



# Job Description & Person Specification

## Section 1 Role Overview

|                                     |                                                                                                        |
|-------------------------------------|--------------------------------------------------------------------------------------------------------|
| Job title:                          | Research Fellow in AI-Enabled Flight Deck Systems Integration and Validation                           |
| Vacancy reference:                  | 5419                                                                                                   |
| Faculty /Professional Service Unit: | Faculty of Engineering and Applied Sciences                                                            |
| Theme:                              | Aerospace and Aviation                                                                                 |
| Job type:                           | Full time<br>Fixed Term Contract for 37 months or until 30 April 2030, whichever is sooner             |
| Hours of work:                      | 37 hours per week, normally worked Monday to Friday.<br>Flexible working will be considered.           |
| Salary details:                     | Salary level 5 – range £38,655 to £46,492 per annum<br>with potential progression to £53,108 per annum |
| Line Manager:                       | Dr Linghai Lu, Reader in Flight Dynamics, Simulation and Control                                       |
| Start date:                         | As soon as possible                                                                                    |

## Section 2

### About Cranfield University

Cranfield's world-class expertise, large-scale facilities and unrivalled industry partnerships is creating leaders in technology and management globally. Find out more about our unique impact, and our vision, mission and values [here](#).

We aim to create and maintain a culture in which everyone can work and study together and realise their full potential. We are a Disability Confident Employer. We are committed to actively exploring flexible working options for each role and have been ranked in the Top 30 family friendly employers in the UK by the charity [Working Families](#). Find out more about our key commitments to Equality, Diversity and Inclusion and Flexible Working [here](#).

## Section 3

### About Aerospace and Aviation

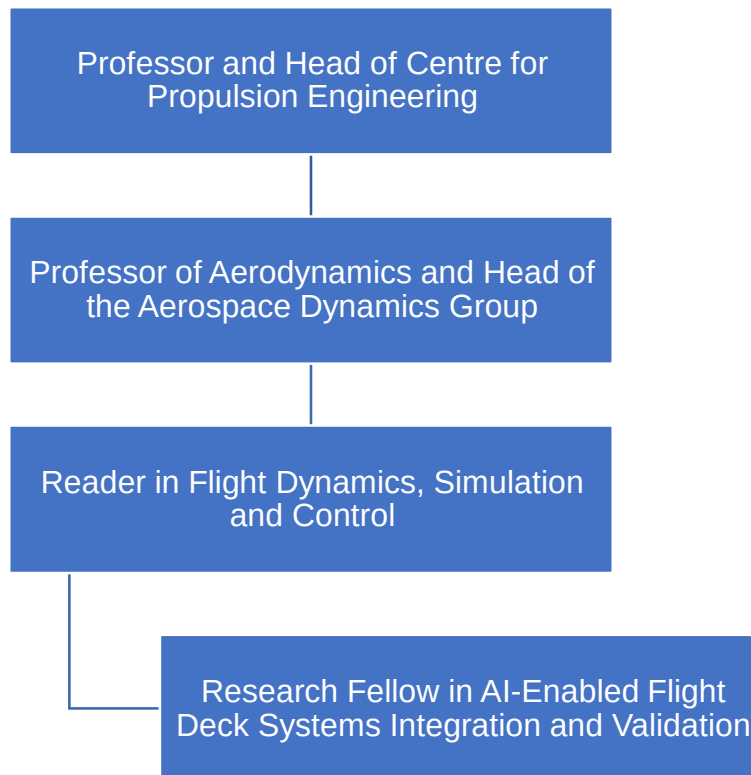
Aerospace has been at the core of Cranfield since the University was founded in 1946 as the College of Aeronautics. Our aerospace research and education now span aircraft design, aerodynamics, flight dynamics and control, propulsion, aerospace manufacturing, avionics and air transport, carried out in close partnership with industry, government and regulators. The University owns and operates its own airport and the National Flying Laboratory Centre, alongside large-scale facilities such as the Aerospace Integration Research Centre and the Digital Aviation Research and Technology Centre, so that work can move from analysis and simulation through to flight. Find out more [here](#).

