Job Description & Person Specification

Section 1
Role Overview

Job title:	Research Fellow in Timing and Positioning Systems
Vacancy reference:	5365
Faculty /Professional Service Unit:	Faculty of Engineering and Applied Sciences
Theme:	AI, Robotics and Space
Job type:	Full time Fixed Term Contract for 24 months
Hours of work:	37 hours per week, normally worked Monday to Friday. Flexible working will be considered.
Salary details:	Salary level 5 – range £38,655 to £46,492 per annum with potential progression to £53,108 per annum
Line Manager:	Professor Ivan Petrunin, Professor of Signal Processing and Intelligent Systems
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 the Faculty of Engineering and Applied Sciences

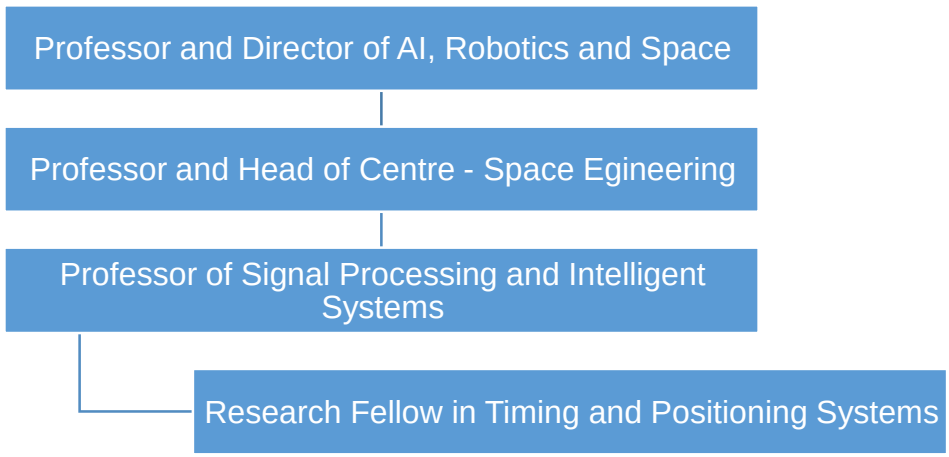
Cranfield's research and educational excellence is recognised internationally and is brought together in the Faculty of Engineering and Applied Sciences. The Faculty hosts the associated core research and education 'Themes', which in turn host a number of world-class Centres and Institutes. The Themes define their own research challenges and educational missions, with the Directors of Theme working closely with the Deputy Vice-Chancellor (FEAS).

About the Centre for Space Systems

Our reputation for leading in the field of aerospace, space and cyber-physical systems, their autonomy, communication systems and signal processing has been established through more than thirty years of research into this field.

We work in partnership with our industrial partners to provide high-quality training, research, development and consultancy to meet the challenges of these competitive markets. We have an outstanding international reputation for the quality of our work and our capability of performing both theoretical and experimental studies. Our work covers academic provision and research. Research work spans from fundamental research and development to single-client contract research and development.

Organisational Chart



Section 4
Job Details

Job Purpose

This position within the Centre for Space Systems (CfSS) is to support the delivery of research on the development of a new generation of high-performance, robust timing and positioning solutions for applications in a wide range of cyber-physical systems, including critical national infrastructure, transport and aerial systems. You will support the development of world-class research on algorithms and prototypes of timing and positioning systems, able to provide accurate position and time information in the absence of GNSS signals. The role also includes delivery of high-quality publications and knowledge dissemination via effective written and oral communication skills.

The main aim of this role is to facilitate the development and wider adoption of new emerging multi-sensor positioning and timing solutions supporting safe operations and services of diverse autonomous, cyber-physical systems and critical infrastructure. To achieve this aim, the development of new processing tools and algorithms is required, with demonstration within the developed prototype software and hardware of robust and resilient timing and positioning services.

Proposed solutions and algorithms will be validated in both simulation and lab environments, including but not limited to the PNT simulator and experimental testbeds, such as the Cranfield Multi-User Environment for Autonomous Vehicle Innovation (MUEAVI), Cranfield's Time and Frequency Innovation Node. The postholder will work closely with colleagues in the Centre and in the Digital Aviation Research and Technology Centre (DARTeC) to make effective use of these facilities.

