UKRI Trustworthy Autonomous Systems Hub programme: Pump Priming (Round 3)

Opportunity status:
Closed

Funders:
UKRI via Trustworthy Autonomous Systems Hub

Funding type:
Grant

Total fund:
£1,250,000

Award range:
£50,000 - £200,000

Publication date:
10 August 2022

Registration open:
10 October 2022

Registration due date (mandatory)**:**
3 November 2022

Submission open:
9 November 2022

Submission due date:
23 November 2022 16:00 UK time

Apply for funding to support novel and creative multidisciplinary research on trustworthy autonomous systems.

Your proposed project should integrate researchers from different disciplines, particularly from social sciences, arts and humanities.

You and your organisation must be eligible for UKRI funding.

Funding is available for around 8 grants. Successful projects must begin between 1 March and 1 April 2023 and last up to 15 months.

This opportunity is part of the UKRI Trustworthy Autonomous Systems (TAS) programme which supports research on the technical, social and ethical challenges surrounding trustworthy autonomous systems.

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Who can apply

Research in the area of trustworthy autonomous systems needs a multidisciplinary approach. We are therefore particularly interested in supporting multidisciplinary teams with the appropriate expertise to develop novel and creative research activities that are focused on trustworthiness as a property for autonomous systems. Successful applicants will be expected to collaborate with the wider **UKRI Trustworthy Autonomous Systems (TAS) programme (TAS website).**

We would encourage researchers from all the disciplines that are supported by UKRI to apply, including but not limited to:

- applied ethics
- computer science
- engineering
- humanities
- innovation studies

- international studies
- law
- organisational management
- philosophy
- politics
- psychology
- Sociology.

TAS Hub is leading this call on behalf of UKRI. Standard EPSRC eligibility rules apply. Research grants are open to:

- UK higher education institutions
- public sector research establishments
- research council institutes
- UKRI-approved independent research organisations and NHS bodies with research capacity

Read the guidance on institutional eligibility.

You can apply if you are resident in the UK and meet at least one of the bullets below:

- are employed at the submitting research organisation at lecturer level or above
- hold a fixed-term contract that extends beyond the duration of the proposed project, and the host research organisation is prepared to give you all the support normal for a permanent employee
- hold an EPSRC, Royal Society or Royal Academy of Engineering fellowship aimed at later career stages (excl. industry employees)
- hold fellowships under other schemes (please contact us to check eligibility, which is considered on a case-by-case basis).

Holders of postdoctoral level fellowships are not eligible to apply for an EPSRC grant.

This call is not part of the EPSRC repeatedly unsuccessful applicants policy.

What we're looking for

This call aims to support creative, inter- and multi-disciplinary research which focuses on the challenging question of how to ensure that the design, engineering, and operation of autonomous systems generates positive outcomes and mitigates potentially harmful outcomes for people, societies, economies and the environment. Successful proposals would seek to address factors that impact the trustworthiness of autonomous systems, including but not limited to:

- Their robustness in dynamic and uncertain environments.
- The assurance of their design and operation through verification and validation processes.
- The confidence they inspire as they evolve their functionality.
- Their explainability, accountability, and understandability to a diverse set of users and stakeholders.
- Their defences against attacks on the systems, users, and the environment they are deployed in.
- Their governance and the regulation of their design and operation.
- The consideration of human values and ethics in their development and use.

While researchers are encouraged to link their research to any appropriate application area, we are particularly encouraging the following **priority application area(s)** for this funding round:

- **TAS to accelerate the path to net-zero**: how can TAS contribute to reach net-zero carbon emissions, improve the resilience and efficiency of our digital systems, and encourage sustainable use of natural resources?
- **TAS to contribute to the creation of an inclusive, fair and just world**: how can TAS foster the design and creation of technologies and systems for inclusive and equitable societies?

For this call, we encourage projects to demonstrate clear **routes to impact** to address both imminent and long-term needs of industry and government. For example, we encourage partnerships with projects or activities already funded by various UKRI programmes or Knowledge Transfer Networks (KTNs) that look to develop or use autonomous systems at high Technology Readiness Levels (TRLs) or inform policy around their use and deployment strategies. These could include but *not limited to* the following KTNs:

1. Future Flight
2. Clean Maritime
3. AI in Health
4. AI for Services (Finance, Insurance, Accountancy and Law)
5. Infrastructure
6. Manufacturing

We encourage such collaborations to:

- Develop methodologies for the assurance and certification of systems involving humans and machines.
- Support the development of legal and responsible innovation toolkits that can be used by SMEs and large corporates to help them meet current regulation and anticipate future changes to regulation and standards.
- Establish policy engagement activities that enhance conversations involving policymakers, researchers, practitioners, end-users, and the public.

