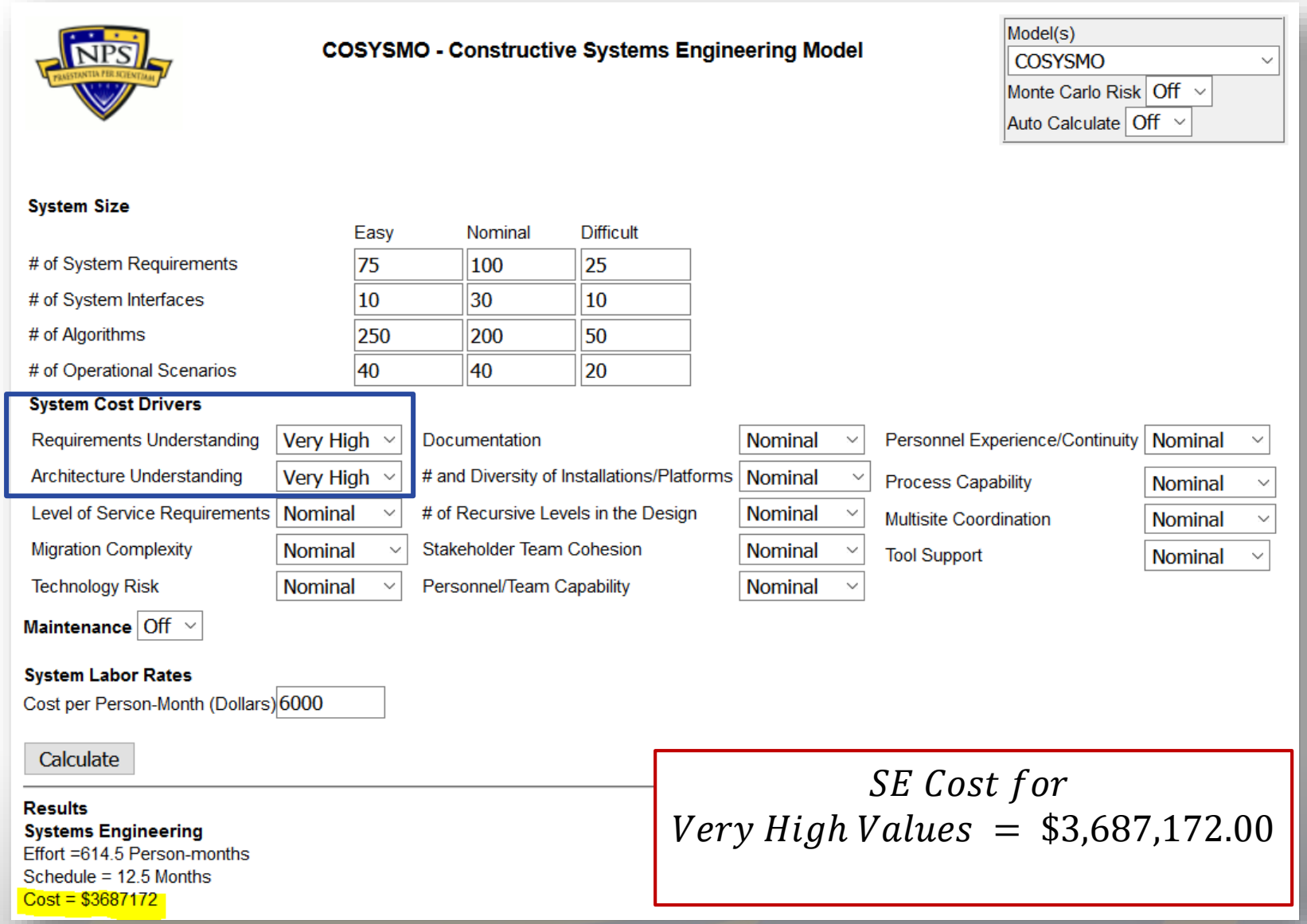
Cost per Person-Month (Dollars) 6000

Calculate

**Results**
**Systems Engineering**
Effort =982.8 Person-months
Schedule = 14.6 Months
Cost = $5896640

$$SE\ Cost\ for\ High\ Values = \$5{,}896{,}640.00$$

# Example of application – Very High Values



**COSYSMO - Constructive Systems Engineering Model**

Model(s): COSYSMO
Monte Carlo Risk: Off
Auto Calculate: Off

**System Size**

| | Easy | Nominal | Difficult |
|---|---|---|---|
| # of System Requirements | 75 | 100 | 25 |
| # of System Interfaces | 10 | 30 | 10 |
| # of Algorithms | 250 | 200 | 50 |
| # of Operational Scenarios | 40 | 40 | 20 |

**System Cost Drivers**

| | | | | | |
|---|---|---|---|---|---|
| Requirements Understanding | Very High | Documentation | Nominal | Personnel Experience/Continuity | Nominal |
| Architecture Understanding | Very High | # and Diversity of Installations/Platforms | Nominal | Process Capability | Nominal |
| Level of Service Requirements | Nominal | # of Recursive Levels in the Design | Nominal | Multisite Coordination | Nominal |
| Migration Complexity | Nominal | Stakeholder Team Cohesion | Nominal | Tool Support | Nominal |
| Technology Risk | Nominal | Personnel/Team Capability | Nominal | | |