You will have a specific set of responsibilities within established research projects, including the coordination of specific research activities, the preparation of project reports and deliverables, and high-quality knowledge dissemination via effective written and oral communication skills. You will also be encouraged to make a contribution to the Centre's teaching activities, take on supervisory responsibilities where opportunities arise and be an active and visible publisher of academic papers.

Key Deliverables

	Description of Deliverables	% of time
1	Work with existing colleagues in the Centre and the industrial partners to develop and deliver future PNT research. Responsibilities include: • Manage and deliver contract research and reporting tasks using methodology and techniques appropriate to the research of high-performance, safe and robust navigation solutions at an internationally leading level. • Engage and visit academic partners across the UK to inform the research. • Integrate key research from academic partners across the UK into our testbeds. • Develop a research vision and roadmap.	80%

2	Write and publish in high-quality journals suitable for the Research Excellence Framework. Participate in international conferences to disseminate the results of your work.	10%
3	Contribute and support MSc and PhD student supervision, grant proposal writing and support teaching activities.	5%
4	Contribute to supporting Cranfield's research culture and taking on citizenship roles, as may be relevant. Contribute to the effective operation of the AI, Robotics and Space theme. Carry out other activities as directed by your line manager. Ensure that Environmental, Health and Safety policies are adhered to as required by the Faculty and University.	5%

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 be expected to deliver the research work and teaching support within the timescales agreed with your line manager.

The role will involve short-term responsibilities such as day-to-day project management, interaction with the wider project team and organising project meetings. As different tasks will require different time periods for planning, flexibility and good coordination skills will be important.

Work will need to be clearly documented on a day-to-day basis, showing a clear development path for the project. On an ad-hoc basis, you may be required to assist with other related projects where your skills may be relevant.

Communicating and influencing

You will need to be able to demonstrate excellent interpersonal skills to communicate with staff from all organisations across a wide range of disciplines to discuss project methodologies and to interpret results.

You will be expected to be able to articulate information about your work in a clear and concise manner and to discuss problems constructively with your line manager and colleagues.

You will also need to be confident in engaging with stakeholders and key informants. An active and collegiate team mentality is the expected norm at Cranfield.

You will be expected to communicate scientific results effectively through reports and presentations at national and international meetings/conferences, and to prepare articles suitable for publication in peer-reviewed journals that will have the widest dissemination and engagement for the relevant user community. There is an expectation that at least two high-quality peer-reviewed journal papers will be published from the projects supported by this role.

There will be opportunities to present project outputs at industry and science conferences through oral presentation, and a need to be able to actively contribute to workshops, technical meetings and seminars. A confident approach to presentation and delivery is required.

Problem solving

You are expected to be an early-career but promising researcher. You will be able to work independently for a significant part of your time, with reference to your line manager and other project colleagues for points of clarification.

You will be able to think through and solve problems that may be encountered in terms of methodology, analysis, development of models and interpretation of results. You will be involved in making design decisions for the architectures, methodologies and approaches in close collaboration with project partners and Cranfield colleagues, selecting and implementing hardware and software components of the test/demo platforms, researching and developing data processing along with the positioning and timing algorithms. You will also be responsible for planning and conducting test and validation activities for the developed components and technologies.

Most problems will be solved through experience and through the guidance and mentoring available. You will be expected to discuss problems constructively with the line manager or other colleagues.

Decision making

I) Decisions you will take without reference to others

- Day-to-day management and planning of ongoing research within the overall specifications provided by the project terms of reference/proposal.
- Draft delivery of high-quality research and reports to deadline and quality standards.
- Writing draft journal and conference papers.
- Preparing material for jointly-authored papers and conference presentations.
- Active participation in the implementation of health and safety procedures in the areas in which you work.
- Drafting reports, minutes, actions and papers.
- Identifying, collating and communicating associated research papers and reports.
- Engaging with industrial and defense stakeholders.