Note that all proposals submitted will be assessed equally, irrespective of which priority application area and/or KTN the proposal aligns with.

We understand an autonomous system to be a system involving software applications, machines, and people, that is able to take actions with little or no human supervision. While the term is also used in different disciplines to specifically mean robots, routing protocols for the Internet or AI-powered systems, our definition[1] includes systems involving **both humans and machines working together** (e.g., human-agent collectives or human-machine teams), **and automated decision-making processes and the ways in which they are employed by and impacting on people** (e.g., automated recruitment, facial recognition systems). Machine-to-machine or Human-to-Human trust are also an important concern and may be relevant to TAS but these are not the central to the TAS programme.

We are seeking to support high quality co-created research which focuses on one of the six categories outlined below and which add benefit to the overall aims of the TAS Programme.

1. **Early-stage proof of concept projects primarily** aimed at Early-Career Researchers (ECRs), which will de-risk the early stage of research projects (e.g., shape New Investigator Award bids), build new collaborations, nationally or internationally (leveraging our partner

[1] https://www.tas.ac.uk/our-definitions/

network and the nodes) and explore new research directions – particularly to address identified gaps.

2. **Foundational research into** the identified TAS Hub Grand Challenges and priority areas, which represent contexts of significant public concern and risk to potential economic and societal growth; this research is expected to provide the foundations of larger pieces of research to complement and inform that carried out by the Hub and Nodes.
3. **Industry-driven application-oriented research** that supports the academic-industry team to engage with stakeholders and users of autonomous systems and involve them as first-class citizens in the different phases of system development, deployment and use.
4. **Entrepreneurship training and business incubation,** which takes researchers with commercially promising research projects out of the lab and helps teams determine whether there is a market for products or services that utilise their research, and if so, license or spin-out the research into a company.
5. **Exchanges with world-leading centres.** Funding here is aimed at supporting an intense but time-limited collaboration with world-leading centres, providing the researcher with the flexibility and freedom to spend a substantial amount of time (typically between 3 and 12 months) at the partner centre to carry out excellent research.
6. **Advocacy & Engagement**. Funding here will support researchers to advocate for the importance of trustworthy autonomous systems and highlight the huge impact they have on our everyday lives. A diverse range of activities will be supported including residencies, creation of public engagement activities, developing demonstrators for research outputs, media production, or installations.
7. **Impact Accelerator.** For projects primarily aiming to accelerate routes to impact and partnerships with projects or activities already funded by various UKRI programmes or Knowledge Transfer Networks (KTNs) that look to develop or use autonomous systems at high Technology Readiness Levels (TRLs) or inform policy around their use and deployment strategies (as mentioned above).

A balanced range of projects will be funded.

The activities that are funded through this call will run alongside, and are expected to complement, the existing UKRI TAS Hub programme and contribute to the world leading research into the technical, social and ethical challenges that surround trustworthy autonomous systems.

Learn about the TAS programme (TAS website).

In addition to collaborating with the wider programme, it is anticipated that successful applicant teams will also engage with stakeholders and users of the research, who are essential to the design, conduct and impact of application-orientated research.

We envisage that the successful research activities will deliver primarily against the creative, multi- and interdisciplinary research of this call by:

- undertaking novel and creative multidisciplinary research which addresses the key challenges around trustworthy autonomous systems
- co-creating and carrying out the research with stakeholders and users from industry and other sectors in society
- building skills and capability in the development of trustworthy autonomous systems
- contributing to the development of a cohesive and world-leading UK community in trustworthy autonomous systems.

Funding available

Up to £1.25 million funding is available through the TAS Hub Pump Priming Programme to support around 8 grants for up to 15 months (at 80% full economic cost (fEC)).

We expect to fund research and proof-of-concept projects as well as Impact Accelerator projects requesting funding between £50,000 and £200,000 (at 80% fEC). Entrepreneurship, Exchanges, Advocacy and Engagement projects would in general be expected to request up to £50,000.

Please note that due to the nature of this funding, additional requirements on spending profile, reporting, monitoring and evaluation as well as grant extensions will apply. This will be reflected in the grant additional conditions, and those funded will need to comply with them. Further details are provided in the additional information section below. In particular, please note that any projects funded through this call will have a fixed start date, and that no slippage to this date will be permitted.

Grants will be funded at 80% of the stated fEC. The remaining 20% must be contributed by the academic or industry partners submitting the proposal. The grant can support any directly incurred (DI) costs, such as research staff time, consumables and travel to the project partners, and also directly allocated (DA) costs, such as investigator time or overheads.

Prospective applicants are not expected to have existing collaborations or contacts withing the TAS programme, and this is not a requirement for applications.

