

# 17th ESA Workshop on Avionics, Data, Control and Software Systems ~ ADCSS2023 ~

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... it is **NOT** authorised to walk unaccompanied  
in Zone/Area 2 corridors!!!!

In case you have a meeting with ESTEC Staff,  
please arrange for pick-up at the ESTEC Reception by your host.

He/she should also bring you back to the ESTEC Reception.

After each presentation there will be a short amount of time for Q&A.

Please raise your hand and you will be handed our lovely 'catch box'.

Before asking your question,

it would be appreciated if you mention your name & company/affiliation

For the people following via WebEx please mention your question in the WebEx chat.

There is a Shuttle Bus from ESTEC Reception to Noordwijk Hotels  
and one to Schiphol Airport

Shuttle departure times are available at the Registration Desk.

For booking, please go to the ESTEC Main Reception during Coffee/Lunch Break.

**Be aware that the Shuttle Bus leaves on time!!**

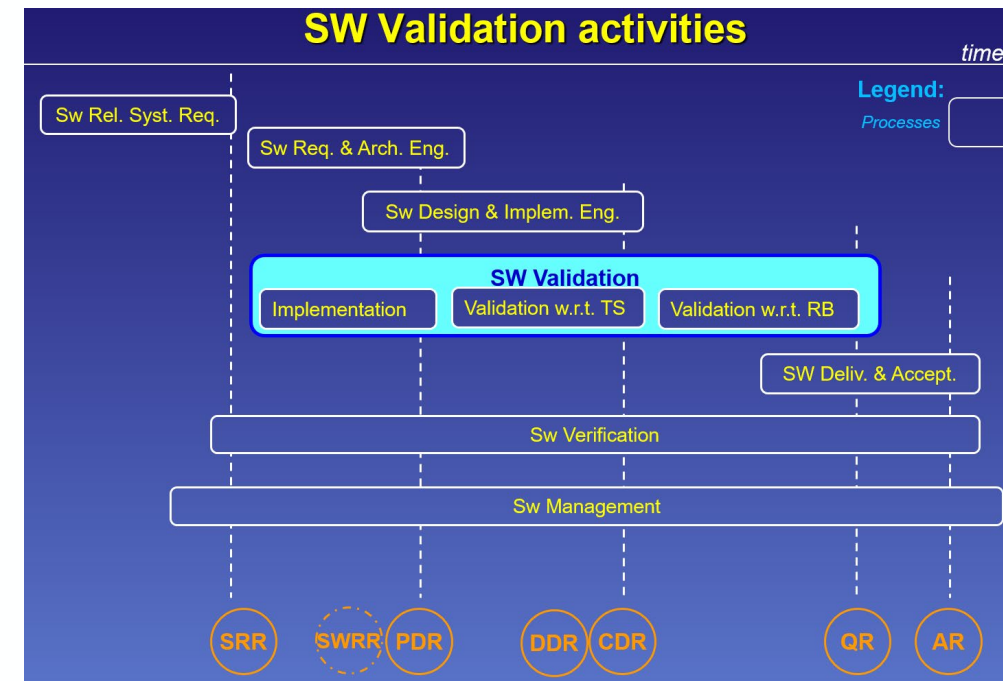
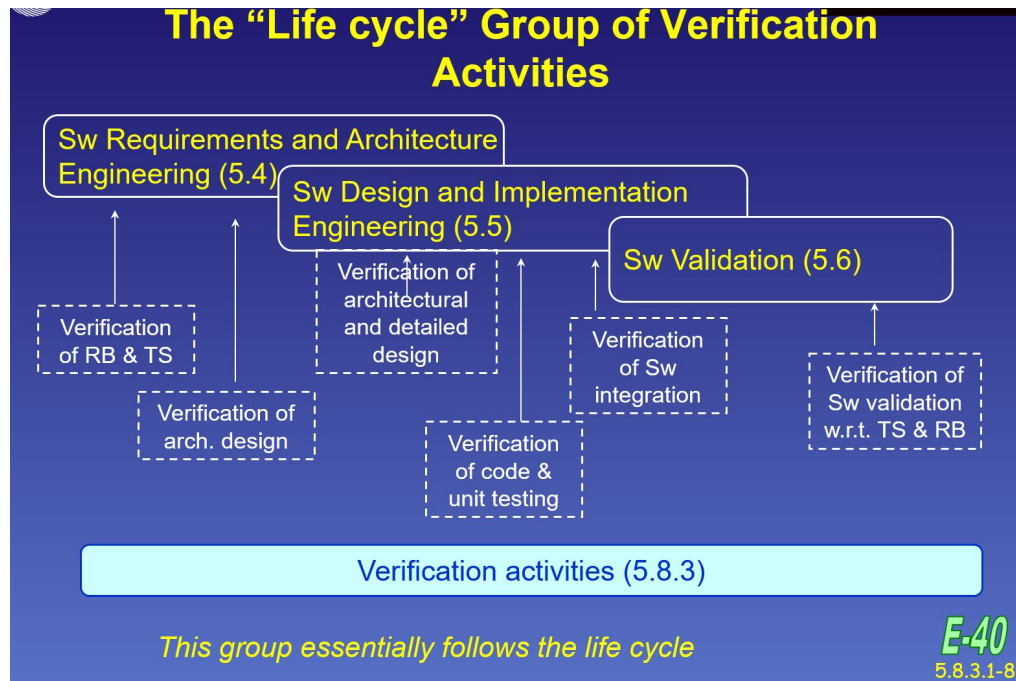
In case the Shuttle departure times are not convenient,  
a regular taxi can be booked too.

