

PLM Road Map & PDT EMEA
Kyle Hall AIRBUS

MoSSEC and the importance of PLM data interoperability in a future sustainable and connected world
Gothenburg, Sweden
18-19 October 2022

PLM Road Map™ EMEA & PDT Europe 2022
Digital Transformation and PLM – a call for PLM professionals to re-define and re-position the benefits and value of PLM
18 & 19 October

CIMdata **eurostep**

MoSSEC
Modelling and Simulation in a Collaborative Systems Engineering Context

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The puzzle only makes sense when all of the pieces fit together

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Modelling and Simulation in a Collaborative Systems Engineering Context


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Kyle Hall




Airbus lead for ISO 10303-243 (MoSSEC) 

Career working closely with international partners across industries and academia... 

...realising methods to digitise and transform the ways in which knowledge can be made accessible to machines. 


Current role as an Airbus Data Driven System Engineer... 

working closely with Airbus' digitalisation transformation community to produce and procure solutions that are both:

- Domain specific to Airbus domains
- Interoperable amongst teams, systems and partners 

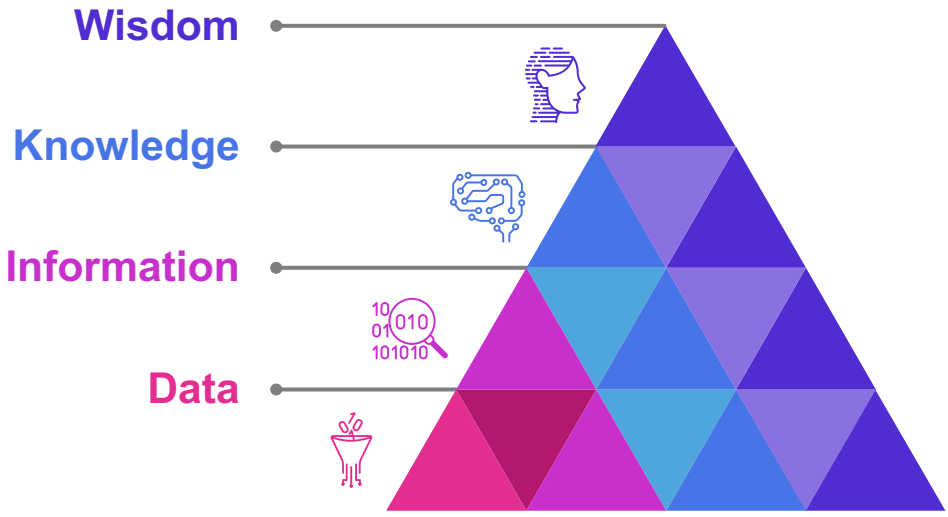
providing the future data framework capability to develop the platforms and solutions that are yet to be envisioned. 



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The DIKW pyramid

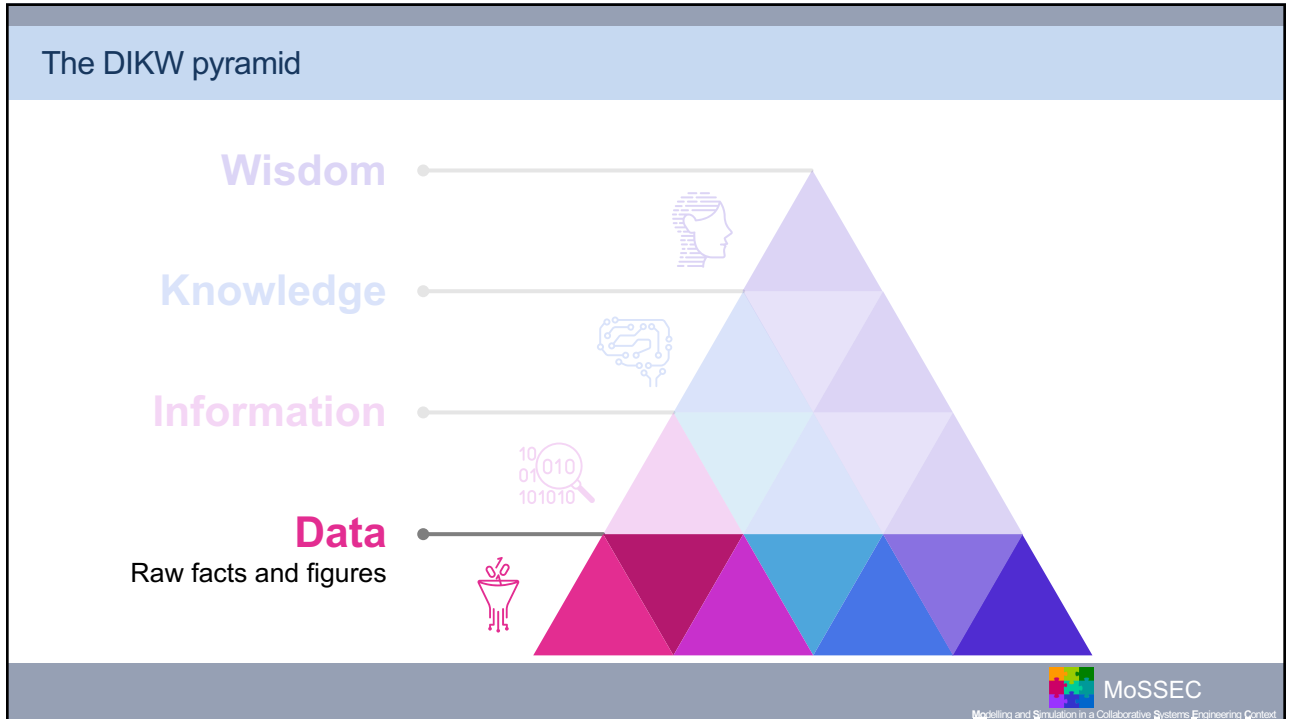


The diagram shows a pyramid composed of smaller triangles, colored from bottom to top: red, orange, yellow, green, blue, and purple. To the left of the pyramid, four levels are labeled with horizontal lines pointing to the pyramid's edges:

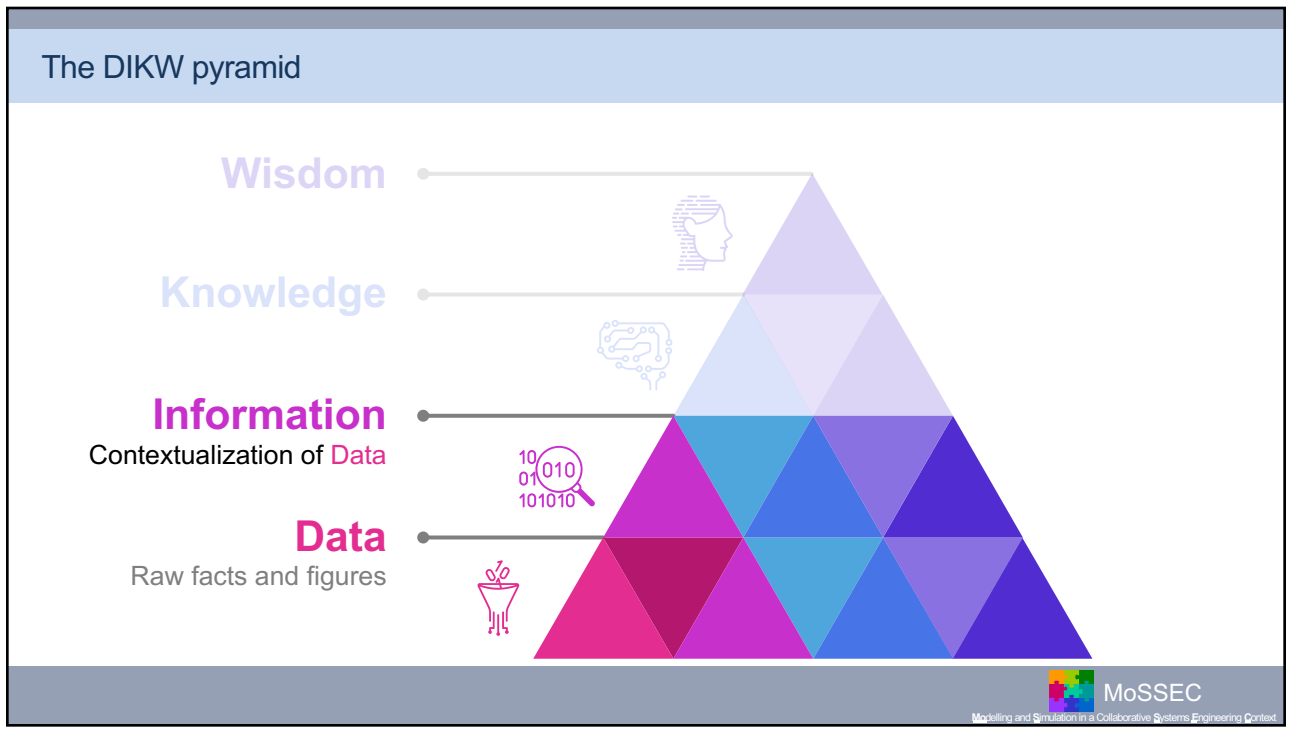
- Wisdom**: Accompanied by an icon of a head with a brain.
- Knowledge**: Accompanied by an icon of a brain with circuitry.
- Information**: Accompanied by an icon of a magnifying glass over binary code (10, 01, 010, 101010).
- Data**: Accompanied by an icon of a funnel.

