

Postdoctoral Research Position: Pilot and Aircraft State Estimation for Adaptive Cockpit AI

Key words: Human-machine teaming, AI, Human factors, Cockpit Assistant

Département: DCAS

JOB DESCRIPTION:

The European TRUST IA project aims to develop an intelligent cockpit assistant, from Technology Readiness Level (TRL) 2 to TRL 4, to support future commercial aircraft operations while ensuring safe, trustworthy and pilot-centred Human-AI Teaming (HAT). The project brings together Cranfield University (coordinator), ISAE-SUPAERO, Technische Hochschule Ingolstadt (THI) and Rolls-Royce, with input from an advisory board including aviation industry stakeholders such as Airbus, Thales and Air France-KLM. The postdoctoral researcher will contribute to the development and validation of a multimodal, context-aware framework for real-time estimation of pilot and system states. The ultimate goal is to integrate pilot physiological signals, behavioural data, human-AI interaction metrics, and aircraft and engine parameters to estimate the joint state of the human-AI team and enable safe, trustworthy and adaptive human-AI teaming in aviation.

MISSIONS:

The post-doctoral research will focus on:

- Multimodal state estimation combining physiological, behavioural and flight-system data to assess pilot workload, stress, trust, and startle responses in relation to the operational context.

- Machine learning and data fusion: developing and comparing machine learning approaches, including classical models, recurrent neural networks and hybrid neuro-symbolic methods, to achieve robust, interpretable and safety-aware state estimation.
- Adaptive AI assistance: evaluating how integrated team-state estimates can inform the level and type of assistance provided by the intelligent cockpit assistant, including cognitive workload mitigation and startle recovery.
- Experimental validation: assessing model performance and assistance strategies in simulation environments of increasing realism, from synthetic piloting task (MATB) to X-Plane and PEGASE flight simulators, under both nominal and non-nominal flight scenarios. Different levels of assistance will be assessed.



Figure 1: The PEGASE flight simulator, halfway between high-end simulation and individual computer simulation, is ideal for human factors and cockpit assistant research.

REQUIRED PROFILE:

Candidates should hold a PhD in Computer Science, Robotics, Artificial Intelligence, Cognitive Science, Neuroscience, Human Factors or a related discipline. A strong background in one or more of these fields is expected.

- A solid understanding of computer science, AI, robotics, cognitive science or machine/deep learning.
- An interest in human behaviour, neuroscience, cognitive processes and/or human-AI interaction.
- Strong scientific and analytical skills, including the ability to design experiments, analyse data and interpret results.
- Programming proficiency in Python, C# or C++; experience with Unity is an advantage.

- Experience with physiological or behavioural data, multimodal data fusion, state estimation, machine learning or simulation environments would be beneficial.
- Motivation to work in an interdisciplinary research project connecting AI, human factors and aviation.

Candidates who do not meet every technical criterion but demonstrate strong scientific aptitude and a willingness to develop their programming skills will also be considered.

DURATION:

The postdoctoral position will be offered for an initial period of 18 months, with the possibility of a one-time renewal for an additional 18 months, depending on the results achieved.

LOCATION:

The position will be based at ISAE-SUPAERO, Toulouse, France. The postdoctoral researcher will work in an interdisciplinary and international research environment involving academic and industrial partners. The position will include experimental work using task simulations and realistic flight-simulation environments.

RESPONSIBLE OF THE POST-DOCTORATE:

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APPLICATION PROCESS:

To apply, please send the following documents to mickaelcausse@isae.fr:

- A CV detailing academic qualifications, research experience and technical skills.
- A cover letter describing research interests and suitability for the position.
- Two reference letters.

APPLICATION DEADLINE: The application deadline is 16 November 2026, and the expected start date is 4 January 2027.

REFERENCES:

- Causse, M., Chua, Z. K., & Rémy, F. (2019). Influences of age, mental workload, and flight experience on cognitive performance and prefrontal activity in private pilots: A fNIRS study. *Scientific Reports*, 9, 7688.
- Kohn, S. C., de Visser, E. J., Wiese, E., Lee, Y.-C., & Shaw, T. H. (2021). Measurement of trust in automation: A narrative review and reference guide. *Frontiers in Psychology*, 12, Article 604977.
- Taheri Gorji, H., Wilson, N., VanBree, J., & others. (2023). Using machine learning methods and EEG to discriminate aircraft pilot cognitive workload during flight. *Scientific Reports*, 13, 2507.