



Science and
Technology
Facilities Council

UK Astronomy Technology Centre

Ewan Fitzsimons

India-UK LIGO Workshop - 9th Feb 2022



UKATC

- UK's national laboratory for astronomical instrumentation
- Co-located with U. Edinburgh's Institute for Astronomy (IfA)
- Incl. Higgs Centre for Innovation (in partnership with UoE)
 - Business incubation for academic spinouts and space flight hardware testing facility
- Incl. ROE Visitor Centre
 - Part of UKATC-led National Laboratories Public Engagement programme



STFC

- UKATC is part of the Science & Technology Facilities Council...
- ...which is part of UK Research & Innovation (UKRI)
- STFC annual budget: £836M (FY21/22)
- Staff: ~2000, across 6 sites

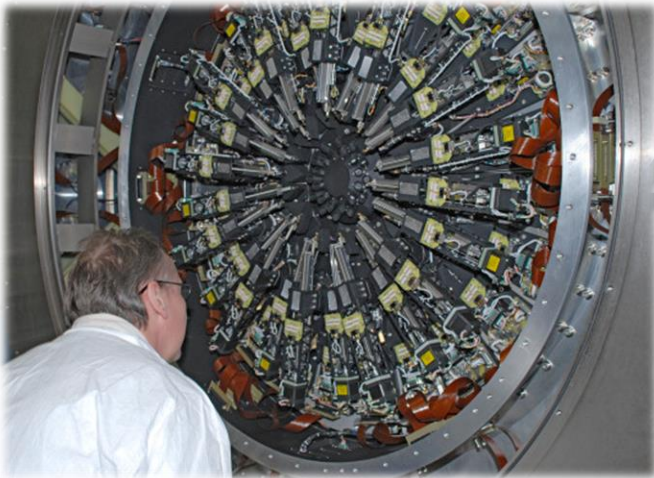


STFC

In astronomy, STFC funds:



Facilities



R&D



Exploitation

UKATC

- ~100 staff, with skills/expertise across all aspects of astronomy
 - Science, management, system eng., optics, mechanical, electrical, detectors, software
- ~80% of programme is astronomy:
 - Leading roles in facility-class instruments
 - Partner roles developing key sub-systems
 - Smaller R&D projects
- ~20% of non-astronomy projects:
 - Earth Observation, Diamond Light Source, healthcare
 - Use connections & skills to support commercial companies



