MoSSEC
A new initiative for sharing Modelling and Simulation information in a collaborative Systems Engineering Context
Why do I need MoSSEC?

What is MoSSEC?

How do I get involved in MoSSEC?

Summary
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• What is MoSSEC?

• How do I get involved in MoSSEC?

• Summary
Lifecycle of “System of Interest”

Layers

System Layer

Sub System Layer

Implementation Layer

Requirement Definition
Concept and Design
V&V
Validation
Qualification
Integration & Test
Implementation

Sequential

V-Cycle

Maturity

Iterative
To develop highly complex systems also involves **multiple partners using different platforms in different locations.**
Challenges for distributed systems engineering

- **Distributed Infrastructure**
  - Secure Collaboration for:
    - Locations
    - Organisations
    - Software Platforms

- **Distributed Processes**
  - Multitude of Modelling and Simulation tools
  - Simulation driven design changes traced and under PLM control

- **Distributed Data**
  - Modelling and Simulation data
  - V-cycle meta-data
    - (who what when where how why etc)
  - Efficient sharing, synchronisation and integration

Remain Compliant with existing Standards (e.g. AP233, AP239, AP242)
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Collaboration vs Modelling & Simulation Data

- **Modelling and Simulation data**
  - Managed in the PLM/M&S systems
  - Exchanged with technical standards

- **Collaborative SE context data**
  - Managed by MoSSEC Compliant Tools
  - Exchanged with MoSSEC services

- Together they enable the distributed dataset
How is it used in practice

Typical process

Who
What
Where
When
How
Why

Does work and save

Cad
Generate Geometry

Mesh and Simulate

Results Interpretation

Notify location

FEA + solver

Decides what to do

Results for different simulation topics distributed but disconnected

Typical process with MoSSEC

Who
What
Where
When
How
Why

Does work and save

Cad
Generate Geometry

Mesh and Simulate

Results Interpretation

Notify location

FEA + solver

FEA + viewer

Collaborative Systems Eng Traceability

Results for different simulation topics distributed and fully connected to PLM referential

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How is it used in practise - distributed

- **Distributed Infrastructure**
  - Secure Collaboration for:
    - Locations
    - Organisations
    - Software Platforms

- **Distributed Processes**
  - Multitude of Modelling and Simulation tools

- **Distributed Dataset**
  - Step1 – Generate Geometry
  - Step2 – Mesh and Simulate
  - Step3 – Results Interpretation

The MoSSEC structure and services enable the distributed dataset.
Agenda

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MoSSEC: a common approach based on standards

- MoSSEC provides a common approach for:
  - Structuring the Distributed Dataset
  - Structuring the Information Services for Dataset Management

- MoSSEC is built on ISO standards
  - ISO 10303-239 PLCS

Structured By:
Exposed As:
Defined By:
Built On:

MoSSEC Business Object Model:
- Security & Trust
- Actors & Fair Play
- Value Generation
- Assessments & Quality
- Models
- Management
- Methodology
- Interfaces

Built On:
- ISO
- OASIS
- SourceForge

Collaboration Services:
Why not just use the ISO standards?

PLCS (ISO 10303-239) is **generic, flexible**, and designed to be **extended and specialised** therefore:

- **MoSSEC Business Object Model** provides usage guidance to explain how the standard is used in context
- **MoSSEC Services** are at a higher level than the standard, so are more efficient
MoSSEC enables capture of data throughout the Lifecycle of the “System of interest”
MoSSEC Business Object Model defined with SysML
MoSSEC Data Sharing approach

- Data Sharing (Web services)
  - Defined using WSDL + XSD
  - Management of WSDL: To be Defined
    - (e.g. OASIS PLCS, OASIS OSLC, OMG, ISO TC184SC4)
MoSSEC Data Sharing approach

MoSSEC Data Exchange [DEX] specification

Data exchanged using e.g. file transfer

MoSSEC Templates

- Data Exchange (file based)
  - Baseline: DEXs to use OASIS PLCS PSM templates
  - Recommended practices (formal mapping of information model to underlying OASIS PLCS Standard)
  - Target: DEXs to be based on ISO AP239 Ed 3 (organization of an international workshop in the next 6 months to finalize the white paper)
MoSSEC: Current and previous case studies