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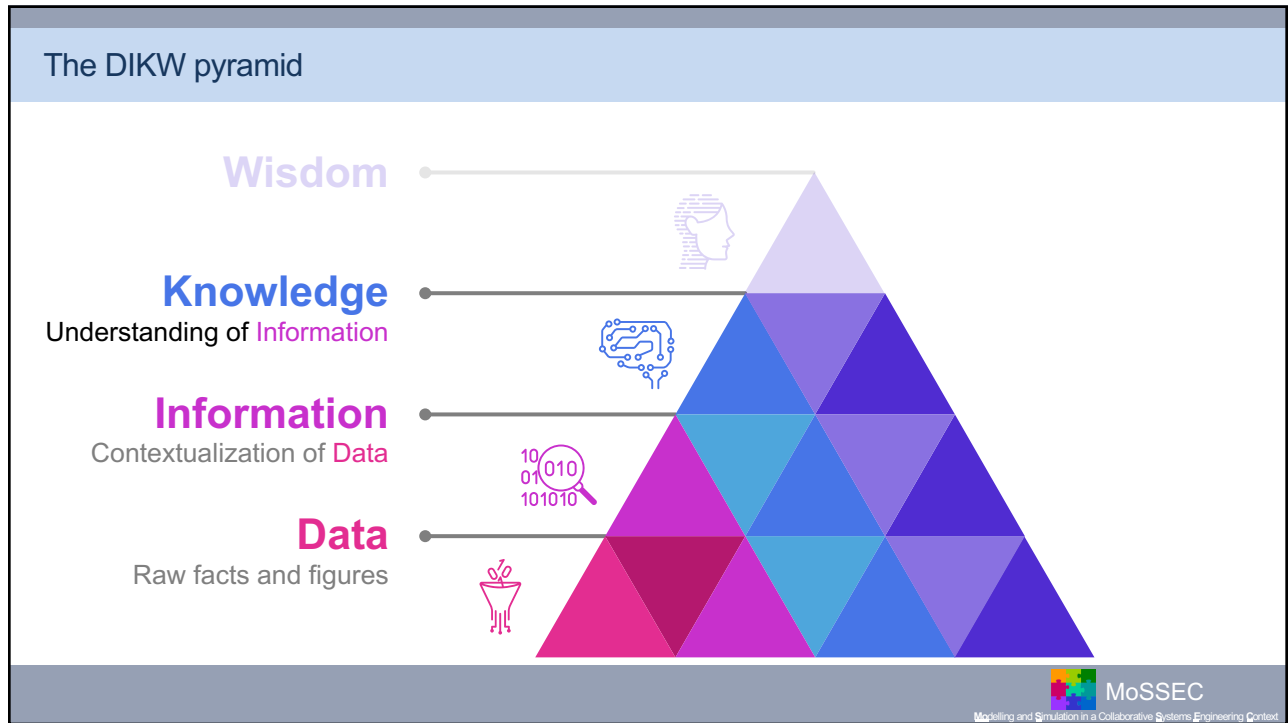
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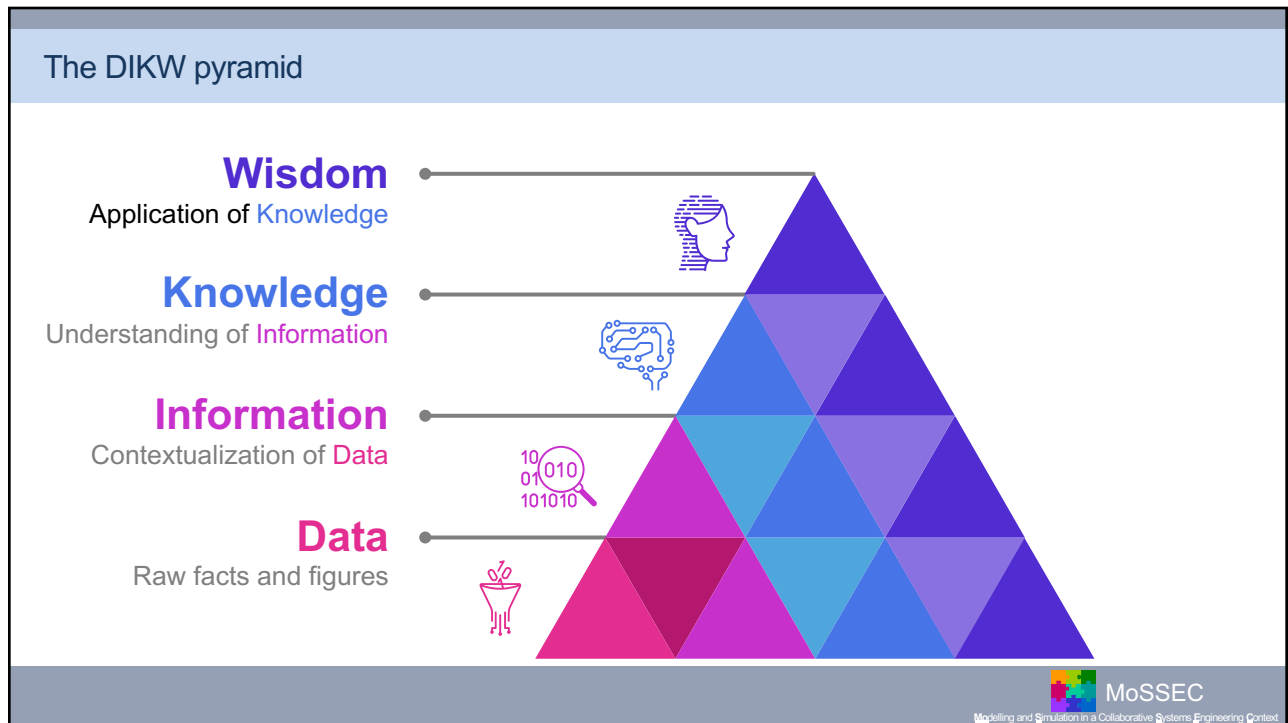
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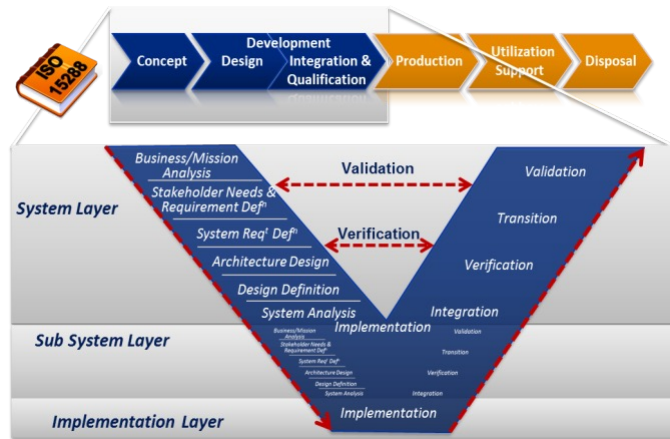


