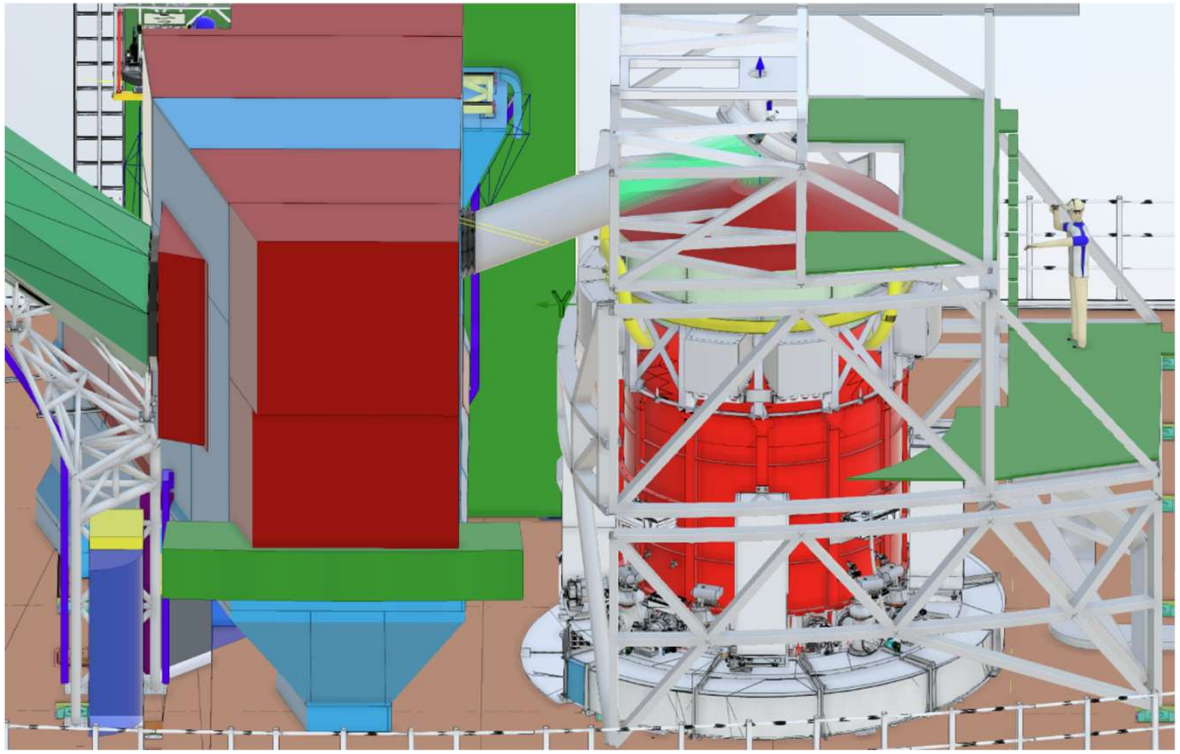
HARMONI

HARMONI Procurement



01 Oct 2025

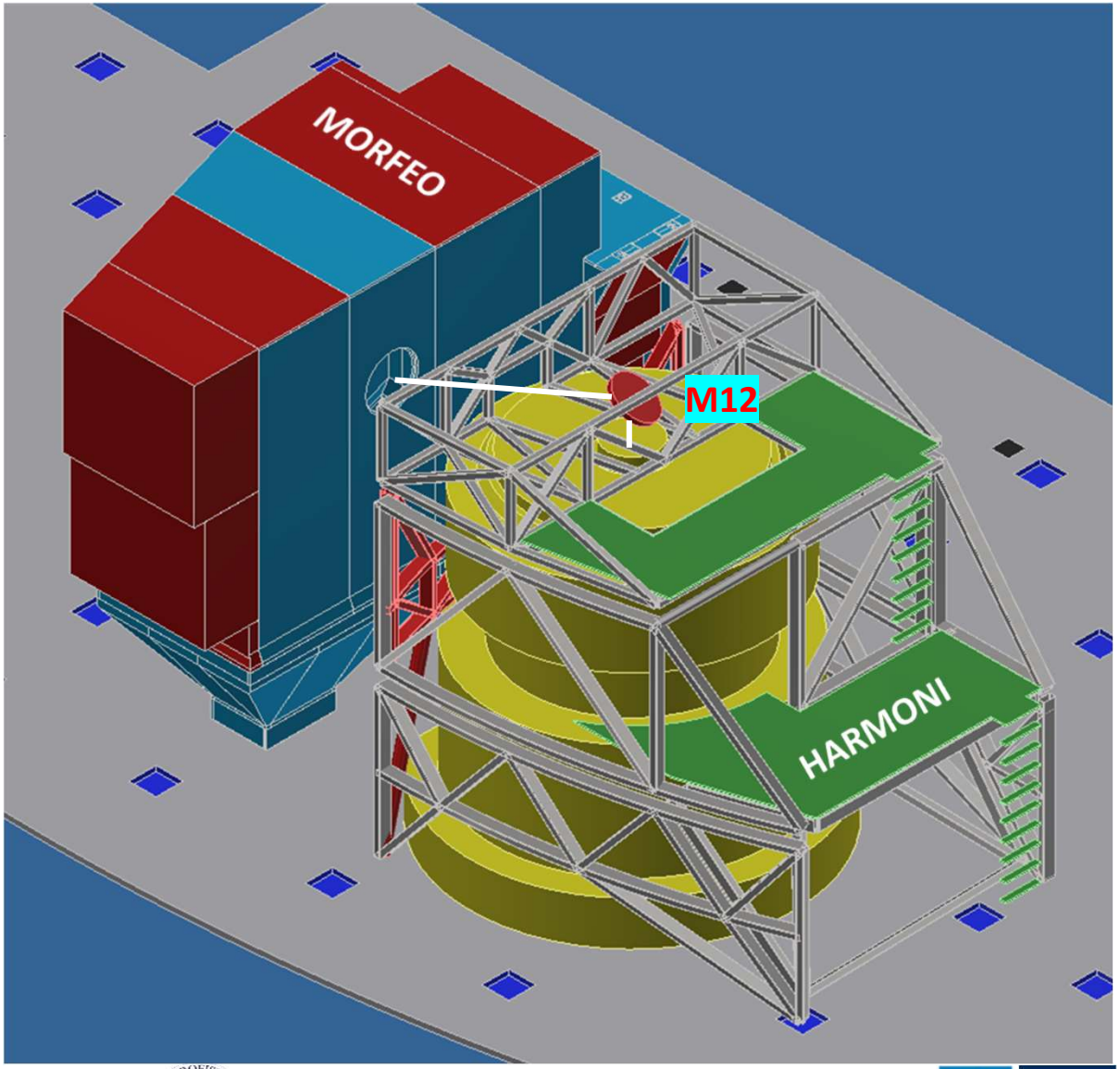
Stephen Chittick

HARMONI Instrument

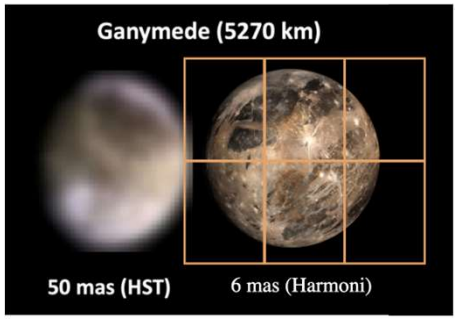
Near-IR Integral Field Spectrograph for the ELT

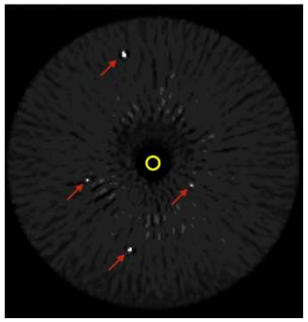
New PI

Jim Dunlop – University of Edinburgh
james.dunlop@ed.ac.uk



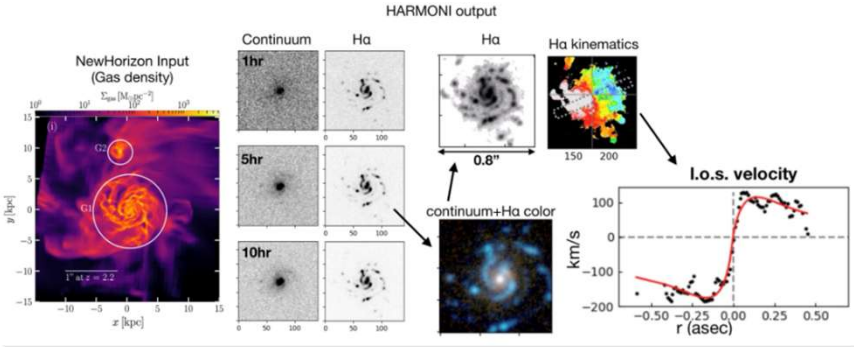
HARMONI Science Goals



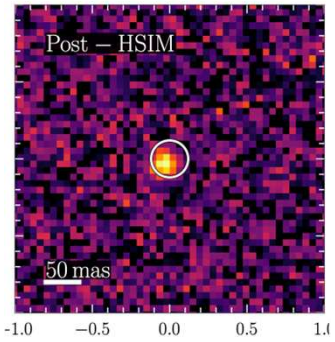


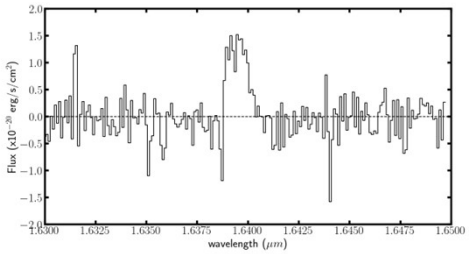
- HARMONI on the ELT offers a uniquely powerful near-IR capability in the JWST era

- Medium (R~7000) and low (R~3500) resolution spectroscopy over entire near-IR wavelengths



- At an angular resolution ~0.012 arcsec delivered by MCAO (MORFEO) or SCAO, sampled by optimised spaxel scales (for either resolution or field-of-view)





- HARMONI on the ELT will go well beyond the angular and spectral resolution limits of JWST, enabling the detailed astrophysical study of sources ranging from the nearest exo-planets to the very first galaxies/stars during the epoch of reionisation.

