The French-German Research Institute of Saint-Louis (ISL) situated in the border triangle of Germany, France and Switzerland is an internationally renowned research institute belonging to a global industrial and economic network. The spectrum of our core activities comprises a variety of topics: aerodynamics, energetic and advanced materials, lasers and electromagnetic technologies, protection, security and situational awareness. Our activities are related to both basic and applied research.

The challenge will lie in developing general methods which will allow the derivation of optimal guidance strategies leading to the maximum possible range. For special cases, analytical solutions are expected, while for more general cases, only numerical solutions are probably possible.

The main tasks of the project will consist of the following steps.

- Development of a mathematical model of the projectile with appropriate force and moment modeling depending on the aerodynamic configuration.
- An extended literature survey to assess the existing knowledge on guidance laws which could be promising for projectile range extension.
- The core of the PhD will then focus on the development of new guidance strategies to satisfy the mission criteria described above, while respecting implementation simplicity and mathematical rigour.

Candidate profile and embedding

The PhD candidate shall be able to work independently as well as in a multidisciplinary environment collaborating with scientists, engineers, and other PhD students working in the field of aerodynamics, exterior ballistics, flight mechanics, guidance, navigation, and control. Desired qualities and knowledge:

- Motivated, diligent, and committed in realizing his/her duties
- Knowledge on dynamical systems, control systems, and MATLAB/Simulink
- Knowledge in aerodynamics and flight mechanics is not essential, but would be considered as an asset

The PhD candidate will join the GNC group of ISL, one of the four groups in the division “flight techniques for projectiles.” The GNC group has a particular expertise and a proven track record in designing and implementation of high performance algorithms for flying vehicles.