



Science and
Technology
Facilities Council

UK ATC Strategy

2026-2031



Mission

The mission of the UK Astronomy Technology Centre at the Royal Observatory Edinburgh is to conceive, develop, and deliver advanced instrumentation and facilities for ground- and space-based observatories worldwide, in alignment with national strategic priorities. Through these capabilities, the Centre strengthens the UK's leadership in astronomy, supports international collaboration, and enables the UK scientific community to make transformative discoveries at the forefront of astronomy.



What we do

- The UK ATC is the national laboratory for the design and development of astronomical technology. Not available anywhere else in the UK, we provide a strength and depth, in science, engineering, management, and technical skills with specialist expertise in design, construction, and operation of space and ground-based astronomical instrument and facilities.
- We maintain essential laboratory facilities with expert scientific and technical staff dedicated to the integration and testing of crucial deliverables for international consortia, that range from small sub-systems to the largest cryogenic instruments in the world.
- We are internationally renowned and partner with a world-wide range of universities and laboratories. Our role is key to enable world-leading curiosity driven research by the UK astronomical community, influence international organisations (e.g. ESO, ESA, SKA), and building the international reputation of STFC.



Objectives

Enabling the UK's exploration of the Universe through technological excellence — uniting world-class science, engineering, data analysis, and international collaboration, to deliver transformative ground-based and space astronomy missions that expand human knowledge. To be an engine for innovation, skills development, education, and resilience, delivering tangible returns for the UK economy and society.



Science

We will continue to be active members of the **UK scientific community**. We will both identify and shape the opportunities for **new capabilities**, combining the academic goals, **national priorities**, and **emerging technologies**, to deliver cutting-edge instrumentation for astronomical observations.



People

We will maintain and further develop the **key skills**, with a critical mass of staff with the **world-leading multi-disciplinary expertise** required to support construction of facility-class instruments. Providing staff with opportunities for acquiring **applied experience** must become a priority to sustain our delivery in time.



Facilities

We will work to further develop **integration and testing spaces**, mechanical, optical and electronic labs and workshops. These should allow staff to apply **modern practices and processes** in line with the excellence of the missions we are working towards. The reliability of our instruments depends on these facilities.



Technology

We will have a pro-active approach to generating **impact and innovation**, seeking alignment of technologies developed for astronomy with other areas of **government priority**. We must place special focus to advances in optical materials for space, new detector technologies, and Artificial Intelligence.



Industry

We will work closer with **UK industry** during the early stages of development of our major projects to secure return. We must be strategic at prioritising our activities and **outsourcing to commercial partners** when suitable. Engineering teams should work across our projects to identify such opportunities.

UK ATC Project Strategy

Priority Projects

Space

UV/VIS/IR

- MIRI

MIRI science exploitation, making case for leading roles in future large missions.

Continuing to seek networking opportunities supporting potential future partnerships with US, Canada, Japan.

Gravitational Waves

- LISA

Delivery of LISA (ESA flagship mission) is a high priority for UK ATC. Building capability via knowledge exchange and practices for future space missions is crucial.

Ground-based

UV/VIS/IR

- MOONS
- HARMONI
- METIS
- CUBES

Delivery and commissioning of MOONS will showcase our strength. Team and experience must transition to ELT projects. Lessons need to be captured and shared. UK ATC must ensure the success of new HARMONI.

Radio/Sub-mm

- ALMA
- SKA

UK ATC must continue to play a leading role in observatory tools (exploiting AI/ML data advancements) and maintain the excellent performance in SKA.

Skills and Technology development

UK ATC must secure a healthy portfolio of enabling projects, exploiting funding opportunities outside of the STFC PPAN remit, with a focus on technology and staff capability development required to achieve our priority targets.

These projects should be seen as adaptable in short timescales, evolving as necessary, depending on financial, staffing, prioritisation constraints. They should facilitate stakeholder relationships and, when appropriate, act as case studies for our Priority Targets.

Staff resource for these projects needs to be aligned with the capability map of our different engineering groups. Graduates should be particularly engaged in these smaller projects with guiding.

Opportunities across all UKRI buckets

- UK Science Landscape/Priorities
- ATC Engineering capabilities/Heritage
- Government priorities, IS8, Impact



Technology Roadmap

- Detector technologies (IR, CMOS)
- Optics and photonics (AO, Communications, Space domain awareness)
- Advanced manufacturing (Space solutions)
- Mechanical solutions (Positioners, Cryo-mech, Quantum)
- Digital, AI, Computing



- Skills, Increase TRL, Industrial engagement
- Income, enhanced portfolio and opportunities

Capabilities Map

- Non-PPAN projects/collaborations
- Pathfinder projects for Priority Targets
- Other discipline projects (BID)

Priority Targets

UV/VIS/IR

- HWO
- GAIA-NIR

UK ATC must play important roles in the future large NASA/ESA missions. As a high-priority, we must target a role in delivery of a UK-led instrument or major sub-system for HWO.

