SAMARES ENGINEERING

TITLE: Animating Operational Scenarios With 3D Design Framework

## Duration and period

6 Months

Context

Samares-Engineering delivers services in systems engineering and specially to support Model-Based Systems Engineering (MBSE). Samares-Engineering provides consulting and innovative solutions for design offices of different domains: avionics, space, energy, railway…

MBSE gets more and more importance in the industry, especially when consistent method is provided with tools. Indeed, modelling language such as UML / SysML is just a notation. Within Samares-Engineering, we are developing a SysML method that enables system engineers to simulate their System-of-Interest at each step of the modelling process, from context to architecture. In current practices, the operational context of a system, i.e. its context of use, is often not much representative. For instance, the following Figure shows the best we can do today using SysML alone. It represents the operational context of an UAV and interactions with its environment.
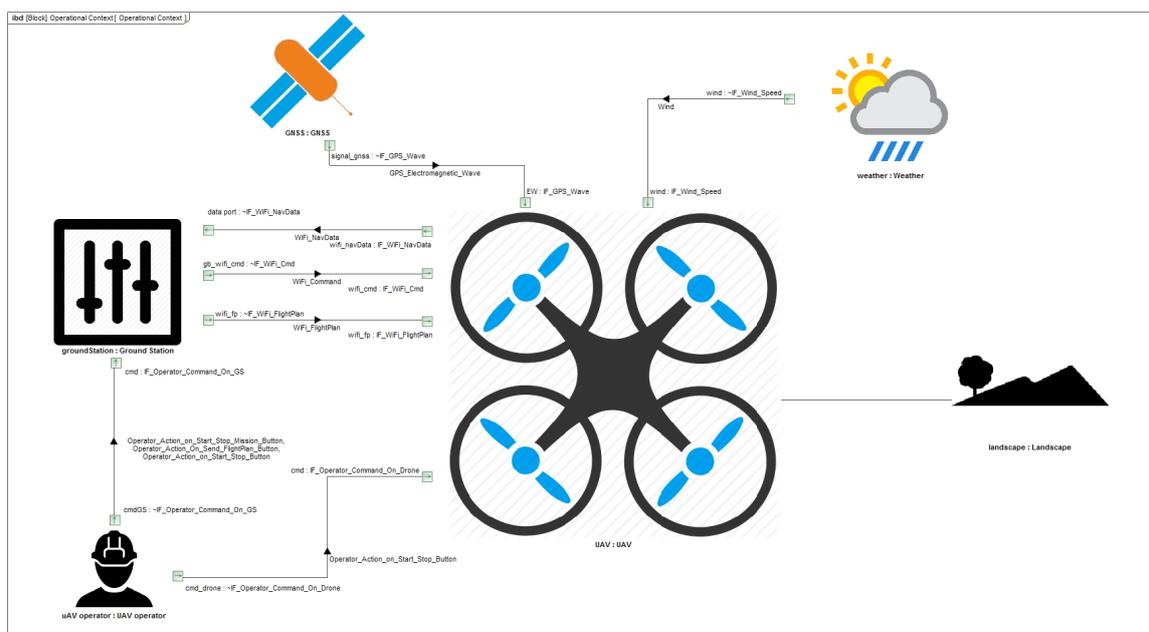
This kind of diagram can be animated (visualising flow propagations on the connector) but it remains difficult for end user or customer to clearly understand what really happens and thus to validate modelled behaviour. It would be useful to provide engineers the capability to start modelling the operational context in SysML while being able to connect it to 3D model libraries and 3D framework .

Indeed, the SysML model could become the specification of a 3D environment. Then, providing solutions that mix abstract view (SysML) and "real-world" view (3D) could lead to innovative immersive approach where engineers could review and validate operational scenarios in a "digital context" at any moment of the modelling method.

In this context, Samares-Engineering would like to integrate 3D capabilities in combination with a SysML method to better visualize and validate the operational context and especially the operational scenarios of the system under design.

Goal and tasks

Goal: main goal is to connect 3D framework with SysML Cameo System Modeler, to enable the integration of a precise system's environment at the operational context level in order to animate operational scenarios.

Tasks
1. Understanding of the State-of-the-Art about integration of 3D framework with SysML concepts.
2. Looking for open-source and commercial 3D framework that could answer to the stated problematic.
3. From a SysML model of an operational context and operational scenarios, study and propose a way to connect the model to a 3D framework that provides object libraries.
4. Implementation of a connector that animate the operational scenarios model while retrieving and displaying the result in a 3D environment.
5. Final report: synthesis, recommendations, and suggestions of new features to be implemented.

Note: time allocated to each task is not yet defined and will be established at the beginning of the internship according to the data already available to prepare each task. Some tasks might be updated during internship to be extended if needed or shorten if results are available before planned period. In addition, it may happen that a new task is requested if it can help improving topic. New task may come from intern, Samares-Engineering, or other partners.

Pedagogical goals

Intern will develop skills/knowledge in systems engineering and more especially in model based system engineering with focus on architecture modelling, model-driven engineering technologies, (distributed) simulation and co-simulation.

Technical and functional environment

For implementation, deep knowledge in Java language is required. Knowledge in C and C++ is also a strong asset.

Intern profile and expected skills

Engineering background and especially in Software Engineering, knowledge in model based engineering and system engineering (modelling and simulation).
Motivation and serious, you are curious about learning new methods and tools and have some autonomy to find by yourself a first level of answers to your main questions. Consider that Samares-Engineering will bring vision, context, regular guidance and support.

Location
TOULOUSE / BLAGNAC

Internship compensation
825 € / month

Contact
Please send your candidature to: contact@samares-engineering.com or by mail to
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