



# Call for Strategic Partnerships on Space and Industrial AI with University of Strathclyde

*Purpose:* Opportunity to buy in to a doctoral training network managed with respect to your company's research priorities.

The offer: The University of Strathclyde have earmarked £140k of match funding to form a doctoral network pushing AI in the Space domain, as described below. This is a cost-effective opportunity to plug companies into an extensive network of researchers and companies.

#### Timeline and action points:

**March and April:** discussion on scope of project with our industrial clusters. The clusters match companies with the optimal researchers within the university. Contact: <u>ross.horne@strath.ac.uk</u>

**30**<sup>st</sup> **April:** firm deadline for signed letter confirming match funding of £13,333 per annum, giving control of a PhD student and access to the network. Other funding models are possible to discuss.

1<sup>st</sup> October: Launch of the Strathclyde Centre for Doctoral Training in Space and AI.

### About Strathclyde

The Space and Industrial AI clusters at University of Strathclyde are gateways for plugging into a national and international R&D network. With leading expertise in aerospace engineering and a track-record of industrial partnerships spanning agencies such as ESA, aerospace multinationals and new space startups, Strathclyde is well-equipped to assemble teams capable of delivering research solutions that require cross-sector expertise.

This partnership opportunity combines research with training of doctoral students, effectively addressing critical skill gaps in highly specialised industries. An emphasis is on the creation of expertise to deliver AI solutions that can enhance the ground and space operations particularly in high-growth areas such as Low Earth Orbit (LEO).

### Funding models to discuss

Strathclyde offer tailored funding models aimed at providing access to our extensive research network while promoting the development of specialised expertise.

The standard model is a strategic partnership costing from around £13k annually giving access to scientific, engineering and industrial expertise driven by pressing problems, with a key output being the training of experts who are awarded a doctoral degree. For each such partnership a management structure will be created ensuring knowledge exchange between university-appointed and industry-appointed experts, fostering collaborative problem-solving and shared understanding.

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A popular alternative model, the PhD-in-work scheme, allows an employee of a company to engage parttime in a PhD. Strathclyde also welcomes partnerships with companies who are uncertain whether cash contributions can be made, since joint tender bids are possible via European Space Agency (ESA) or Innovate UK for example.

## Applied Research Topic in Space and Industrial AI

Flexibility on topics is key to ensure relevance to problems faced by space-industry players. To be concrete, several potential topics for collaboration are proposed, with some building on past and ongoing projects involving Strathclyde and partners. To be concrete, security challenges include the optimisation of space activities involving satellites from multiple organisations, while respecting confidentiality requirement of information flow across the organisational boundaries of operators. Reliability challenges include onboard AI solutions for anomaly detection that are explainable for reporting purposes, while respecting limited onboard resources such as power and downlink constraints.

- Decentralized Privacy-Preserving Systems: opportunities include developing methods for securely sharing data or co-trained models across distributed control systems, such as those linking control centres spanning multiple nations or organizations. Key challenges include preserving privacy and ensuring that sensitive or competitive operational data remains protected. This enables enhanced collaboration between international space agencies and private companies, facilitating efficient resource sharing while maintaining data integrity.
- Ground Operations and Space-Based Systems: collaboration could focus on extending decentralization to ground operations and exploring the potential to shift computational elements into orbit. Addressing resource constraints, such as limited power, processing capacity, and downlink bandwidth, is critical. Use cases include distributed satellite management and Al-driven decision-making in low-resource environments.
- Cybersecurity: joint efforts can target vulnerabilities, such as side-channel attacks, within decentralized ground operation frameworks. Effective cybersecurity measures are essential for ensuring the integrity and trustworthiness of shared systems, particularly when crossing national or corporate boundaries.
- *Explainability in AI*: projects may emphasize the development of interpretable AI models capable of providing root-cause explanations for system behaviour or failures. For example, analysing how AI algorithms contributed to critical incidents, such as the crash of recent private-sector moon landers, could lead to improved system reliability and debugging practices.

### Sample projects and successes

Securing the Future of Space Using AI: https://www.aiforsustainability.space/

The space sustainability paradox: https://doi.org/10.1016/j.jclepro.2023.138869

Anomaly Detection Using Deep Learning Respecting the Resources on Board a CubeSat: <u>https://doi.org/10.2514/1.l011232</u>