### About the Centre for Aeronautics, Propulsion and Power

The Centre for Aeronautics, Propulsion and Power brings together Cranfield's expertise in aircraft design, aerodynamics, flight dynamics, propulsion systems and sustainable power. It has more than 120 staff, and around 250 postgraduate and doctoral researchers, and combines postgraduate teaching, research, industrial collaboration and continuing professional development with large-scale experimental facilities.

The post sits within the flight dynamics and simulation research led by Dr Linghai Lu, which covers flight dynamics, handling qualities, and the modelling and simulation of fixed-wing, rotorcraft and eVTOL aircraft, together with pilot-in-the-loop simulation and certification by simulation. Much of this work is carried out in the Future Systems Simulator (FSS), a reconfigurable research flight simulator for prototyping current future flight decks, developed with Rolls-Royce and DCA Design International. The FSS is the integration and demonstration platform for the TRUST-IA project. Please visit the Centre's webpage [here](#) for more details of our current activities.

# Organisational Chart



**Works closely with:** the TRUST-IA team at Cranfield (project coordinator: Dr James Blundell, Multimodal Interaction and Human Factors Team); technical staff supporting the FSS; research teams at Technische Hochschule Ingolstadt, ISAE-SUPAERO and Rolls-Royce; and the project's Industry and Regulatory Advisory Board.

# Section 4

## Job Details

### Job Purpose

TRUST-IA (Trustworthy Real-time User-Centred and Support Technologies for Intelligent Assistants in the Cockpit) is a 42-month Horizon Europe research project coordinated by Cranfield University, with Technische Hochschule Ingolstadt, ISAE-SUPAERO and Rolls-Royce as partners, developing a pilot-centred intelligent assistant for the flight deck of commercial aircraft, built from four technology bricks: an adaptive teaming behaviour engine; aircraft and engine state monitoring; pilot and team state estimation from physiological and behavioural data; and two-way multimodal interaction using voice, gesture, haptics and mixed reality. The application is engine management, from eco-piloting in normal operation to non-normal engine events.

The postholder will be the main researcher on Work Package 9, Technology Brick Integration. The role is to bring the partners' technology bricks together in Cranfield's Future Systems Simulator (FSS) so that they run in real time as one assist that pilots can fly with. This means building and maintaining the integration platform and its automated test framework, setting up the operational scenarios, running pilot-in-the-loop readiness checks and trials, and producing the validation and assurance evidence needed to take the integrated systems to TRL 4. The postholder will also manage the day-to-day running of the FSS laboratory.

### Key Deliverables

|   | Description of Deliverables                                                                                                                                                                                                                                                                                                                                                                                                                                           | % of time |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1 | <b>Integration Baseline and Interfaces (Task 9.1)</b><br><br>Complete and then maintain the WP9 integration baseline and the Interface Control Specification (D9.1, Month 12), covering data definitions, timing and latency budgets, synchronization and failure handling for the four technology bricks.<br><br>Run configuration control (Git versioning, change requests, release criteria), and prepare the monthly Integration Control Board with the partners. | 15%       |
| 2 | <b>Integration Platform and Automated Test Framework (Task 9.2)</b><br><br>Design, build and maintain the integration middleware and runtime orchestration in the FFS: message bus and API layer, time synchronisation, simulator input/output for sensors and interaction devices, and data logging.<br><br>Set up continuous integration with automated build, interface-compliance and regression tests (D9.2).                                                    | 25%       |
| 3 | <b>Technology Brick and Scenario Integration (Task 9.3)</b><br><br>Integrate the partners' pilot-state, aircraft/engine-state, teaming-behaviour and multimodal-interaction software and hardware through at least six integration sprints.                                                                                                                                                                                                                           | 20%       |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|   | Build the nominal and non-normal engine-management scenarios in the FSS, with event scheduling, triggers and instrumentation for workload and trust measures (D9.3).                                                                                                                                                                                                                                                                          |     |
| 4 | <b>Pilot-in-the-Loop Trials, Validation and Assurance Evidence (Task 9.4)</b><br>Preapre and run pilot-in-the-loop readiness checks and the integrated trails with airline and test pilots.<br>Process and analyse simulator, physiological and questionnaire data; assess timing, stability, adaptive transparency and authority handback; compile the validation and assurance evidence for D9.4 and for the project's EASA alignment work. | 20% |
| 5 | <b>Reporting, Publication and Handover (Task 9.5)</b><br>Write project deliverables and technical reports, including the final demonstrator handover and transition report (D9.5).<br>Publish in peer-reviewed journals and at conferences, present at consortium, Advisory Board and European Commission review meetings, and contribute to the project's dissemination activities.                                                          | 10% |
| 6 | <b>Management of the FSS Laboratory</b><br>Look after the day-to-day running of the Future Management Systems Simulator: bookings and scheduling; software and configuration control; routine hardware upkeep with technical staff; risk assessments and safe operating procedures; and induction and supervision of students and visiting partner staff using the facility.                                                                  | 10% |