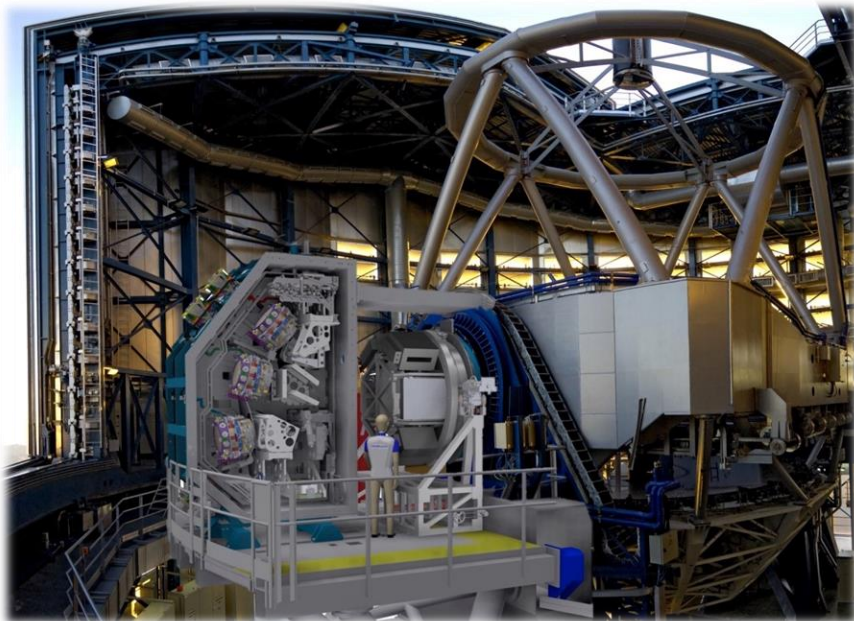
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