**Maintenance** Off

**System Labor Rates**

Cost per Person-Month (Dollars) 6000

Calculate

**Results**
**Systems Engineering**
Effort =614.5 Person-months
Schedule = 12.5 Months
Cost = $3687172

$$SE\ Cost\ for\ Very\ High\ Values\ =\ \$3{,}687{,}172.00$$

# Example of application – Cost Saving Percentages

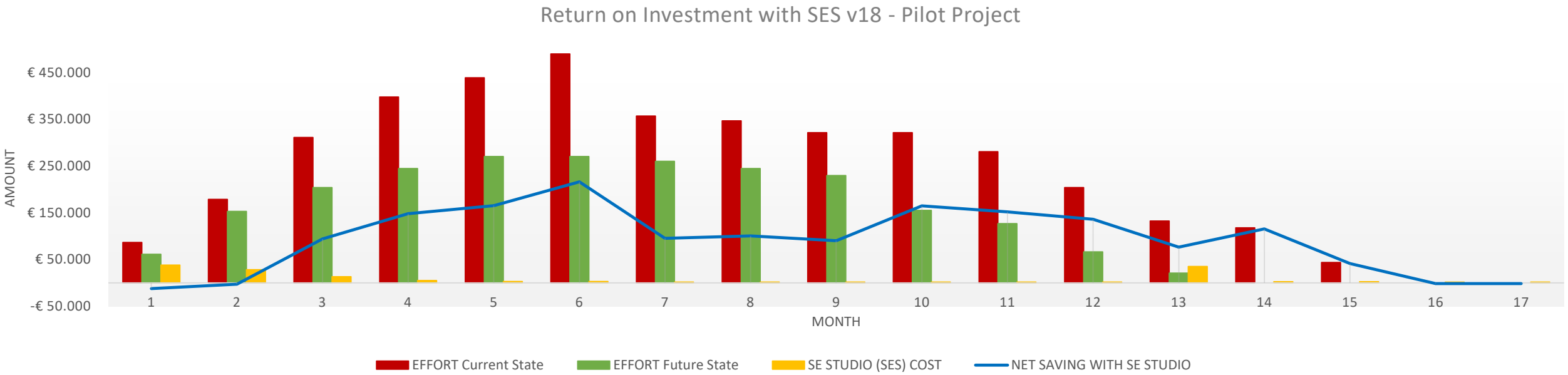
*SE Cost for* ***Nominal*** *Values = $9,454,288.00*

*SE Cost for* ***High*** *Values = $5,896,640.00*

*SE Cost for* ***Very High*** *Values = $3,687,172.00*

*Percent Change* ***Nominal to High = 37.63%***

*Percent Change* ***Nominal to Very High = 61.00%***



# Conclusions

KCSE approach as a mean to enhance projects

40% Cost Saving

Ontology Design and Architecture based on the goals and efforts


Tailoring activities to optimize tools, processes and assets

4 Person Month


# THANK YOU!

elena.gallego@reusecompany.com

# Next webinar

- **Topic:** How to write requirements in the Space Industry using a Knowledge Library based on ECSS standards
- **Content:**
  The **European Cooperation for Space Standardization** - an initiative established to develop a set of standards aiming to gain a common understanding across the space industry in Europe. ECSS has released some **guidelines** for the development of technical requirements specifications.
- The REUSE Company has developed a **Knowledge Library**, coping with the ECSS standard, to guide requirements writers writing high-quality requirements and provide help during the long-lasting requirements inspections, thus making easier the compliance with the ECSS standards. This Knowledge Library is part of the SES Suite (Systems Engineering Suite), managed by our tool Knowledge Library and include **glossaries**, **taxonomies** of terms, taxonomies of types of requirements, requirements **patterns** and requirements **quality** rules.
- **Dates:**
  - Tuesday, November the 20th at 5.00 pm CET
  - Wednesday, November the 21st at 9.00 am CET

| | | | |
|---|---|---|---|
| TRCW-08 | How to write requirements in the Space Industry using a Knowledge Library based on ECSS standards | 20/11/2018<br>21/11/2018 | 5.00 pm CET<br>9.00 am CET |
| TRCW-09 | A practical way to implement ISO 15288 V&V processes: The VERIFICATION Studio | 11/12/2018<br>13/12/2018 | 5.00 pm CET<br>9.00 am CET |
| TRCW-10 | Automatic checking of quality metrics for logical and physical models | 15/01/2019<br>17/01/2019 | 5.00 pm CET<br>9.00 am CET |
| TRCW-11 | Streamlining traceability domain: Managing and suggesting traces using Traceability Studio | 12/02/2019<br>14/02/2019 | 5.00 pm CET<br>9.00 am CET |
| TRCW-12 | Extending RQA with custom quality rules: A one-hour practical approach | 12/03/2019<br>14/03/2019 | 5.00 pm CET<br>9.00 am CET |

# the REUSE company