MoSSEC
A proposed standard for sharing Modelling and Simulation information in a collaborative Systems Engineering Context
Agenda

- Why do I need MoSSEC?
- What is MoSSEC?
- What is the status of MoSSEC?
- Summary
Why do I need MoSSEC?

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Lifecycle of “System of Interest”

Sequential

V-Cycle

Layers

System Layer

Sub System Layer

Implementation Layer

MoSSEC – Presentation to NAFEMS SMSWG

September 27th 2016
Lifecycle of “System of Interest”

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)
Challenges for distributed systems engineering

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Distributed SE challenges are applicable to in-house organisations
Challenges for distributed systems engineering

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- **Distributed Data**
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  - 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)
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 standard

Together they enable the distributed dataset

Technical Standards
e.g. AP242, AP209, FMI

MoSSEC who, what, where, when, how, why
How is it used in practise - distributed

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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
MoSSEC Business Object Model coverage

- **Contracts**
  - Access rights
  - Security classification

- **Security & Trust**
  - Organizations
  - Persons

- **Actors & Organisations**

- **Value Generation**
  - Expectations,
  - Needs and Goals,
  - Value Creation Strategy

- **Requirements & Quality**
  - Requirements and Approvals
  - Assumptions and Justifications
  - Quality Gates and Reports

- **Models Management**
  - Networks
  - Models
  - Key Values

- **Methodology**
  - Templates
  - Methods
  - Libraries

- **Architecture & Interfaces**

- **Optimisation**
  - Studies
  - Objectives
  - Concepts

- **Connections, Components Breakdowns**

- **Studies Objectives Concepts**

- **Objects are:**
  - Business Level
  - Domain neutral
MoSSEC Business Object Model defined with SysML

Summary View

Detailed Block Diagrams

ISO International Organization for Standardization

AP242 etc

AP239

MoSSEC Business Object Model

Model Based mapping

3D Geom RM PDM etc

Model Based mapping
SysML use in MoSSEC

• MoSSEC standardisation team
  ➔ Use SysML to define the MoSSEC standard

• Capability Developers
  ➔ Read SysML definition to develop the MoSSEC enabled client/server capabilities

• Capability End Users
  ➔ Use the capabilities
  ➔ No SysML knowledge required
Linked Data, OSLC and MoSSEC – How and What

- **Linked Data**
  - Resources in different repositories
  - Link stored as <http> with role

- **OSLC**
  - Defines standard services (RESTful)
  - E.g. Create, Query, Select, Display, Preview/Dialog
  - Defines **OSLC-specific** domain language

- **MoSSEC**
  - Defines domain language **based on ISO standard AP239**
  - Services defined as per ISO-10303 architecture
  - So far for shared data, could also use Linked data
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MoSSEC: Status

- Created and utilised on EU, UK and International research projects

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

- Launched International Project
  - Industrial and Vendor participation
  - Agreed standardisation under ISO
  - Website created (www.mossec.org)
  - Preliminary Work Item submitted
  - New Work Item and White Paper to be submitted 4th October
MoSSEC project - participants

• **Project Co-chairs:**
  - Adrian Murton (Airbus Operations Ltd)
  - Greg Pollari (Rockwell Collins)

• **Industrial:**
  - Airbus Group, Boeing, Rockwell Collins, Honeywell, GKN Aerospace, BAE Systems…

• **Vendors:**
  - Dassault Systèmes, Eurostep, MSC Software, Siemens PLM Software…

• **Organisations:**
  - ASD SSG, AFNET, UKCeB, AVSI/SAVI, PDES Inc. (to be confirmed), AIA (to be confirmed),
MoSSEC White Paper (associated with New Work Item)

• MoSSEC Business Aspects
  • Overview of business context
  • Synthesis of business requirements
  • Business use case example
• MoSSEC Technical Aspects
  • Definition of technical content
  • Development principles
  • Interdependencies with related standards
• MoSSEC Project and Risk Management
  • Deliverables
  • Financial aspects
  • Scheduling

White Paper

ISO 10303 (STEP) MoSSEC edition 1

Application Protocol
For Modelling and Simulation information
in the collaborative Systems Engineering Context (MoSSEC)

Issue 0.01, xx.xx.2016
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
  – Consistency Checking between domains
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 is being enabled as vendors implement clients and servers
Further MoSSEC information

- **MoSSEC website**
  - [http://www.mossec.org/](http://www.mossec.org/)
  - Overview
  - Resources
  - News
  - Links

- **Members website**
  - [http://private.mossec.org](http://private.mossec.org)
Participate in the International MoSSEC Project

• To be added to the members list contact:
  • Gregory.Pollari@rockwellcollins.com
  • Adrian.Murton@airbus.com

• Participate in bi-weekly Teleconference
Why do I need MoSSEC?

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Summary
MoSSEC: Modelling and Simulation information in a collaborative Systems Engineering Context

A proposed ISO standard:

• To improve decision making for complex products.

• For sharing the systems engineering context (Who, What, Where, When, How, Why) of modelling and simulation data between Internal teams/domains and Extended Enterprise

• Supported by industrial partners (e.g. Airbus, Rockwell Collins, Boeing, BAE Systems) and vendors (e.g. Eurostep, Dassault Systèmes, MSC Software, Siemens)

Status:

• A first definition used extensively on EU research projects

• “New Work Item” and associated white paper to be submitted to ISO October 2016

• www.mossec.org