Current Hub and Node investigators cannot be costed on the grant.

Equipment over £10,000 in value (including VAT) is not available through this call. Smaller items of equipment (individually under £10,000) should be in the Directly Incurred – Other Costs heading.

Note that any deviation from the spending profile beyond 5% is not allowed (any underspend will not be refunded nor any overspend allowed). No-cost extensions cannot be allowed.

How to apply

Applicants should ensure they are aware of, and comply with, any internal institutional deadlines that may be in place.

Proposals should be prepared using the provided submission template, completing all of the sections, and submitted in a PDF format via the online application portal. Proposals must contain an explanation of how the proposed work aligns with the objectives of the TAS programme and how it fits into the frame of the TAS Hub. Applicants should be explicit about the need for this funding and the added value their proposed activity brings to a specific area of the programme. All proposals must also demonstrate how they will ascertain adherence to their spending profile.

The TAS Hub reserves the right not to fund a project if ethical concerns exist and/or are raised by the reviewers or panels members. Concerns may include overlooked aspects, or issues not appropriately accounted for. You must complete the EDI and RRI section to identify and demonstrate how challenges will be addressed as part of the research.

An eligible member of the research investigation team will be identified as the Main Contact. They will submit the bid and be the point of contact with TAS Hub for all communication during the bid and post award (if successful). The Main Contact must register their intent to submit a proposal during the registration period. A user account will be created for registrants who do not have an ERPNext user account, and they will receive a welcome email with details and instructions to access the system. It is

particularly important for investigators who do not currently have ERPNext accounts to register in sufficient time prior to the submission window.

The registration and submission system will be activated by the stated opening date.

Access to ERPNext home page is via the following link:
https://erpnext.tas.ac.uk

There is a User Instructions link to detailed user guides for “System Access” and “Pump Priming Bid Submission”. To complete your bid submission, you will need to complete a bid details form in ERPNext and upload your proposal document. Sections of the form include:

- Key project details, bid summary & proposal upload
- Project team
- Financial information
- Alignment to TAS Hub & Nodes

The Pump Priming Bid Submission user instruction explains all the sections of the bid form. You can save and return to progress completion of the bid. Once you “Submit” your proposal you will receive a confirmation email, including details of your submission.

TAS Hub must receive your application by 16:00 on 23 November 2022.

How we will assess your application

Assessment process

This call will use a two-step assessment process.

Step one: postal peer review

Proposals will be sent out for postal peer review. Peer review will consider the assessment criteria detailed below.

Any proposals without sufficiently supportive reviews will be rejected at this stage.

Step two: panel

Proposals with sufficiently supportive peer review will be considered by a panel of experts in order to select the final successful proposals.

All criteria detailed below will be assessed in determining the final rank ordered list, taking into consideration the peer review comments.

Funding decisions will be made based on the rank ordered lists as well as the nature of the projects. To ensure a balanced portfolio of activities, we will aim to fund at least one project against each one of the six TAS programme project categories (see section 'What we are looking for').

Assessment criteria

Proposals will be evaluated based on their innovation, relevance to stakeholders, applicant team and alignment with the TAS Hub programme given the type of project applied for. Pump-priming projects can be categorised as follows:

Research:

1. Early-stage proof of concept projects
2. Foundational research
3. Industry-driven application-oriented research

Knowledge Exchange:

4. Entrepreneurship training and business incubation
5. Exchanges with world leading centres
6. Advocacy and engagement
7. Impact Accelerator

All submitted pump-priming projects will be evaluated according to the following criteria:

Quality of the proposed activity (primary)

- *Novelty, timeliness, ambition, potential to transform research or knowledge exchange*
- *Contribution to state-of-the art or advancement of knowledge*
- *Adequate consideration of trust or other core issues for TAS*
- *Suitability of proposed methodology*

- *Realistic and achievable objectives and workplan, evidence of risk mitigation*
- *Relevance of the project to identified stakeholders and sectors, clear consideration of impact pathways*

For Knowledge Exchange projects, the potential to grow the knowledge base in academia and industry will be considered.

Relevance to stakeholders (secondary major)

- *Evidence of **at least one** named non-academic project partner*
- *Evidence of project co-creation with partners*

For Knowledge Exchange projects, more emphasis will be placed on the level of engagement with key stakeholders or relevant partners.

Applicant team (secondary major)

- *Expertise and capabilities within the applicant team to deliver the project*
- *Multi-disciplinarity: investigator involvement from **at least two** disciplines*
- *Suitability of the plans to include a diverse range of investigators from different backgrounds and career stages, particularly inclusion of suitable early career researchers is encouraged*

For Knowledge Exchange projects, particular emphasis will be placed on the potential to grow the career and networks of individuals involved.