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Gaining an understanding

In a well established System Life cycle process, at each stage, a business typically requires that:

-  Experts understand their roles
-  Experts have access to the tools and knowledge to fulfill their roles
-  Experts provide sufficient knowledge for their leaders to make decisions

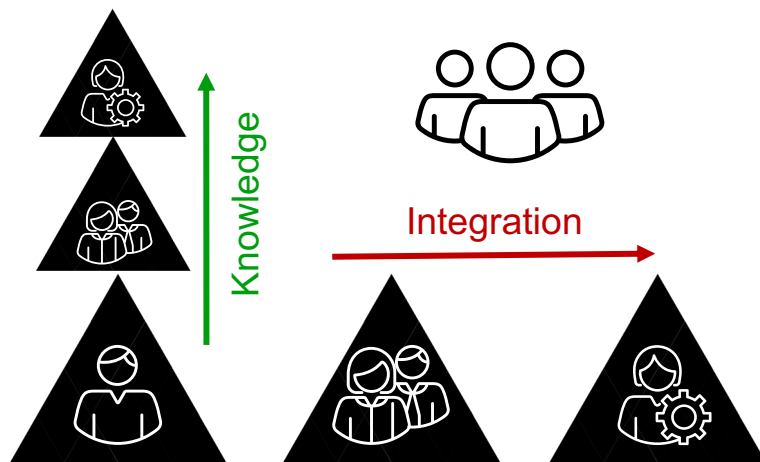


Gaining an understanding – Decision makers

Experts typically understand their role specific to their domain

Experts have their own tailored set of processes, and generate clusters of domain-specific knowledge

The knowledge flow is vertical limiting horizontal integration



Gaining an understanding – Decision makers

Because of this isolation, data processes are:

- defined by the domain's methodology
- knowledge sharing is constricted
- processes across the system **can** be unnecessarily duplicated
- ultimately results **can** be sub-optimal and inefficient

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Gaining an understanding – Decision makers

The result of this disconnect culminates in often severe pain points with:

- difficulties in understanding the global system
- limited knowledge of previous results, repeating study evaluations
- challenges when migrating from legacy systems

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The typical questions that decision makers ask

If there is a change to this requirement and what does it impact?

Why was it decided to use this technology?

Which partner has the skills to perform this task

Show me the detailed analysis behind these figures of merit?

What inputs were used for this analysis and where were the results used?

What method has been used for this type of analysis in the past?

Who made this assumption and what evidence was there to support it and where was it used to support a decision

What method should be used to verify this requirement and what level of output quality is needed

This is surrogate model of this component behaviour and is valid for this input range

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Gaining an understanding – Decision makers

So we share the same platforms across our business?

No.

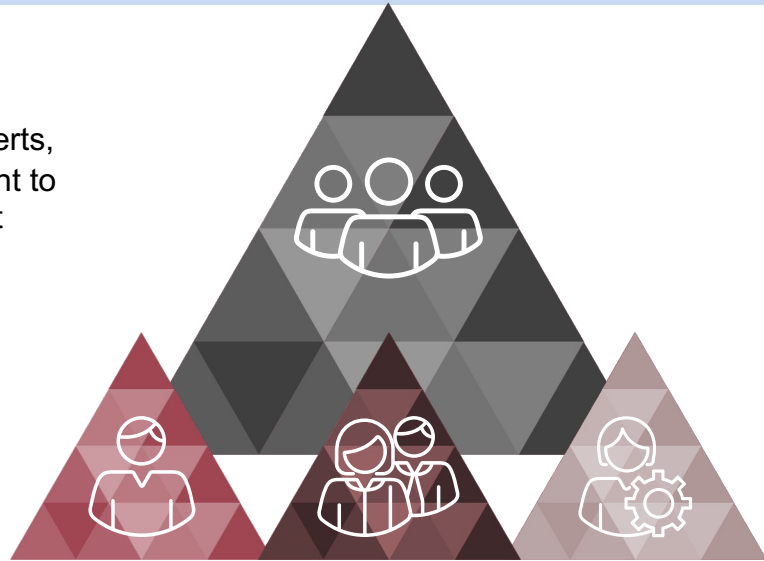
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Gaining an understanding – Decision makers

A single tool/ platform means:

- A sub-optimal environment attempting to cater to all experts, requires significant investment to configure according to expert requirements
- Restricting opportunities for innovation – constricted to a single tool and provider
- No extended enterprise collaboration without the support of the tool provider



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Gaining an understanding – Decision makers

The solution is to define a common framework for recording and sharing the context of data, to:

- understand the information throughout the full system life cycle
- promote knowledge sharing between domains
- enable the experts to collaboratively deliver the optimal global solution



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Gaining an understanding – The connected expert

 **Knowledge available as a global resource**
Systems have a global understanding of the knowledge available to them

 **Unobtrusive**
No extra responsibilities on the experts. Legacy tools supported.



Time Saving 
The system should facilitate real, quantifiable savings in time and cost for the expert to ensure their support