Gravitational Waves

- 2nd Gen GWO

After delivery of LISA, UK ATC will be in a strong position for continuing playing a key role in the future of gravitational waves facilities. We must engage in these discussions early via strategic technologies.

UV/VIS/IR

- WST
- ELT programme
- VLT programme

UK ATC must capitalise on its technical expertise for VIS/NIR ground based instrumentation. We must engage with the UK community and seek funding avenues for the future of ESO VLT/ELT programme and post-ELT VIS/IR facilities.

Radio/Sub-mm

- AtLAST
- Operational Software

To engage in future sub-mm large facilities, we should seek technical contributions for which rebuilding local knowledge is essential. We must seek leading software/operations roles in these facilities, embracing AI.

Technology Roadmap

We are determined to actively maintain the UK ATC technology development roadmap. This roadmap must strategically incorporate solution spaces for key technology challenges of our target missions/facilities and reflect the national and international priorities to maximise the value and impact of our deliverables.

Our key focus areas are Optical and Photonic Innovations, Detector Technologies, Computational and Data advances with AI/Machine learning, lightweight mirrors for space via additive manufacturing, and fibre positioners for extreme multiplexing. We aim to:

- **Updated UK ATC technology roadmap**

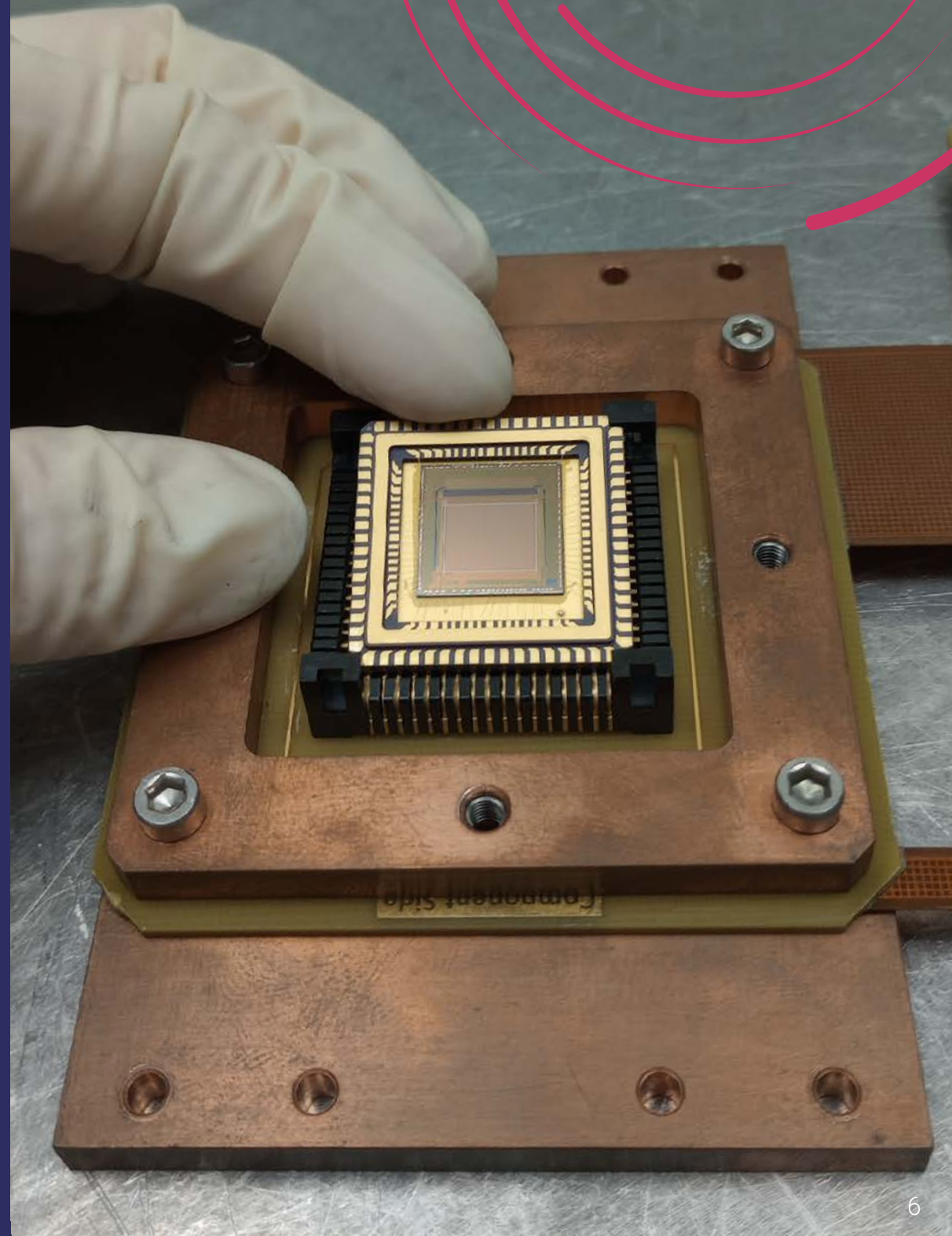
We will deliver and actively maintain our technology roadmap, with well-defined objectives, via annual review and discussion in our engineering and science groups.