**Please note that pictures will be taken during the Workshop for  
publicity & advertising**

**For people who don't want to be in the picture,  
please locate yourself in the 2<sup>nd</sup> half of the room**

	Monday 13/11	Tuesday 15/11	Wednesday 16/11
08:00		Registration	Registration
09:00		Data Handling	Modern techniques for software verification and validation
13:00	Registration	Lunch Break	Lunch Break
14:00	SAVOIR - Space AVionics Open Interface aRchitecture	Towards zero-debris AOCS and GNC systems	Artificial Intelligence applied to fault detection on board spacecraft
18:00	Welcome Drink	End of Day 2	End of ADCSS2023

- **Verification and Validation activities** in E40C/Q80C are quite extensive, and the **SW systems are becoming quite large & complex**; corresponding SW artefacts are just huge (e.g. a typical SW Technical Specification is around 1000 pages, without considering ICDs).
- **New methods for verification and validation** are needed, together with the **proper tools**, to manage the complexity.
- **Verification activities** (e.g. Model-Based approaches, verification of test suites, schedulability analysis, static code analysis, dynamic code analysis, extra verification activities for category A SW, ...)
- **Validation activities** (e.g. multi-core approaches, RTOS – Hypervisors; address complex architectures, use other validation methodologies e.g. model-based testing, ...)



WEDNESDAY, NOVEMBER 15



9:00 AM → 1:00 PM Modern techniques for software verification and validation

9:00 AM **Welcome & Introduction** 10m

9:10 AM **ISVV for Evolutions in Software Development Methods and Processes** 25m  
Speaker: Nuno Pedro Silva (Critical Software)

9:35 AM **Methodology and Tooling to Reach Category A Software** 25m  
Speaker: Andoni Arregui (GTD)

10:00 AM **Applicability of Fuzz Testing to Flight Software** 20m  
Speaker: Fabrizio Pastore (SnT - University of Luxemburg)

10:20 AM **Applicability of Mutation Testing Method for Flight Software** 30m  
Speaker: Fabrizio Pastore (SnT - University of Luxemburg)

10:50 AM **Coffee Break** 30m



10:50 AM	Coffee Break	🕒 30m
11:20 AM	<b>Plato N-DPU ASW dual-core architecture and the V&amp;V approach followed</b> Speaker: Philippe Plasson (LESIA)	🕒 25m
11:45 AM	<b>TAS-I multi-core SW architecture and the V&amp;V approach</b> Speaker: Domenico Teodonio (Thales Alenia Space - Italy)	🕒 25m
12:10 PM	<b>Cybersecurity by Design for Mixed Criticality Embedded Systems</b> Speaker: Thierry Maudire (Sysgo)	🕒 25m
12:35 PM	<b>Modern OBSW verification with Rust and data-oriented design patterns</b> Speaker: Michael Melchiorre (Airbus DS)	🕒 25m
1:00 PM → 2:00 PM	Lunch Break	🕒 1h

Have a good session and remember that ideas in this area are always welcome!

## Verification and Validation

- **ISVV Handbook Improvements** from project use-case - **Objective:** to demonstrate the use of the ISVV Handbook in a real project.
- **Methodology and Tooling to Reach Category A Software – Extension** - **Objective:** Raise TRL of Cat-A toolset, more use cases, code generation tools, improve target coverage, programming languages, ISVV gap.
- **Category-A SW and data coverage verification** – **Objective:** to study the verification and validation of the data included within a flight software image loaded into an on-board computer, with the main objective of defining a methodology to verify and validate such data, together with a toolset supporting it.
- Improve **Mutation Testing** in Space Software Systems - **Objective:** to define a methodology and toolset to do test suite verification and test suite improvements.
- **Augmented Observability** of OBSW for enhanced testing - **Objective:** to augment the OBSW observability capabilities thanks to innovative mechanisms.
- **Software validation using Artificial Intelligence techniques to automatically generate tests** - **Objective:** To automatically generate tests for software validation.

- Open Source **Software Randomisation Framework** for Probabilistic WCET Prediction and Security on (multicore) CPUs, GPUs and Accelerators - **Objective**: develop an open source, qualifiable and platform agnostic software randomisation source-to-source compiler framework.

## Modern SW methods

- **C++20** for Flight Software development - **Objective**: to research the latest version of the standard and determine if it is suitable for flight software development
- **cRustacea in Space** - Co-operative Rust and C embedded applications in Space - Theory and Practice
- Evaluation of **Rust usage** in space applications by developing BSP and RTOS targeting SAMV71
- Using game engine techniques and **Rust** to modernize On Board software

**Objective**: to evaluate the use of Rust for flight-software development.

- Artificial Intelligence applied to **code repair** after code static analysis verification - **Objective**: to create an AI-based solution capable of automatically repairing code with the lowest human intervention.

... And some others