

Contact:

- Dominique Blouin, Télécom Paris (dominique.blouin@telecom-paris.fr)
- Jean Leneutre, Télécom Paris (jean.leneutre@telecom-paris.fr)
- Olivier Levillain, Télécom SudParis (olivier.levillain@telecom-sudparis.eu)
- Gregory Blanc, Télécom SudParis (gregory.blanc@telecom-sudparis.eu)

Subject: Platform engineer position

Context: Interdisciplinary Center for Defense and Security Studies (CIEDS), Institut Polytechnique de Paris

Duration: 3 years

Motivation:

The **CERES** project (*Cybersecurity Evaluation in Realistic EnvironmentS*) is one of the first research and innovation projects from the *Interdisciplinary Centre for Defense and Security Studies (CIEDS)* of **Institut Polytechnique de Paris**. It combines the expertises of two research teams (ACES at Télécom Paris and R3S at Télécom SudParis) in model-driven engineering and industrial information systems security.

The main objective of CERES is to **assess the security** of **cyber-physical** systems of systems in **realistic conditions** using multiple, heterogeneous modelisations of parts or the entirety of the target system. As a matter of fact, the accelerated development of such systems in constrained periods of time leads to drastic engineering choices such as the reuse of existing software or hardware blocks that are not under our control. Thus, it becomes *difficult to define and/or ensure security properties*. It appears necessary to provide a methodology to 1) **specify security properties** that are expected from the system, 2) **deploy mechanisms** to enforce security policies, and finally 3) **verify the efficiency** of those mechanisms.

Developing this methodology requires more or less *realistic* modelizations (relying on more or less physical components) : a pure model, a dataset, an **isolated component or prototype**, and the **digital twin** (a complete system replica integrating data related to the operational state, expert knowledge, similar systems information or data collected from the target system's environment). With respect to these last two modelizations, it is necessary to **build and maintain platforms** integrating real or realistic subsystems. The considered use case is the **building management system (BMS)**.

Proposed work:

The main tasks revolve around building platforms implementing a digital twin for co-simulation, i.e., a realistic industrial system with respect to its architecture or the involved subsystems but at a smaller scale. Some of the heaviest equipments will thus be replaced by smaller models – or even by simulations, at first. The platform engineer will have to train oneself to the use of these subsystems using specific training kits. The main missions of the engineer are :

- defining/designing the subsystems composing the BMS
- collect pricing quotes for the purchase of the subsystems
- build an animated platform (for a single subsystem)
- reproduce this work for other subsystems while integrating environment data from the digital twin
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- integrate the subsystems in to a complete system
- maintain the platforms (software, hardware, system)
- administer the platform system

Required skills:

The candidate **MUST** hold a computer science diploma (MSc or engineering degree) and have experience in one of the following domains: cyber-physical systems, embedded systems, building management systems. Skills in systems, networks administrations and model-driven engineering are desirable but not mandatory.