- **Develop pathways for future astronomy programmes**

We will identify technological challenges for future major astronomy missions/facilities which align with our focus areas. By seeking enabling projects to develop and test these new technologies, we will strategically position the UK in our priority target projects.

- **Foster UK industrial engagement**

We will strengthen and expand our engagement with UK industry, ensuring that the development of cutting-edge astronomical instruments and observatories directly contributes to national industrial capability and economic growth.



Engineering Culture

UKATC is uniquely situated between scientific research organisations and industry. We aim to produce one-off, highly complex scientific “experiments” using best practice from industry.

We adopt formal processes to manage projects and design work to ensure the highest quality delivered products, while minimising the risks in our projects.

We deliver total solutions – working from initial concept inception all the way through to delivery and commissioning of the instruments on-sky.

UKATC has capability at every stage of the engineering life-cycle. We aim to:

- **Continuously improve our ways of working to achieve the maximum scientific benefits with the resources available to us**

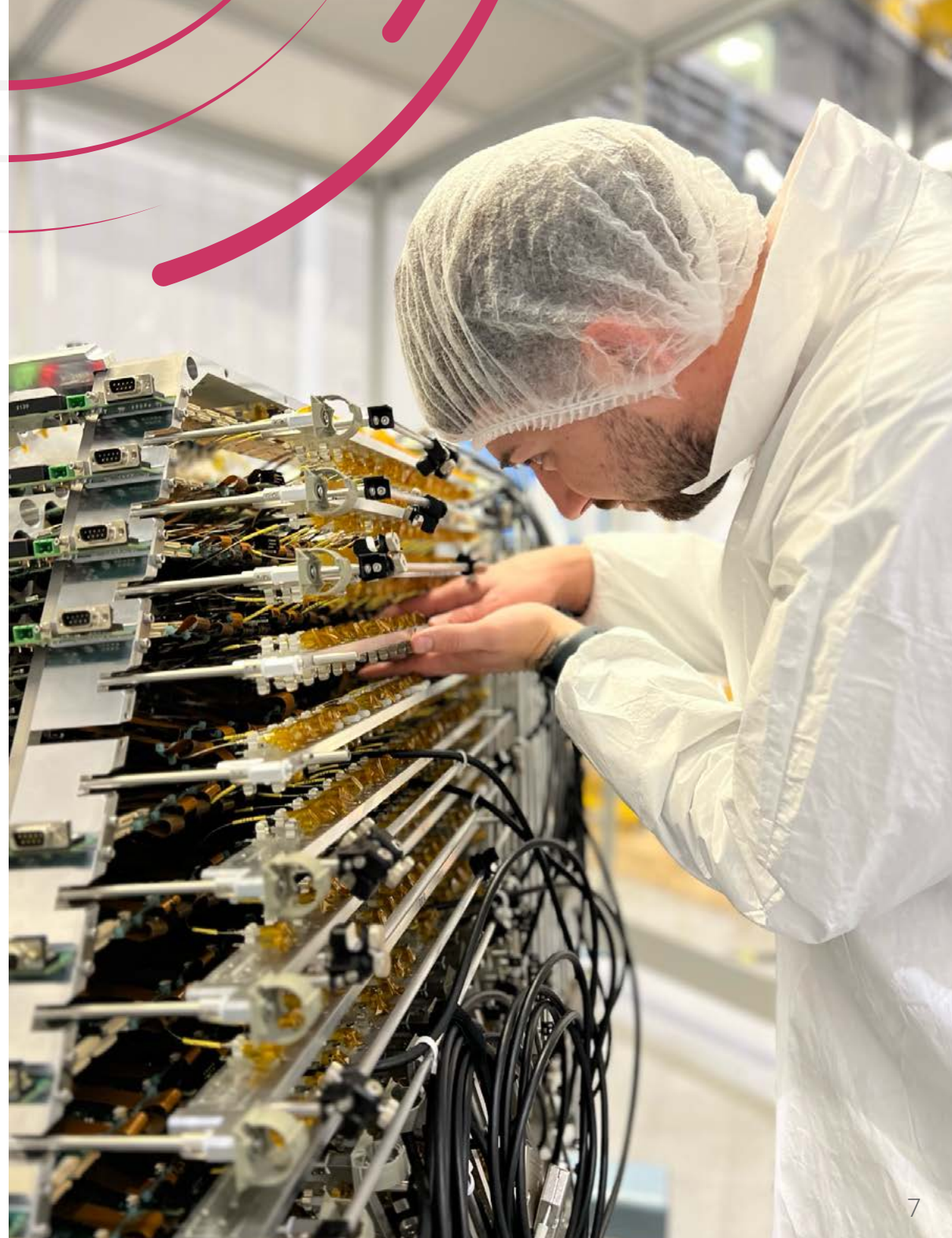
This requires adoption of a right-first-time mindset and the formal processes that will make it happen. Our processes should be effective and tailored to the needs of the specific projects.

