

Research internship: Contribution to the Development of an Approach using Formal Methods to Verify AADL Model Transformations

Institute: [LTCI Lab](#), [Telecom Paris](#), [Institut Polytechnique de Paris](#), Palaiseau, France

Contact: Dominique Blouin (dominique.blouin@telecom-paris.fr)

Disciplines: Software engineering, formal verification, model-based engineering, cyber-physical systems, embedded systems

Context:

The design of cyber-physical systems requires models to specify, analyze and synthesize the systems to detect design errors early in the development cycle and to reduce development efforts. In this context, the Architecture, Analysis & Design Language ([AADL](#)) has been developed for the modeling of cyber-physical and real-time embedded systems. To support various modeling activities, model transformations are an essential ingredient by allowing to translate an architecture model into different formalisms used to verify the system, and to refine an architecture model by adding implementation details in a step towards code generation. To achieve this, we have developed the Refinement of AADL Models for the Synthesis of Embedded Systems tool ([RAMSES](#)) and we are interested in verifying the various model transformations it employs.

Objective:

The internship consists of contributing to the development of model transformation verification methods in the context of the RAMSES tool for its model transformations implemented with the Atlas Transformation Language ([ATL](#)). The intern will contribute to developing the approach and to prototype and validate it on realistic AADL models. The intern may have to work with formal proof assistant languages such as Coq and / or Event-B. The prototype will be mostly developed with the Eclipse Modeling Framework) implemented in Java.

Tasks:

- Update the current state of the art we currently have on the verification of model transformations.
- Review / update our current approach based on the [Coq](#) proof assistant accordingly.
- Prototype the approach on a simple toy example and later a realistic example of RAMSES.
- Participate in writing technical documentation and scientific publications.

Skills:

- Basic knowledge of formal methods
- Knowledge in model-based engineering, model transformations and the EMF would be a plus.