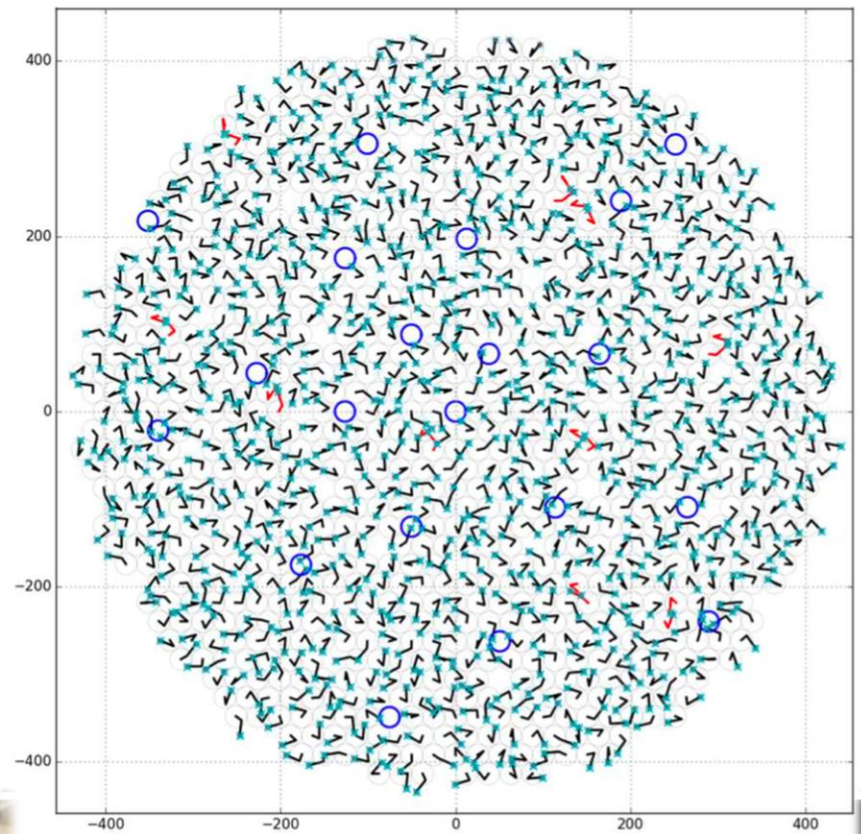
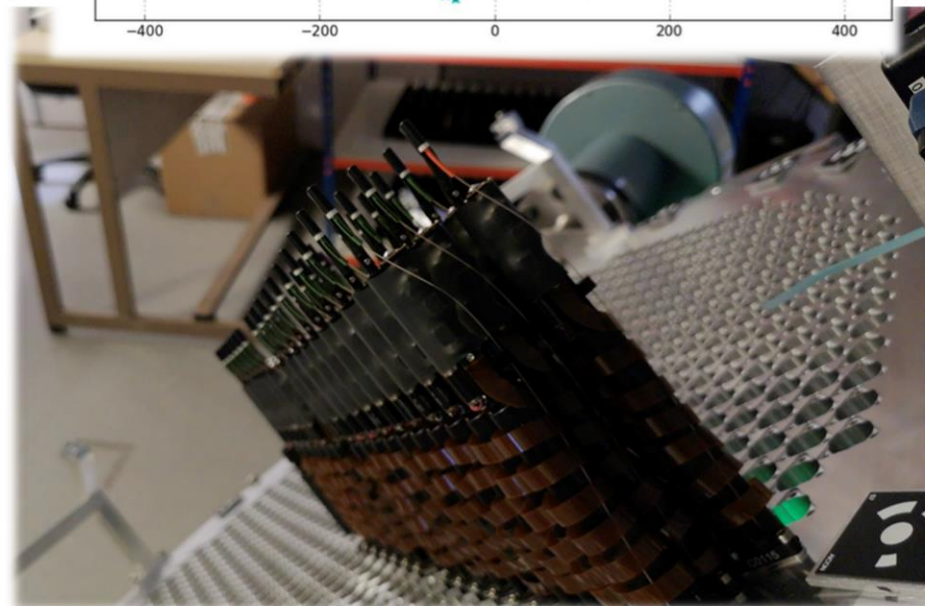
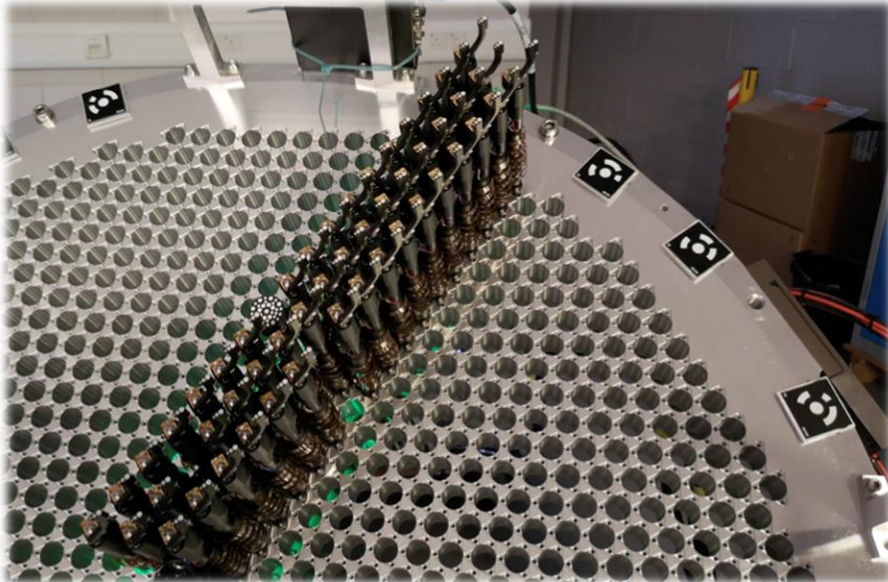
VLT MOONS

