Université de technologie de Compiègne – Thesis proposal

Part 1: Scientific sheet	
Thesis proposal title	Secure channel access protocols for the communication of fleets of heterogeneous mobile objects (FMHs) in a Fog/Edge computing environment
Research laboratory	MESR
Laboratoire d'accueil	unité de recherche : HEUDIASYC équipe de recherche :SCOP site web : https://www.hds.utc.fr/recherche/equipes-de-recherche/scop-surete-communication-optimisation.html
Thesis supervisor(s)	Hicham LAKHLEF (HDR)
Scientific domain(s)	IT, electronics, Engineering sciences
Research work	Unmanned aerial and ground mobile objects have enormous potential for the development of new applications in various fields, ranging from military, security, health applications to traffic monitoring applications. In addition, these fleets will generate considerable amounts of data which will be analyzed by monitoring stations. The management of these quantities of data will require the use of Fog / Edge computing type outsourcing architectures which make it possible to offer a data storage and access service close to end users and with very reduced latency times. . However, there are many obstacles that must be lifted before it is possible to effectively deploy fleets of heterogeneous air and ground mobile objects without pilots. Mention may in particular be made of communication security and quality of service (QoS), for example making it possible to prioritize the reliable transmission of urgent messages in the shortest possible time. Added to this is the problem of secure management of data generated by mobile objects and stored in Fog / Edge servers. The objective of this thesis project is the study and development of innovative and robust solutions for securing the communication chain of fleets of mobile objects while ensuring quality of service in a Fog/Edge computing storage environment. . We will offer a solution based on secure self-organization to access communication time slots while offering a high level of QoS (in terms of communication reliability as well as emergency management). We will also provide effective mechanisms for verifying the integrity of data stored with Fog / Edge servers.
Key words	FMHS, security, communication, IoT, distributed systems
Requirements	Master 2 ou ingénieur en informatique, connaissances en réseaux et ou sécurité
Starting time	1/11/2023
Location	Laboratoire Heudiasyc UMR-CNRS, Université de Technologie de Compiègne

Part 2: Job description

Duration	36 mois
Additional missions available	Teaching starting from the second year
Research laboratory	Heudiasyc UMR-CNRS
Material resources	Funding of the doctorate, its missions and the necessary equipment
Human resources	(nb EC, BIATSS/ITA, doctorants, post-docs etc de l'unité)
Financial resources	budget pour le fonctionnement de la thèse, éventuellement lié à un projet financé
Working conditions	autonomy expected, organization of weekly meetings with the thesis director.
Research project	(en cours ou envisagé, type de financement)
National collaborations	Université Polytechnique Hauts-de-France, CNRS IRISA
International collaborations	Emory University, USA
International cosupervision (cotutelle)	no
Contact	hlakhlef@hds.utc.fr

Please contact first the thesis supervisor before applying online
on https://webapplis.utc.fr/admissions/doctorants/accueil.jsf