

# Hybrid System Simulation Standards:

Mark Burton



# Summary

## This workshop aims to start a dialogue...

Inter-industry collaboration to improve the **interoperability of product and environment simulation:**

based on co-ordination between  
**existing and new open standards**

# The Plan

- **This Workshop:** Foster understanding between Standards communities
  - Users to better understand standards coverage
  - Standards experts to understand requirements, potential overlaps, and points of interaction.
- **Long term:** Foster and initiate actions to improve and co-ordinate standards :
  - Foster and initiate a collaborative action to make standards evolve according to our needs
  - Enable cross-over groups in standards organizations.

**e.g. Possibility to organise working groups within IRT**

# Many people have different views on this...

- Each domain uses different words to describe building complex system model
- Including the Environment
- Connecting multiple systems together

Virtual **Twin**  
Cyber Physical **World**  
**System** of System **Hybrid**

# WHY: Simulation

Collectively:  
**Hybrid System Simulation**

- Simulations are at the core of the development process
  - Simulation through product life cycle
  - System to Environment simulation
  - Systems of Systems
  - Virtual and Real System synchronization
- Each industry (aerospace, automotive, defense,...) is developing its own system simulator environment and coupling mechanisms to simulate and model complete systems.
- Simulations may be heterogeneous, involving multiple abstraction levels, mixing 'real' and 'virtual', devices systems and the environment  
(MIL, SIL, PIL, HIL,...)
- Simulations and models cross multiple enterprises,
  - and are reused in different contexts.

# WHY: Existing standards

Existing standards:

- are often domain- or industry-specific
- cannot be combined easily.
- do not address multi-disciplinary aspect of system simulation and modeling: hardware, software, mechanics, electronics

There is an need for **rationalization/Alignment**

- Select standards for the various abstraction levels and the various activities involved in the PLM
- Define appropriate interfaces between the selected standards
- Match MBSE abstraction with simulation models

# Questions for you . . .

- What simulation models do you aggregate?
  - Covering what subsystems?
  - Covering what type of simulations (hydraulic, electronic,...)?
  - Covering what time-scale?
  - For what purpose?
  - With what constraints e.g. wrt real-time?
- What are the standards currently used?
- What issues are there with current standards (such as HLA, for instance) ?
- What is missing in existing standards
- Do we need new standards or to Align existing standards and develop interoperability layers?

# Standards to be examined at workshop



## Avionics

**VISTAS /  
VHTNG**  
Olivier  
Fourcade and  
Jean Casters  
(Airbus)



## Space

**SMP2**  
standards  
William Arrouy  
(Airbus) Rachid  
ATORI  
(SpaceBel)



## Semi's

**Accellera**  
standards  
Martin  
Barnasconi  
(NXP)



## Automotive

**openADX**  
standards  
Andreas  
Riexinger  
(Bosch)



## Mechatronics

**FM/FMU**  
Jean-Marie  
Gauthier  
(Samares  
Engineering)





# Hybrid System Simulation Standards: TLM

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# Conclusion

- Is there work to be done?
  - Do we need a 'new' standard?
  - Combine existing standards?
  - 'adapt' existing standards (adapters)?
- 
- Are there concrete steps ?
    - (e.g. Build a component that works between standards)

**Shall we work on a project together?**

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