II) Decisions you will refer to your manager/colleagues

- Developing new research ideas, proposals, and identifying sources of funding.
- Balancing ongoing research commitments, project management and publication/proposal-related activities.
- Activities to enable the dissemination and exploitation of research results.
- Aspects potentially affecting the operation of the project or the outcome of the results, such that they will influence the success of the project in meeting the goals.
- Budgetary issues related to research contracts.
- Decisions that involve modifications to contracted deliverables.
- Writing journal and conference papers through to final submission.
- Research support for PhD and MSc students.
- Teaching support in MSc courses.

Guiding framework

The guiding framework for this role is the University's Corporate Plan – Ambition 2027.

Our performance and development review (PDR) scheme provides a set of objectives agreed with the line manager for the year ahead, and expected SMART targets. All staff must conform to the requirements of the Financial Manual. The post will be subject to normal Faculty and University systems, policies and procedures.

You will be procided with every opportunity to develop and grow a successful research activity which complements and enhances the existing research and teaching skills within the Faculty.

Impact

You will have a significant role in making sure that the research project you are involved in achieves its aim, and you will be expected to provide a high-quality research contribution in the field of autonomous systems and in its interactions with industry partners.

You will have access ot the world-class research facilities of the University, such as:

- The Aerospace Integration Research Centre
- The Digital Aviation Research and Technology Centre
- The Intelligent Mobility Engineering Centre
- Multi-User Environment for Autonomous Vehicle Innovation

Much of the research work carried out could be commercially sensitive. Therefore, any technical papers that involve contribution/results from the project might first need to be approved by the project partners involved in the project. No direct responsibility for the budge or other staff/students is associated with this role.

However, opportunities to co-supervise PhD/MSc students will be provided, and we expect all our postdoctoral researchers to take an active role within the Centre, and more widely within the Faculty, to both inform others of their ongoing work and to make the best use of existing knowledge and expertise. There will also be scope to develop linked project bids, and to work with colleagues in responding to research calls as appropriate. You will be expected to present work at national and international meetings/conferences, and to write peer-reviewed journal papers.

Facts and Figures

Cranfield University excels in strategic and applied research. In the latest 2021 Research Excellence Framework (REF), 88% of our research was considered 'world leading' or 'internationally excellent' in its quality. We are in the top 30 in the world for Engineering – Mechanical, Aeronautical and Manufacturing (QS Worl University Rankings by Subject 2023). As an institution, Cranfield has the second-highest income of all UK universities in terms of income per FTE from industry (source: HESA 2019/20 data). Our world-class academics, with proven research records, are in constant touch with industry through research, consultancy and product development. Over 5,000 students from over 100 countries study either full- or part-time, or in parallel with their career.

At Cranfield, we value Diversity and Inclusion, and we aim to create and maintain a culture in which everyone can work and study together harmoniously with dignity and respect, and realise their full potential. We particularly welcome female applicants and actively consider flexible working options, such as part-time, compressed or flexible hours and/or an element of homeworking. To further demonstrate our commitment to progressing gender diversity in STEM, we are members of WES & Working Families, and sponsors of International Women in Engineering Day.

Section 5
Am I suited to this role?

Criteria	Essential	Desirable
Education / Qualifications	PhD (or close to completion) in Computer Science or Engineering areas related to signal processing for sensors or applications, and/or related disciplines.	PhD in the area of positioning, navigation and timing technologies.
Experience	Evidence of significant independent contribution to the design and execution of research. Solid experience in estimation theory, signal processing and AI/ML with application to positioning and timing problems. Proven track record of publishing in high-quality journals.	Experience in sensor/signal/ data processing for timing and positioning. Experience in design and development of simulation tools for timing and positioning applications.
Knowledge	Timing and positioning concepts and techniques. AI/ML design for applications.	Navigation system architectures and solutions, for example using GNSS, LEO or 5G signals.
Skills / Aptitudes	C/C++, Python, MATLAB. Ability to prioritise and meet strict deadlines. Excellent communication and presentation skills, with the ability to interact with different types of customers: students, industrial and research partners. Ability to write reports and journal papers to a high standard. Ability to work with others and collaborate effectively.	Practical experience with engaging and merging ideas. Embedded Systems, SDR Programming and performance optimisation.
Values	Ability to demonstrate our values: Ambition, Impact, Respect and Community.	
Other	Ability to travel independently across the UK to meet academic partners.	