Please be advised that the percentages allocated for the key deliverables may be adapted to take into account the needs of the Faculty and / or University.

## Planning and organising

You will plan your own workload against the WP9 schedule, which runs from completion of the interface specification at Month 12 to handover of the final demonstrator in April 2030. Integration is carried out in sprints, so you will agree with each partner what they will deliver and when, keep the integration backlog and release plan up to date, and make sure each release has been tested before it is used with pilots.

Pilot trials take several months to prepare: ethical approval, pilot recruitment, scenario packages, test procedures, and the attendance of partner staff and their equipment all have to be in place on the day. You will also plan the use of the FSS across TRUST-IA and its other users, so that the simulator is available and in the right configuration when it is needed.

## Communicating and influencing

You will work closely with engineers and researchers and Technische Hochschule Ingolstadt (Germany), ISAE-SUPAERO (France) and Rolls-Royce, as well as Cranfield colleagues working on multimodal interaction and Human Factors Group. Much of this is technical negotiation, agreeing

interface definitions, following up late or non-conforming software, and explain test failures clearly enough that they get fixed.

You will report progress at the monthly Integration Control Board, at consortium meetings and at the six-monthly Advisory Board reviews with industry and regulatory members, and you will brief and debrief the pilots taking part in trials. You will write project deliverables for the European Commission and papers for journals, and present the work at international conferences.

## Problem solving

Integration faults seldom sit inside one partner's module. Typical examples are a physiological data stream drifting against the simulator clock, an AI component that behaves differently on live data than on recorded data, or an interaction device that conflicts with the simulator's own inputs. You will need to trace problems of this kind across software, hardware and networks, reproduce them from logged data and scenario replays, and agree a fix with whoever owns the component.

You will also have to judge when a workaround is acceptable in a laboratory demonstrator and when it would affect pilot safety in the simulator or the quality of the experimental data.

## Decision making

### I) Decisions you will take without reference to others

- How integration software, test cases and data logging are implemented within the agreed architecture.
- Planning of your own work and day-to-day scheduling of the FSS.
- Whether a partner software release meets the agreed interface and test criteria and can enter the integration baseline.
- Processing and analysis methods for routine test data.
- Stopping a simulator session on safety grounds.

### II) Decisions you will refer to your manager/colleagues

- Changes to the interface specification or integration architecture that affect partners.
- Trial protocols, pilot recruitment and ethics applications.
- Purchase of equipment, software or services, and any other spending from the project budget.
- Changes to the content or timing of deliverables.
- Access to the FSS for users outside the project.
- Submission of publications, and any release of project data or software outside the consortium, which is governed by the Consortium Agreement.

## Guiding framework

The work is governed by the Horizon Europe Grant Agreement and the TRUST-IA Consortium Agreement, including their requirements on reporting, intellectual property, confidentiality and open access. Pilot trials need approval through the Cranfield University Research Ethics System (CURES), and personal and physiological data must be handled in line with UK GDPR and the University Data Protection Policy.

Work in the simulator follows University Health and Safety Policy, the laboratory risk assessments, and the FSS operating procedures. On the technical side, the project's interface control and configuration management procedures apply, and the integrated system is expected to follow

emerging EASA guidance on trustworthiness AI in aviation. University policies on research integrity apply throughout.

## Impact

The integrated demonstrator is where TRUST-IA comes together. If the technology bricks cannot be made to work as one system in the FSS, the project cannot carry out its final pilot-in-the-loop validation or show TRL 4. The postholder's work therefore bears directly on the five WP9 deliverables, on the assurance evidence passed to the project's EASA alignment work, and on Cranfield's standing as project coordinator.