Simplicity 
Connections between teams should “just work” – Setup once and forget



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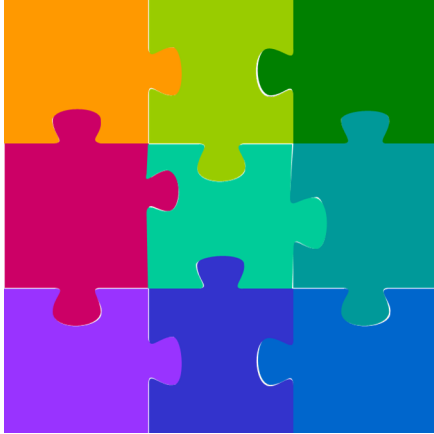
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Enter MoSSEC (ISO 10303-243)

MoSSEC (ISO 10303-243)

Modelling and
Simulation information in a collaborative
Systems
Engineering
Context

An ISO STEP standard to improve decision making for complex products.








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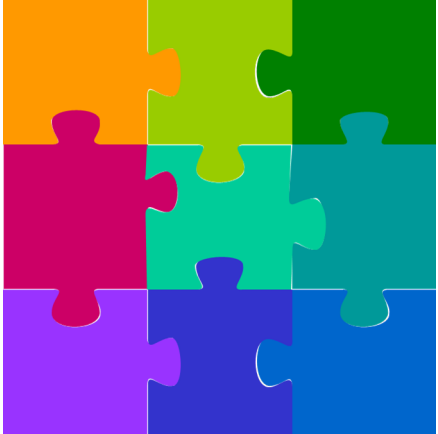
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Enter MoSSEC (ISO 10303-243)

 Defining the data structure for recording contextual 'metadata'

 Enabling knowledge to be transferred from subject experts into a machine interpretable metadata framework,

 Thus facilitating the optimisation of decision making processes within a collaborative multi-company, discipline, platform, etc. setup.





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Enter MoSSEC (ISO 10303-243)



Objects are:

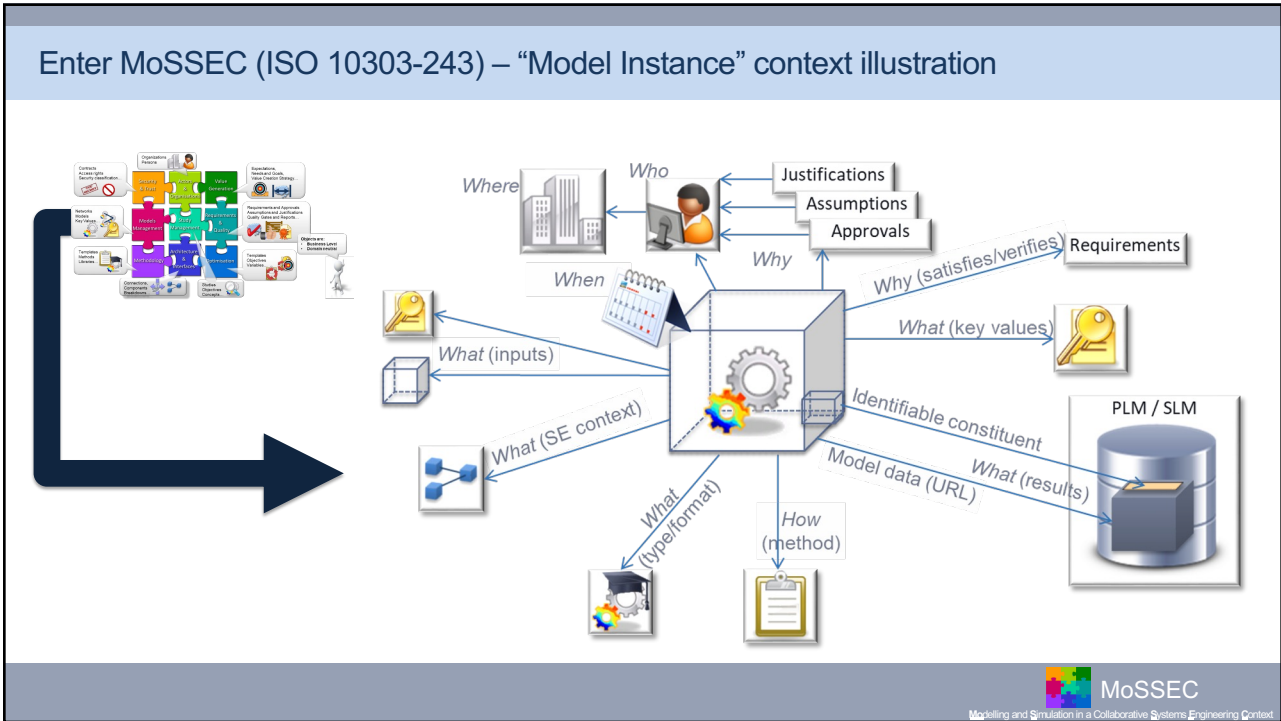
- Business Level
- Domain neutral



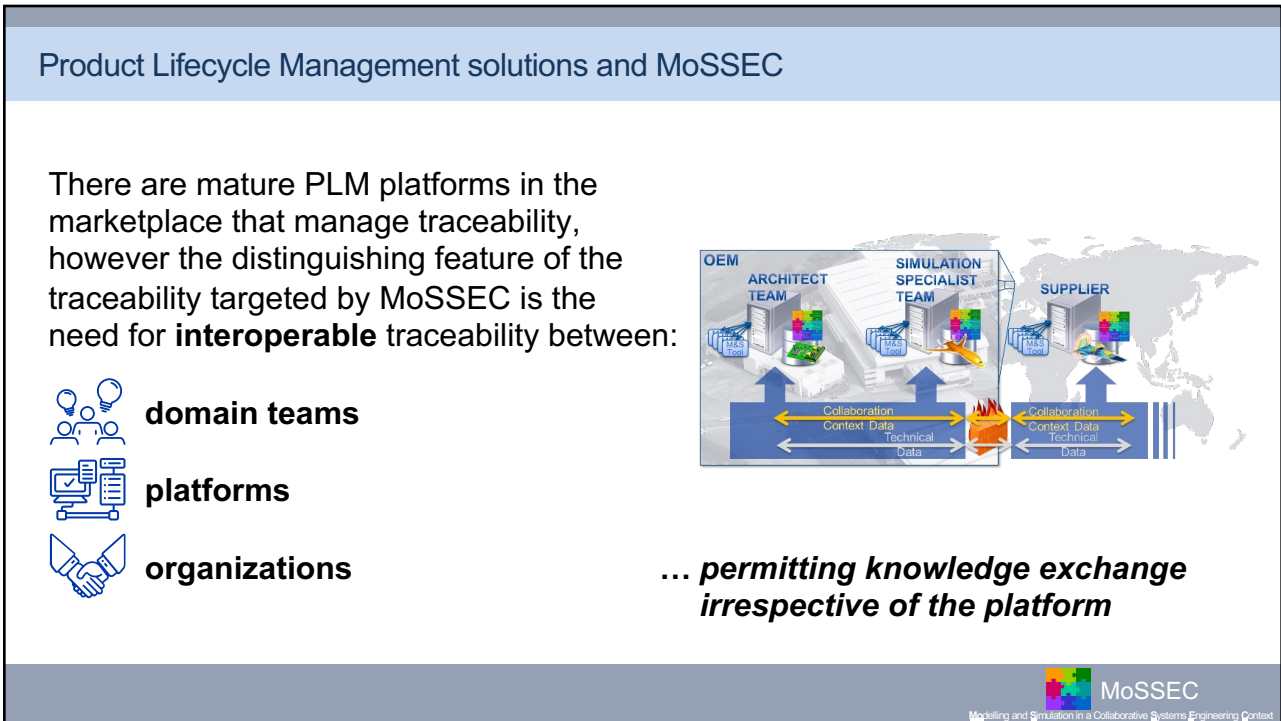


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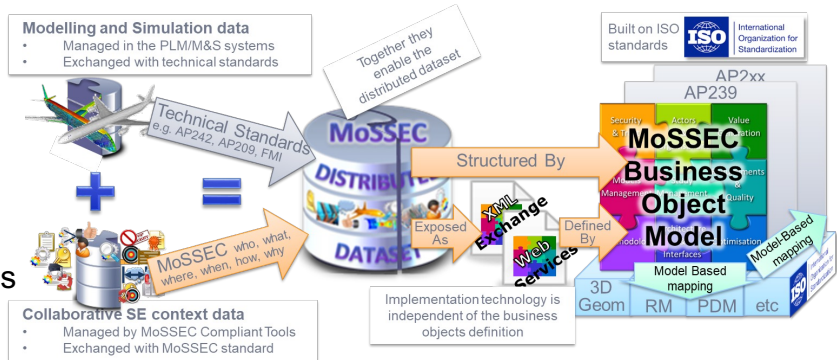


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Product Lifecycle Management solutions and MoSSEC

MoSSEC is the complementary standard to existing technical M&S standards capturing collaborative SE context data.

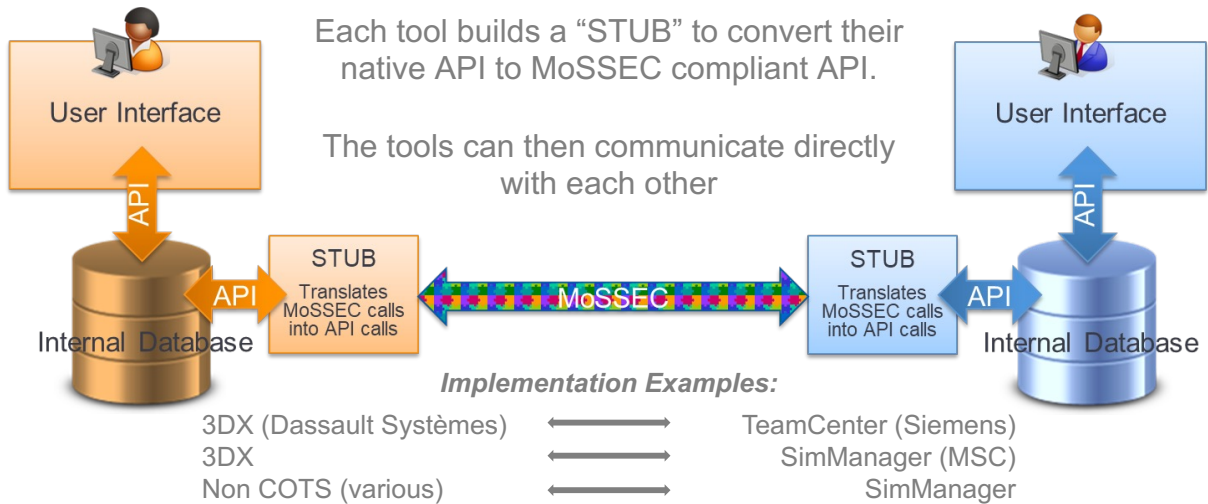
Combining the technical data with its context provides the MoSSEC Distributed Dataset or a "150% model", to which queries can then be made.