- UK-led 3rd gen instrument for ESO's VLT
 - Optical/IR multi-object spectrograph
 - 1000 fibres over 25 arcmin dia. Field
- UKATC leading main AIVT, optics, structure, cryogenics, fibres, focal plane, software and more...



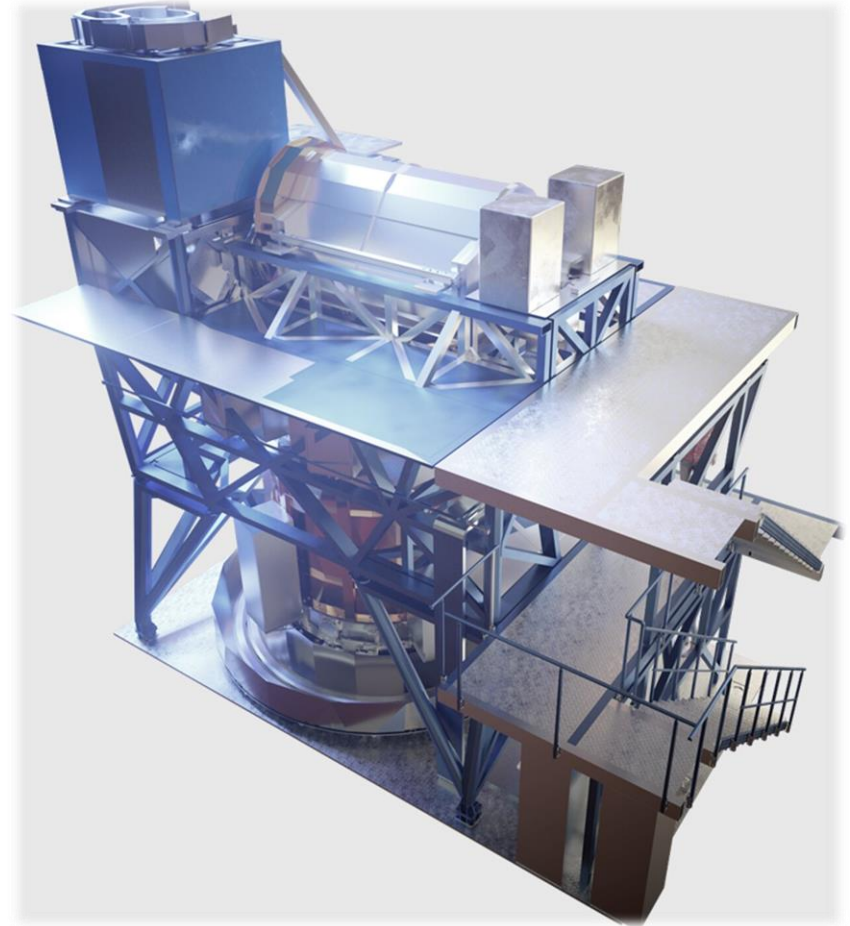
VLT MOONS

- Focal-plane: 1000 independent fibre positioners
- Complex path analysis required for positioning software (efficiency, collision avoidance...)



ELT: HARMONI

- UK-led first-light ELT instrument
 - PI: Niranjan Thatte (Oxford)
 - UKATC is lead technical institute
 - Presently in Detailed Design Phase
- UKATC leading/contributing to:
 - Project management
 - Systems engineering
 - Overall Instrument Assembly, Integration and Test
 - Optical design
 - Mechanical design (cryostat, static structure, focal-plane relay)
 - Adaptive optics



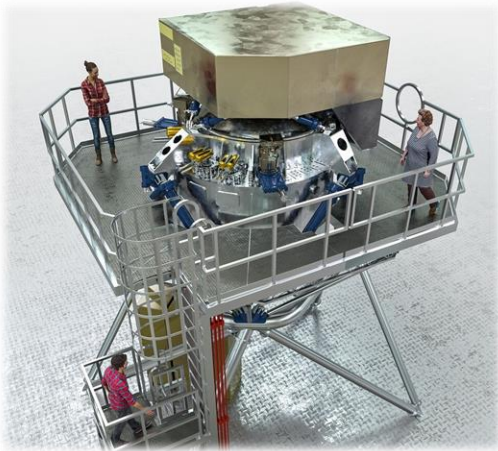
THE EXTREMELY LARGE TELESCOPE

The World's Biggest Eye on the Sky

ELT instruments

METIS

Lead: LM-band spectrograph



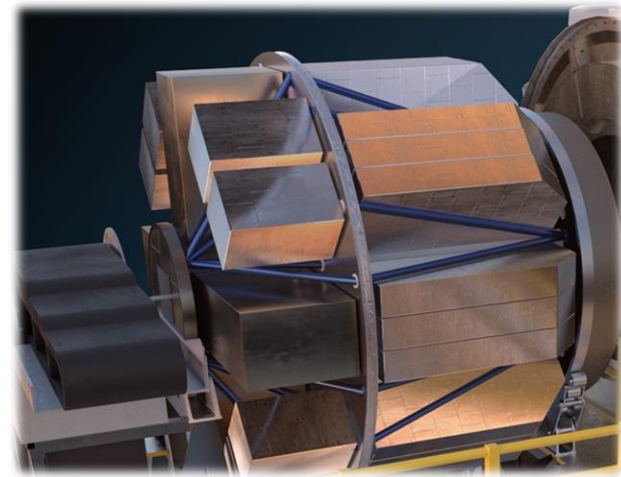
HIRES

Lead: IR spectrograph



MOSAIC

Project scientist / AO sub-sys



THE EXTREMELY LARGE TELESCOPE

The World's Biggest Eye on the Sky



SKAO: Observatory Monitoring & Control

Clearest view of the radio sky

- Broad science case
- Dipole array in Australia
- Dish array in Southern Africa
- Largest big data project in the world

UKATC leading:

- All astronomer facing tools
 - Operator controls (design, execution)
 - Observer tools (proposals, review)
- UKATC Software group also led the development of the Observer tools for ALMA