Fit to the TAS research programme (secondary major)

- *Relationship to the TAS Hub Grand Challenges and/or priority areas*
- *Potential for planned outputs to impact on TAS programme*

Equality, Diversity & Inclusion and Responsible Research & Innovation (secondary major)

- *Plans to embed responsible innovation in the project*
- *Adequate consideration of EDI in terms of the research or knowledge exchange*

Resourcing (secondary)

- *Adequate and fully justified resourcing*

- *Risks to resourcing fully identified and mitigated, including appropriate plans to manage finances during the lifetime of the activity*

More information highlighting key points drawn from our analysis of the reviews and meta-reviews from the first round can be found in the TAS Pump Priming Programme Round 1 Feedback.

Awards will be confirmed upon acceptance of the non-negotiable Terms and Conditions, which will be set out in the Award Letter.

Contact details

For help and advice on costings and writing your proposal please contact your research office in the first instance, allowing sufficient time for your organisation's submission process.

Any general queries regarding the submission of proposals through ERPNext should be directed to the TAS operations team:

- **opsteam@tas.ac.uk**

Any system technical issues in using ERPNext should be directed to the ERP Technical Support Team:

- erpteam@tas.ac.uk

Our working hours are Monday to Friday, 09:00 to 16:00 UK Time, excluding bank holidays and other holidays.

For any other call specific information:

- please email **opsteam@tas.ac.uk** for general enquiries
- TAS Projects Manager Dr Helen Shaw h.l.shaw@soton.ac.uk

Additional info

Background

Autonomous systems are self-contained systems that can act independently of human control or in collaboration with humans, by sensing, reasoning and adapting to a given situation or environment. They are already being developed and deployed across industrial sectors in specific, controlled conditions.

When autonomous systems are used in an uncontrolled environment, where there is a high level of interaction with people and a much larger number of variables, the resulting potential for unexpected and/or undesirable results is significant. These unanticipated events could have a very significant harmful and negative impact, directly affect the acceptability of these systems, and compromise widespread deployment of autonomous systems in the UK.

For society to use and benefit from autonomous systems people need to trust them, and the systems themselves need to be demonstrably trustworthy. This means that the autonomous systems need to function as expected for their purpose. They need to be designed and tested to ensure that they work consistently.

Not only do they need to be appropriately developed, taking into consideration the legal, ethical and social contexts, but they need to be subject to meaningful and appropriate oversight. Trust will only be enabled through technical advances conducted in specific societal circumstances (if those technical applications are embedded in legal, organisational, and social contexts in which they are demonstrably trustworthy).

The UKRI Trustworthy Autonomous Systems (TAS) programme of which this call is a part is a £33.7 million investment on fundamental research into key challenges around the adoption and deployment of autonomous systems. By focusing on key aspects such as safety, security, reliability, acceptability and trust, this programme will ultimately enable autonomous systems to be legitimately, and more effectively, adopted across society and industrial sectors.

The UKRI TAS programme will convene key stakeholder groups to drive forward cross-disciplinary fundamental research into the design, development, curation, verification and validation of autonomous systems

to enable trust, and to ensure that they are safe, reliable, resilient, legal and ethical. This is an essential step to de-risk the technology for the short and long-term benefit of society.

The TAS programme is currently being delivered through two interconnected parts:

- a central Hub that will lead on the delivery of the objectives of the programme,
- several research Nodes, each focusing on one aspect of research (trust, security, governance and regulations, resilience, functionality, and verification) required to making autonomous systems trustworthy.

Read more about the **TAS programme research nodes.**

This investment has the following objectives:

- coordination and collaboration – building a connected and multidisciplinary UK research community tackling the challenges of trustworthy autonomous systems
- creativity and multi-disciplinarity – undertaking recognised world leading fundamental research in the area, with benefits to real world applications and adoption of autonomous systems
- advocacy and engagement – putting in place a clear single point of contact for TAS expertise and engagement with key stakeholders.

Grant additional conditions (GACs)

Please note that due to the nature of this funding stream, there will be specific spending requirements, monitoring and evaluation.

Awards will be confirmed upon acceptance of the non-negotiable Terms and Conditions, which will be set out in the Award Letter.

The project team of all funded projects will be required to engage fully with the programme, including participating in Hub activities and events, alongside attending partner meetings as required during the lifetime of the project, and reporting including on commencing, mid-project, and at the end of the project. In addition, within one month of the end of the project, a

final report will be submitted to the TAS Hub Executive Management Team highlighting the project outcomes and impact.

Supporting documents

Submission template

TAS Pump Priming Programme Round 1 Feedback

Award Letter

Terms and Conditions