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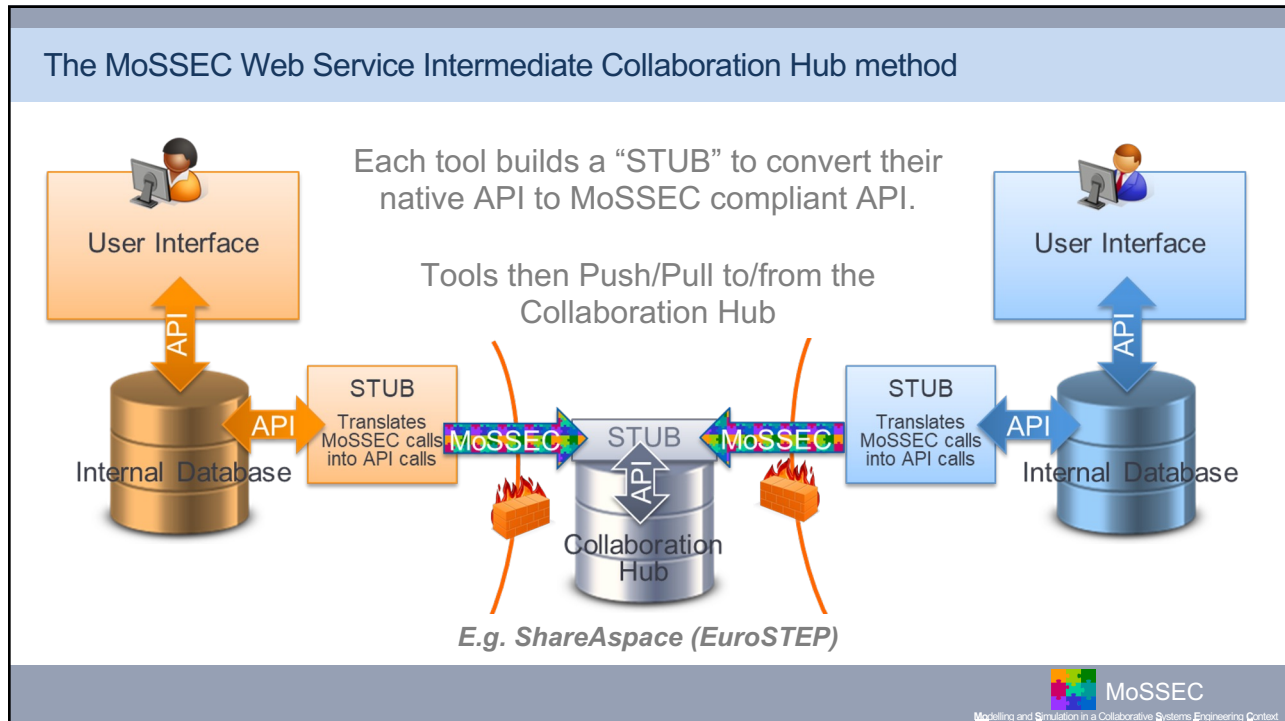
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The MoSSEC Web Service Direct Communication method



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Conceptual Airframe & Engine Collaboration

Research project jointly funded by industry and the UK government between 2016 and 2019.

Process standardisation and full data traceability between Airbus and Rolls-Royce.

Conventional v. APROCONE concept assessment
Realistic but NOT Real:

- Lighter engines
- Lower Max Take Off Weight
- Less fuel burn

Significant reduction in development time

AIRBUS **UNIVERSITY OF CAMBRIDGE** **cfms** **CRJ** **Q&Q** **Q&Q AEROSPACE** **MSC Software** **Rolls-Royce**

APROCONE
Advanced Product Concept Available Environment

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But why MoSSEC in a future sustainable and connected world?

Overall product complexity

Regulation compliance

New technologies, New partners

Evolving customer expectations

Knowledge retention

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The future innovation

1 Knowledge behind the System's life cycle is Machine Interpretable

2 AI technology interoperating between domains, platforms and organisations

3 Identification of novel solutions and **collaborations**

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A personal MoSSEC 2025 vision


- Secure** —● Secure communication is embedded throughout interoperability developments
- Exchange** —● Object exchange processes are well documented and established
- Certify** —● MoSSEC compliance can be measured and certified
- Explore** —● A community sharing concepts, ideas and solutions using MoSSEC objects

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ATLAS Project Days – Proposed MoSSEC Interoperability Forum

ISO 10303-243 (MoSSEC) INTEROPERABILITY FORUM




ISO 10303-243 (MoSSEC) is defined.
Now it needs to be implemented.

