

### Model-Based Avionics Verification & Validation

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#### **Round table**



Questions raised to guide the discussions:

- a. What model-types are involved in the avionics verification and validation?
- b. What is the impact on validation plans by the formal introduction of models? How is the traceability of different models and their relations throughout the verification process ensured today?
- c. Which system properties (data) are required for the avionics V&V process and what function do they have? How is this handled today?
- d. How are the models validated with respect to a domain of applicability and maintained throughout the avionics lifecycle?

# What model-types are involved in the avionics verification and validation?



- Is there a possibility to standardize models and/or model interfaces in order to guarantee their interoperability ? How far do we need to adopt a common architecture ?
- 2. What needs to be modelled? Where are technology limitations today?
- 3. ESL Electronic System Level Design is a tool that allows to specify, design and simulate complex electronics embedded architecture (based on PowerPC/SPARC/Freescale/.... processors) . Some ESL tools can produce "virtual platform" (high-level simulation models that can execute at sufficient high speed so that they can be used to develop the SW). Can the space community make use of the already developed ESL tools for the embedded market? Are there any limitations to this approach for the space market ? Are there other domains (outside the embedded market) which have solutions which could be transferred to space ?

#### What is the impact on validation plans by the formal introduction of models? How is the traceability ensured today?



- 1. Concerning the validation philosophy at which level should FDIR aspect be included for verification purposes ?
- 2. How can the evolution of models along the integration and verification activities help to optmimse the testing levels ? Which tests need to be repeated between unit, subsystem and system level ?
- 3. Where do you expect that HW models (like EMs) will be replaced by SW models in the near future ?

### Which system properties (data) are required and what function do they have? How is this handled today?



- 1. Is there a need of an integrated system data repository to ensure the consistency of this data ?
- 2. How much does an "automatic" link between system engineering data and (simulation) models depend on a common architecture?
- 3. Are there domains which could provide technologies / description methodologies to exchange system information ?

# How are models validated and maintained throughout the avionics lifecycle?



- How far can we define the requirements and features of the various models that are needed in various phases of the V&V process ? What is their evolution (e.g. time accuracy, communication layers, functionality....) ? How can we then (formally) verify them ?
- 2. Is model validation today already included in the overall system validation plan?