Post-doctoral position – 12 months

	Title: Safety verification process of the ETCS Level 3 moving block system considering the uncertainties in train position **Location:** Univ-Eiffel, IFSTTAR – Lille Campus COSYS/ESTAS, France
Université Gustave Eiffel	

Host laboratory

Université Gustave Eiffel is a French multidisciplinary university of national importance. Since the 1st of January 2020 this new institution has brought together a university (UPEM), a research institute (Ifsttar), a school of architecture (Éav&t) and three engineering schools (EIVP, ENSG and ESIEE Paris). Ifsttar, the French institute of science and technology for transport, development and networks, is the research institute that joined Univ-Eiffel. Recognized as a reference organization in the international arena, Ifsttar conducts targeted research and expert appraisals in the fields of transport, infrastructure, natural hazards and urban issues, with the aim of improving life conditions of citizens and, more broadly, promoting the sustainable development of our societies.

The ESTAS laboratory (Evaluation and Safety of Automated Transport Systems) of the COSYS department (Components and Systems) develops methods, techniques and tools intended to help analysing the safety of guided transport systems. The finalized research, which is one of the main features of ESTAS, finds its foundations in the synergy between applied research and feedback from expertise and technical assistance activities in the field of guided transport systems.

Details

Context

The present position is in the framework of the PERFORMINGRAIL project (PERformance-based Formal modelling and Optimal tRaffic Management for movING-block RAILway signalling), supported by Shif2Rail.

Work description

Rail track occupancy management according to moving block principles are investigated today in several works, in particular to ensure that all the safety properties related to train operation are met (or reciprocally, to check inconsistencies). Causes leading to wrong size of moving blocks or causes hindering the on-board system to adjust on-time the size of a block, are specific safety issues that need a particular care. Indeed, such scenarios may lead to hazardous situations such as, for instance, a too small protection zone placed around a train or a zone placed incorrectly around it.

Based on the ESTAS past researches on formal verification techniques on railway critical systems and safety analyses on train localisation, the works intended in this post-doctoral position aim at investigating uncertainties and errors in train location data on ETCS-Level 3 operation. Such data refer to the train head and rear-end positions, as well as its integrity status. The objective is to develop a formal model-based approach contributing to the safe specification of the critical rail moving block systems. These researches will also contribute to determine the added value pertaining to the usage of EGNSS (European Global Navigation System) and possibly other positioning systems for moving block safety.

Candidate profile:
- PhD. degree in automation engineering, computer science or applied mathematics
- Knowledge in dependability and safety, system analysis and formal modelling
- Experience in railway signalling systems will be appreciated
- Fluent English, writing and synthesis skills, sense of initiative, travels foreseen (according to sanitary conditions)

Information:
- The application (resume and cover letter) has to be addressed by e-mail **as soon as possible** to: julie.beugin@univ-eiffel.fr and mohamed.ghazel@univ-eiffel.fr
- Type of contract: fixed-term contract of 12 months
- Gross salary: ~2 500 € / months