- **CRESCENDO** Collaborative and Robust Engineering using Simulation Capability Enabling Next Design Optimisation – 59 partners
  - Thermal Aircraft
  - Power-plant integration

- **TOICA** Thermal Overall Integrated Concept Aircraft – 30 partners
  - Dynamic Aircraft Thermal Architectures
    - functional, physical, zonal, logical…

- **CONGA** Configuration Optimisation of Next Generation Aircraft – 7 partners
  - Set Based Design

- **SAVI** System Architecture Virtual Integration – 11 partners
  - Printed Circuit Boards
Vendor involvement

• Vendors are active in evolving and implementing the standard as part of ongoing research projects

• Vendors involved include:
  • Dassault Systèmes
  • Eurostep
  • MSC Software
  • Siemens PLM

A MoSSEC distributed dataset will only happen if vendors implement clients and servers
MoSSEC: Status

- Baseline version released through:
  - CRESCENDO project

- Utilised and evolved through:
  - TOICA, CONGA and SAVI projects

- Presented to:
  - PDES & ProSTEP

- Support for MoSSEC from:
  - AeroSpace and Defence Industries Association of Europe Strategic Standardization Group [ASD SSG]
MoSSEC Evolution and Development

- Using an MBSE approach
  - Captured using Polarsys
- Utilised by projects
- Contributions from projects consolidated

More projects are welcome to join and contribute.
What’s next – International MoSSEC Project created

- Agree scope of MoSSEC releases
- Agree the relevant modelling, documentation and usage guidelines
- Push through the relevant standards bodies
- Agree the governance for the standard
- Promote approach
  - Internal to your companies
  - With your vendors
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Involvement: Where to access MoSSEC information

- **ASD-SSG website**
  - [www.asd-ssg.org/mossec](http://www.asd-ssg.org/mossec)
  - Overview
  - WSDL + XSD

- **CRESCENDO public deliverables**
  - [www.crescendo-fp7.eu](http://www.crescendo-fp7.eu)
  - Technical documentation downloads
    - UML model
    - Descriptive documentation
    - Deployment guide

- **GPDIS Presentation**
  - [www.gpdisonline.com/presentations2014/SE_60_Airbus-AdrianMurton-MoSSEC.pdf](http://www.gpdisonline.com/presentations2014/SE_60_Airbus-AdrianMurton-MoSSEC.pdf)

- **Contact**: adrian.murton@airbus.com
Involvement: Review the MoSSEC information

- Do you agree with the scope of MoSSEC?
  - What is missing?

- Do you agree with the Object Model definitions?
  - How can they be improved?

- Do you agree with the way information is modelled?
  - How can it be improved?

- Does the user documentation make sense?
  - What topics could be improved?

- Discuss the approach with your vendors
  - Do they support it?
Involvement: Join International MoSSEC Project

• Kick off meeting held October 29th 2014
  • Attendees:
    – Industrial – Airbus, Boeing, Rockwell Collins, GKN Aerospace, Honeywell
    – Vendors - Eurostep, Dassault Systemes, MSC, Siemens
    – Academia/Research Partners – NLR, UI Labs

• Agreed to hold bi-weekly meetings to progress standardisation topics such as:
  • Governance of the standard
  • Coverage of the Business Object Model
  • Overall planning of the standard versions
• Contact adrian.murton@airbus.com to be added to invite list
• Aim to hold kick off international MoSSEC workshop Q1 2015
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Summary
• Why do I need MoSSEC?
  
  ➢ **Industrialists:**
  
  ➢ To provide a platform independent approach to structure and access simulation and decision data in the evolving distributed product dataset.

  ➢ To enable **Modelling and Simulation** in a collaborative **Systems Engineering** Context

  ➢ **Vendors:**

  ➢ To provide access to data and processes in other vendor platforms with one set of services
Summary

• **What is MoSSEC?**
  
  ➢ A SysML based definition of business objects and services extending/specialising ISO 10303-233 (*Systems Engineering*) and -239 (*PLCS*)
  
  ➢ A proposed project launched to formalise and publish as a standard

• **How do I get involved in MoSSEC?**
  
  ➢ Use and contribute to the evolving publicly available definitions and usage guides
  
  ➢ Join the kick off meeting(s) of the proposed MoSSEC project
  
  ➢ Contact [adrian.murton@airbus.com](mailto:adrian.murton@airbus.com) to be added to invite list
Any Questions?