



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.

ISL is offering a **PhD Position**

Research field: Flight techniques for projectiles

Supermaneuverability flight control for unstable aerospace systems

Introduction

Next generation industrial aerospace systems will need to operate within rapidly changing environments and often across a wide spectrum of operating conditions. The quest for increased flight performance and agility naturally leads to the adoption of unstable airframes whereas high levels of autonomy and resiliency require bespoke flight control laws and advanced analysis tools. The proposed PhD project aims to leverage on advanced theoretical and practical concepts regarding the design of such systems in order to satisfy often conflicting requirements to the maximum possible extent.

Context

The typical paradigm of an aerospace flight control system involves a baseline layer that takes into account nominal and uncertain system requirements in a linear and/or nonlinear framework. When the airframe though undergoes rapid flight maneuvers then its actuators and sensors may saturate leading to performance degradation or even instability. A plausible solution to this issue is the inclusion of a so-called anti-windup (AW) layer additionally to the baseline aiming to guarantee optimal functioning even beyond the limits of the airframe nominal capabilities. Several approaches such as direct linear AW, model recovery AW, reference governor, may be considered and combined with advanced linear-parameter-varying (LPV) tools to provide with a complete flight control solution. Most importantly the proposed flight control laws need to be also robust against aerodynamic and mechanical uncertainties as well as rapidly changing operating conditions.

Framework

The potential PhD student will join the Guidance, Navigation and Control (GNC) department of the French-German Research Institute of Saint-Louis and the Institute of Aerospace Engineering of the Technical University of Dresden for a period of three years to perform applied and theoretical research, supported by both the French and German branches of the MBDA company. The candidate will benefit from both an industrial and academic environment and will be encouraged to advance in several disciplines related to the broad area of flight dynamics and control of aerospace systems.

Benefits

The package for the student includes an attractive salary (~2000 € net/month), complete health insurance, dining and sport activities as well as access to low cost housing. Additional benefits include separate allowances for the participation in national and international conferences as well as in academic training. Interested candidates (EU nationality is a requirement) are encouraged to apply for the position enclosing a detailed CV, a motivation letter and two recommendation letters.

French-German Research Institute of Saint-Louis (ISL)

Dr. Spilios THEODOULIS – Guidance, Navigation and Control
5 rue du Général Cassagnou – 68301 Saint-Louis – France
spilios.theodoulis@isl.eu – tel : +33 (0)3 89 69 50 54