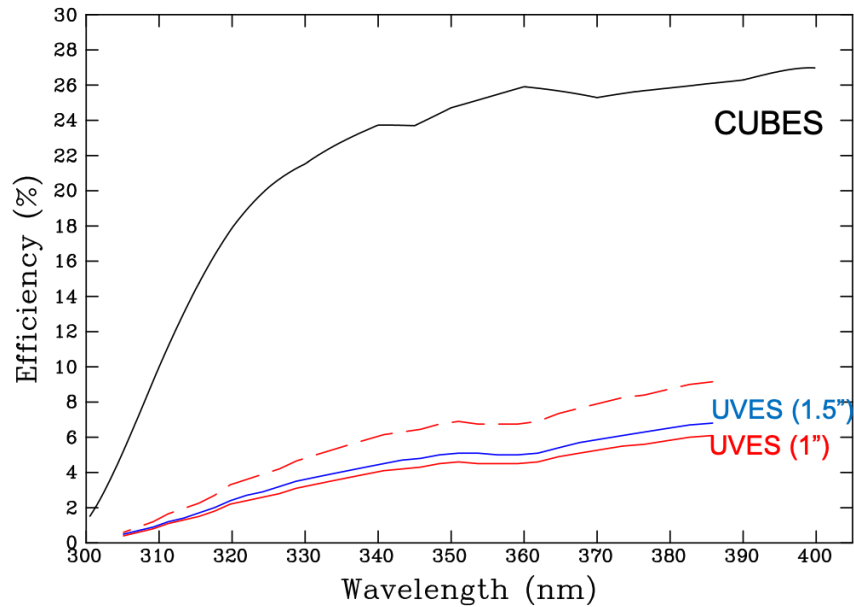


VLT: CUBES



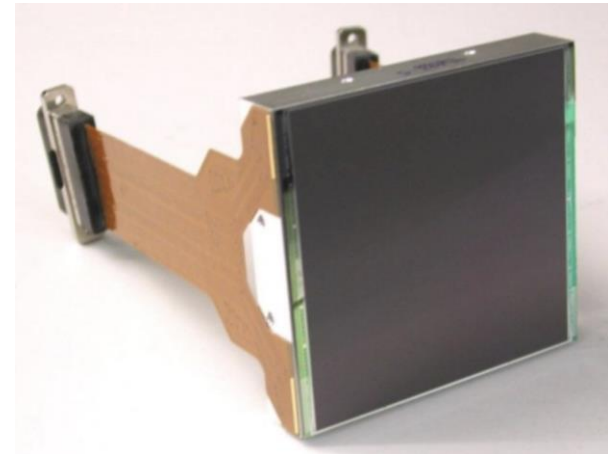
Ultimate UV instrument for Paranal

- Broad science case
- $R \geq 20,000$, over 300-405 nm
- Unique discovery space (incl. cf. ELT)



UKATC leading/contributing to:

- Science
- Optical design
- Detector sub-system

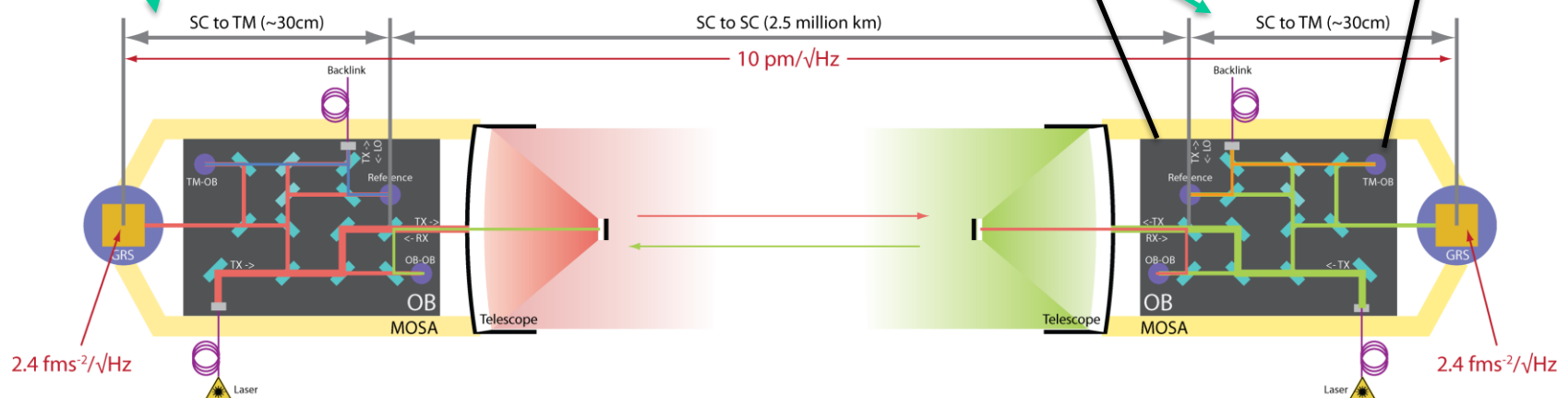
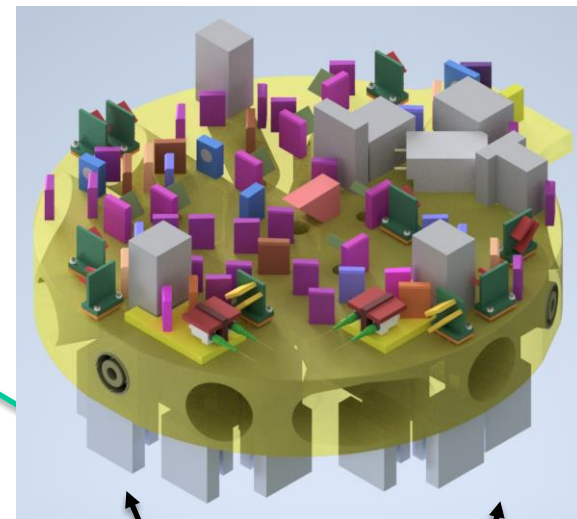
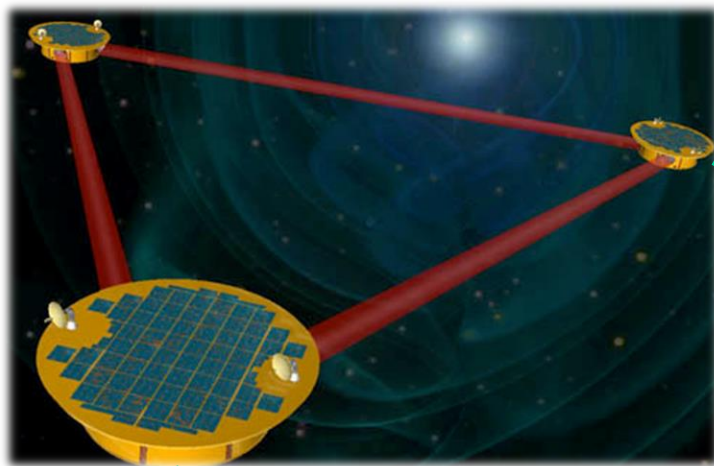