1. AFNeT Standards Days 2022 begins the start of discussions for a MoSSEC IF - Creating the User Group.
2. MoSSEC IF should be part of the MBx IF
3. Begin the conversations between Vendors and Industry to break down blockers to implementation
4. Engage Trade / Standardisation Associations interest and foster the global partnerships for effective implementation

Diagram Credit:
adopted from
PDM-IF

Contact: Kyle Hall
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Email me



ATLAS Projects Days - 11 / 12 May 2022 - <https://atlas.afnet.fr/> - team-atlas@afnet.fr

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The road to interoperability. How you can get involved

- Reach out to the MoSSEC community
- Experiment with the MoSSEC object model
- Demonstrate the potential to your domains
- Get involved with the Interoperability Forum

QR code for Kyle Hall Airbus

Kyle Hall
Airbus

QR code for Juan Carlos Mendo Boeing

Juan Carlos Mendo
Boeing

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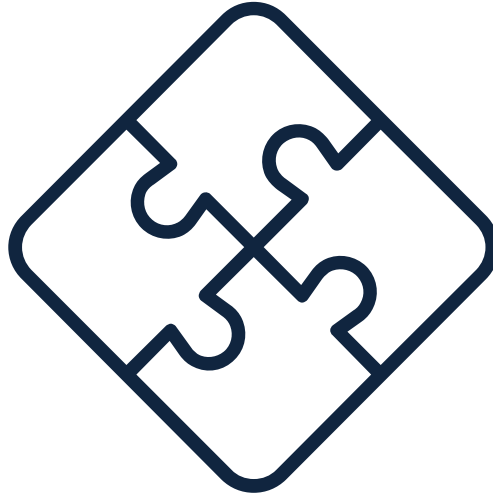
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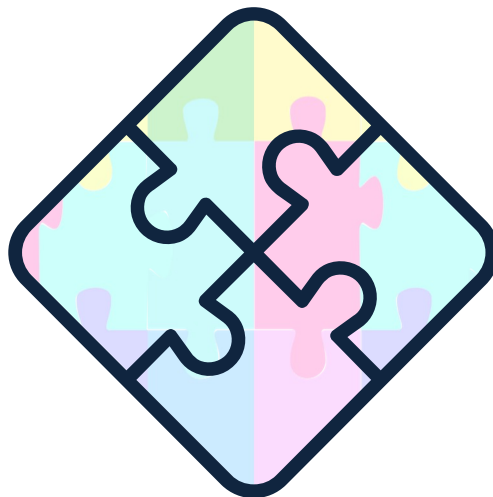
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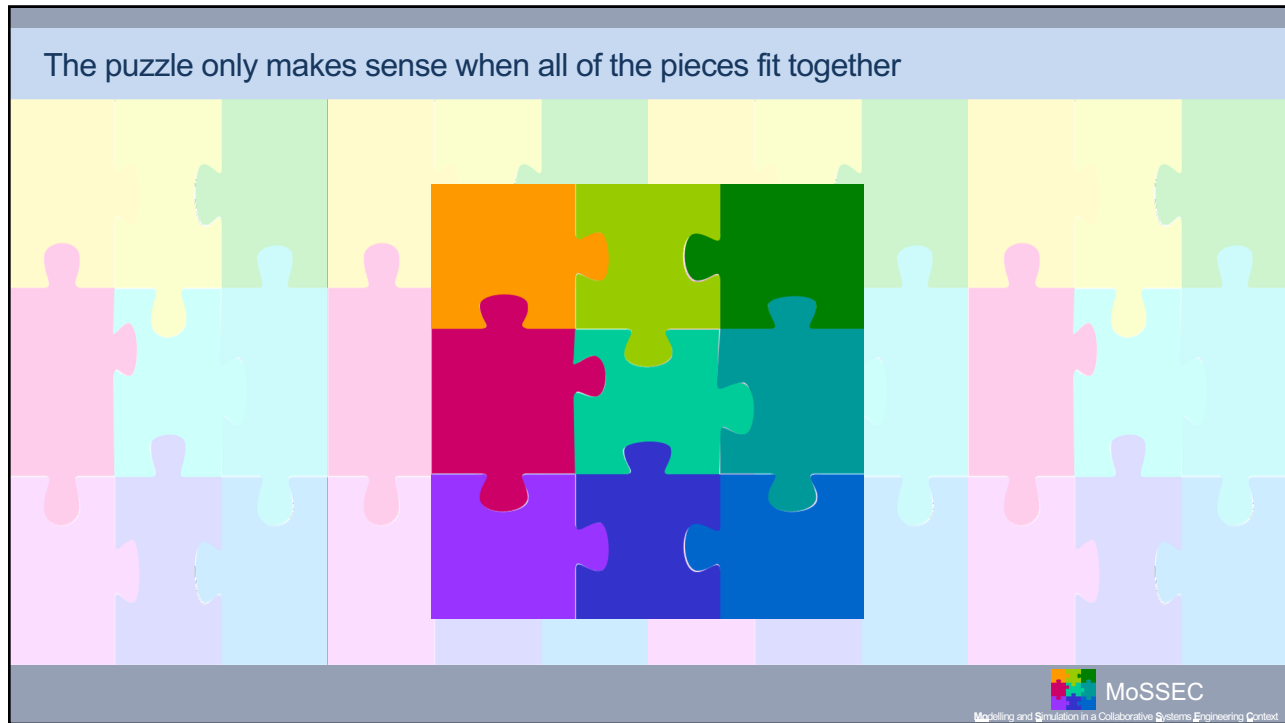


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