Proposition de sujet de stage M2 (2020) à l'Institut de Pluridisciplinaire Hubert Curien (IPHC)

Evaluation of the performance of an ultra-light system for environmental radioactivity monitoring by UAV-based gamma spectrometry

The IPHC DeSIs (Dosimetry Simulation Instrumentation) group is currently developing a UAV-based gamma spectrometry system for accurate and large-scale mapping of environmental radioactivity. The counterpart of this measurement accuracy is the high total weight of the system of about 10 kg. Obtaining an authorization to fly is thus obligatory before taking measurements.

As part of the development of a general methodology to study the evolution of the ecosystem of the Fessenheim nuclear power plant (Juxta Rhenum project), it seems interesting to evaluate the measurement performance of a much lighter UAV-based gamma spectrometry system (<800 g). The main interest would be the exemption from authorization for the overflight of the mapped areas. This would make the environmental radioactivity mapping system much more versatile both in terms of the areas monitored (especially the proximity to houses) and the people involved in carrying out measurements.

The proposed internship focuses on the evaluation of the measurement performance of an ultra-light airborne gamma spectrometry system for the monitoring of radioactivity in the environment. The maximum weight requires the use of very compact detectors (<200 g), which strongly reduces the detection efficiency and measurement performance. The objective of this internship will be to evaluate in laboratory if the capacities of reconstruction of the environmental radioactivity of a drone system equipped with a detector of this type would bring relevant and interesting information within the framework of a radiological follow-up of the ecosystem of Fessenheim, and if so with what precision it can be done. The internship will combine experimental measurements (gamma spectrometry) and Monte Carlo simulation (Geant4, GATE) to achieve this goal.

The DeSIs group will not propose a PhD on this subject after the internship.

Encadrants : Nicolas Arbor (MCF)
Téléphone : **03 88 10 64 27**
Email : nicolas.arbor@iphc.cnrs.fr

Composition de l'équipe : Nicolas Arbor (MCF), Clément Corneille (Doctorant),Stéphane Higueret (IR), Daniel Husson (MCF), Abdel-Mjid Nourreddine (Pr), Emilien Wilhelm (IR), Julien Masseron (IE)

Nom du responsable et intitulé du laboratoire d'accueil : ***BARILLON Rémi***
Adresse : ***Institut Pluridisciplinaire Hubert Curien (IPHC)***
23 rue du Loess, BP 28 – 67037 STRASBOURG CEDEX 2