LISA



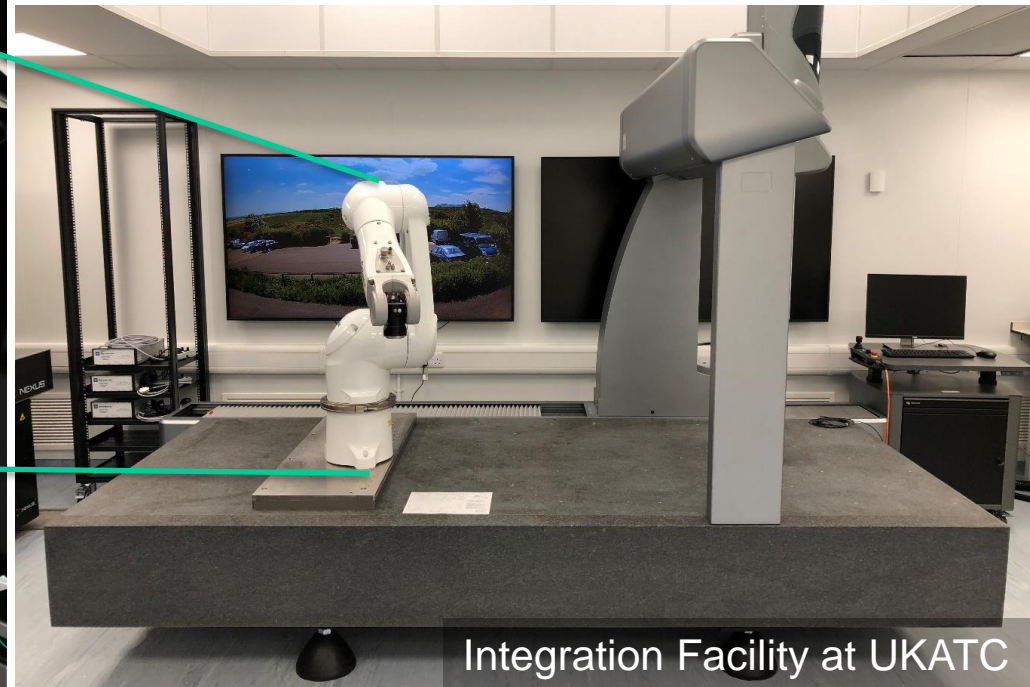
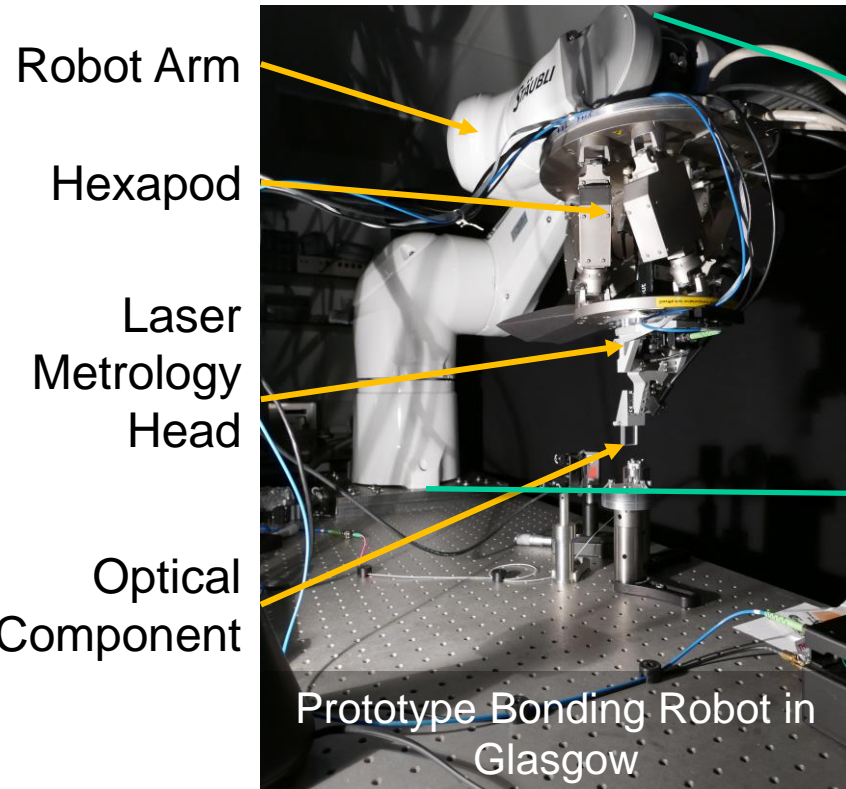
UKATC lead the UK contribution to the LISA Instrument

- Partnership with University of Glasgow
- Design, development, integration and testing of the Optical Bench Interferometer – the key laser metrology optics at the very heart of LISA
- Phase A just completed, Phase B starting in April



Key development is the ability to integrate the 6 flight model OBs required for LISA

- Dedicated integration facility being set-up at UKATC
- Precision robotic integration system developed between Glasgow and UKATC
- Allows alignment of laser optics at sub-arcsecond alignment and fixation with hydroxide catalysis bonding



Thanks!