- **Develop and maintain our skills**

This should be done through faster turn-around small projects which can be entirely run in-house. Each engineering group should develop and maintain a capability map, in line with our targets, ensuring the required group skills are developed and transferred appropriately.

- **Utilise emerging technologies to improve instrument design**

We will embrace opportunities and links with additive manufacturing, AI, and quantum computing, while keeping risk to delivered projects as low as possible.



Engineering Culture – Quality

Quality Management and Design Assurance

- Astronomy instrumentation is continuing to increase in size and complexity meaning ever increasing cost and delay from risk realisation
- In very high value projects, cost of rework can be extremely high
- We are committed to continue to improve our quality culture to avoid unacceptable delays and costs to our projects
- Sponsored by the vision of the Director, UK ATC is implementing a new Design Assurance Group to champion quality, working across site to promote, facilitate, and review the adherence to adequate procedures defined with the different engineering groups.
- The **Design Assurance Group** will set the overall quality strategy and policies for the UKATC. Through adequate **Quality Assurance we will ensure** the compliance of UKATC site activities. **Project Product and Quality Assurance** will be placed within projects to ensure well-defined/ suitable policies are set and adhered to, in line with the needs of the individual projects.



Engineering Culture - Learning

Careers and development

Early careers: Leveraging STFC's exceptional 2-year Graduate Programme and 1-year Industrial Placements.

- Strengthen the UK's talent pipeline in science and engineering, supporting national priorities in innovation, productivity, and global competitiveness.
- UK ATC tailored, domain/discipline focus.
- Meaningful, supported project experiences from the start.
- Drive for practically beneficial placements – building context and networks at an early stage.
- Develop a highly skilled workforce by giving practical experience and transferable technical expertise.

Career Development: Strong culture of learning and continuous improvement.

- Each project should represent a step change from the last, with lessons learned consistently captured and applied across our delivery.
- Structured approach to capturing opportunities for improvement based on experiences from previous projects.
- Promote knowledge sharing and mentoring.
- Individual objectives aligned to agreed development goals.



Social Impact

We will continue to help shape a society in which everyone feels confident, welcome, and inspired to engage with STEM, research, and innovation. This means creating meaningful opportunities for people of all backgrounds to connect with the ideas and discoveries.

The night sky belongs to everyone. It is an endless source of wonder that has inspired humanity for generations, sparking curiosity, creativity, and a shared sense of possibility about our place in the universe.

Celebrating ROE science, technology and people

Sharing stories that highlight not only groundbreaking research, but also the diverse individuals and career pathways behind it.

Working in equitable partnerships with local organisations

Engaging with schools, community groups, cultural institutions, and charities to co-create programmes that are relevant, inclusive, and impactful. These partnerships will ensure our work is grounded in local needs and perspectives.

Improving our connections with diverse audiences

Strengthening connections with diverse audiences, prioritising those historically underrepresented in STEM. Through listening, collaboration, and long-term relationship-building, we aim to ensure our work is accessible, inclusive, and truly reflective of the communities we serve.





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