The integration platform, test framework and scenarios will stay in the FSS after the project, giving the University a reusable capability for future flight deck and human-AI teaming research with industry.

## Facts and Figures

- Project: TRUST-IA, Horizon Europ (topic HORIZON-CL5-2025-03-Two-Stage-D5-09), Grant Agreement 101271428, 42 months.
- Consortium: Cranfield University (Coordinator, Dr James Blundell), Technische Hochschule Ingolstadt, ISAE-SUPAERO and Rolls-Royce plc, supported by an Advisory Board of airframe, airline and regulatory stakeholders.
- WP9: five tasks and five deliverables (D9.1 to D9.5); four technology bricks integrated in the FSS; target TRL 4.
- At least six integration sprints, and at least two pilot-in-the-loop readiness checks, with three to four pilots each, before the final integrated trials.
- Post: 37 months, 1 April 2027 to 30 April 2030. No line management or budget-holding responsibility.

# Section 5

## Am I suited to this role?

| Criteria                          | Essential                                                                                                                                                                                                                                                                                                                                        | Desirable                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Education / Qualifications</b> | PhD in aerospace engineering or a related engineering discipline, or equivalent research experience.                                                                                                                                                                                                                                             | <p>Membership of a relevant professional body (e.g. RAeS, IMechE or IET).</p> <p>Formal training in AI or machine learning (e.g. postgraduate modules or recognised courses).</p> <p>Pilot's licence or flight training experience.</p>                                                                                                                                                                                                           |
| <b>Experience</b>                 | <p>Research in aerospace modelling and simulation, flight dynamics or flight control.</p> <p>Developing real-time simulation software, or integrating software systems built from several components.</p> <p>Writing technical reports and publishing in peer-reviewed journals or at conferences.</p>                                           | <p>Planning and running pilot-in-the-loop or human-in-the-loop simulation trials (training will be given).</p> <p>Integrating AI or machine-learning components, or sensor hardware such as eye trackers or physiological sensors, with a simulator or other real-time system.</p> <p>Day-to-day responsibility for a laboratory, simulator or test facility.</p> <p>Collaborative research projects with industry or international partners.</p> |
| <b>Knowledge</b>                  | <p>Aircraft flight dynamics and control, and the modelling and simulation of aircraft and their systems.</p> <p>A working knowledge of AI and machine-learning methods, sufficient to integrate and test AI software developed by others.</p> <p>Good software engineering practice, including version control (Git), testing and debugging.</p> | <p>Commercial flight deck systems and displays (e.g. PFD, ND, EICAS), and engine management.</p> <p>Aviation human factors, including measurement of workload, situation awareness and trust.</p> <p>Interface control, requirements traceability, and verification and validation.</p> <p>Real-time communication and middleware (e.g. UDP/TCP, ROS 2, DDS, Lab Streaming Layer).</p>                                                            |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           | EASA guidance on AI in aviation.                                                                                                                                                                                                                              |
| <b>Skills / Aptitudes</b> | <p>Good programming skills (e.g. C# / Unity, C++ or Python), shown by substantial research software.</p> <p>Clear written and spoken English, including the writing of reports and papers.</p> <p>Ability to organise your own work, meet deadlines and keep good technical records.</p> <p>Ability to work constructively with colleagues and partners from different disciplines and organisations.</p>                                 | <p>Substantial Unity development, including links to external hardware or simulation software.</p> <p>MATLAB/Simulink and flight simulation software (e.g. X-Plane).</p> <p>Statistical analysis of experimental data (e.g. ANOVA, mixed-effects models).</p> |
| <b>Values</b>             | Ability to demonstrate our values: Ambition, Impact, Respect and Community.                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                               |
| <b>Other</b>              | <p>A positive, constructive attitude and willingness to learn new methods.</p> <p>Willingness to take responsibility for the day-to-day management of the FSS laboratory, including health and safety.</p> <p>Willingness to travel in the UK and Europe for project meetings and integration work at partner sites.</p> <p>Flexibility to work occasional evenings or weekends when trials are arranged around pilots' availability.</p> |                                                                                                                                                                                                                                                               |