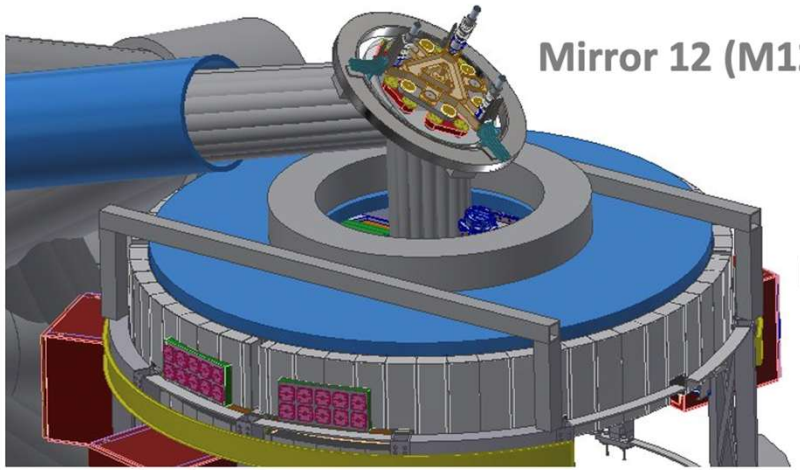
HARMONI

beam from MORFEO

comprises

Natural Guide Star Sensors (NGSS)

(for pointing, guiding, and tip-tilt correction
– arms lock on to 3 natural guide stars)



Instrument Pre Optics (IPO)

(including spaxel scale changer & High Contrast Unit)

Integral Field Unit (IFU)

(the “image slicer”)

The Spectrograph

(in fact 4, one for each quandrant of the IFU)

HARMONI

comprises

Natural Guide Star Sensors (NGSS)

(for pointing, guiding, and tip-tilt correction
– arms lock on to 3 natural guide stars)

Instrument Pre Optics (IPO)

(including spaxel scale changer & High Contrast Unit)

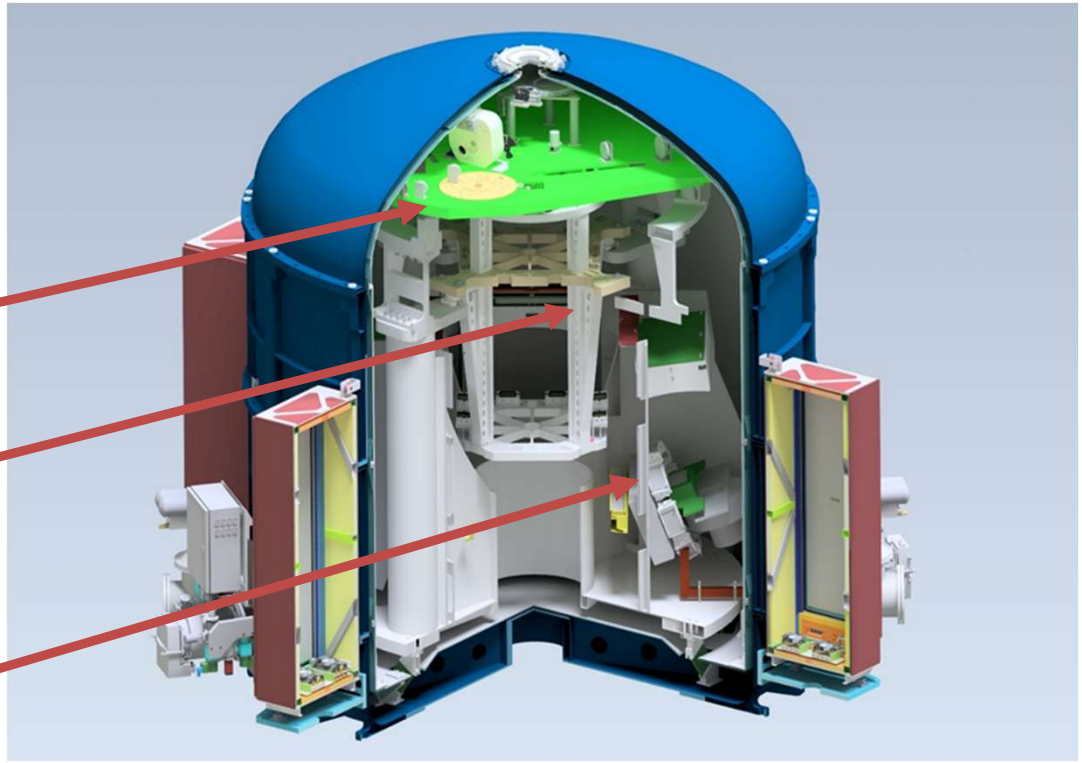
Integral Field Unit (IFU)

(the “image slicer”)

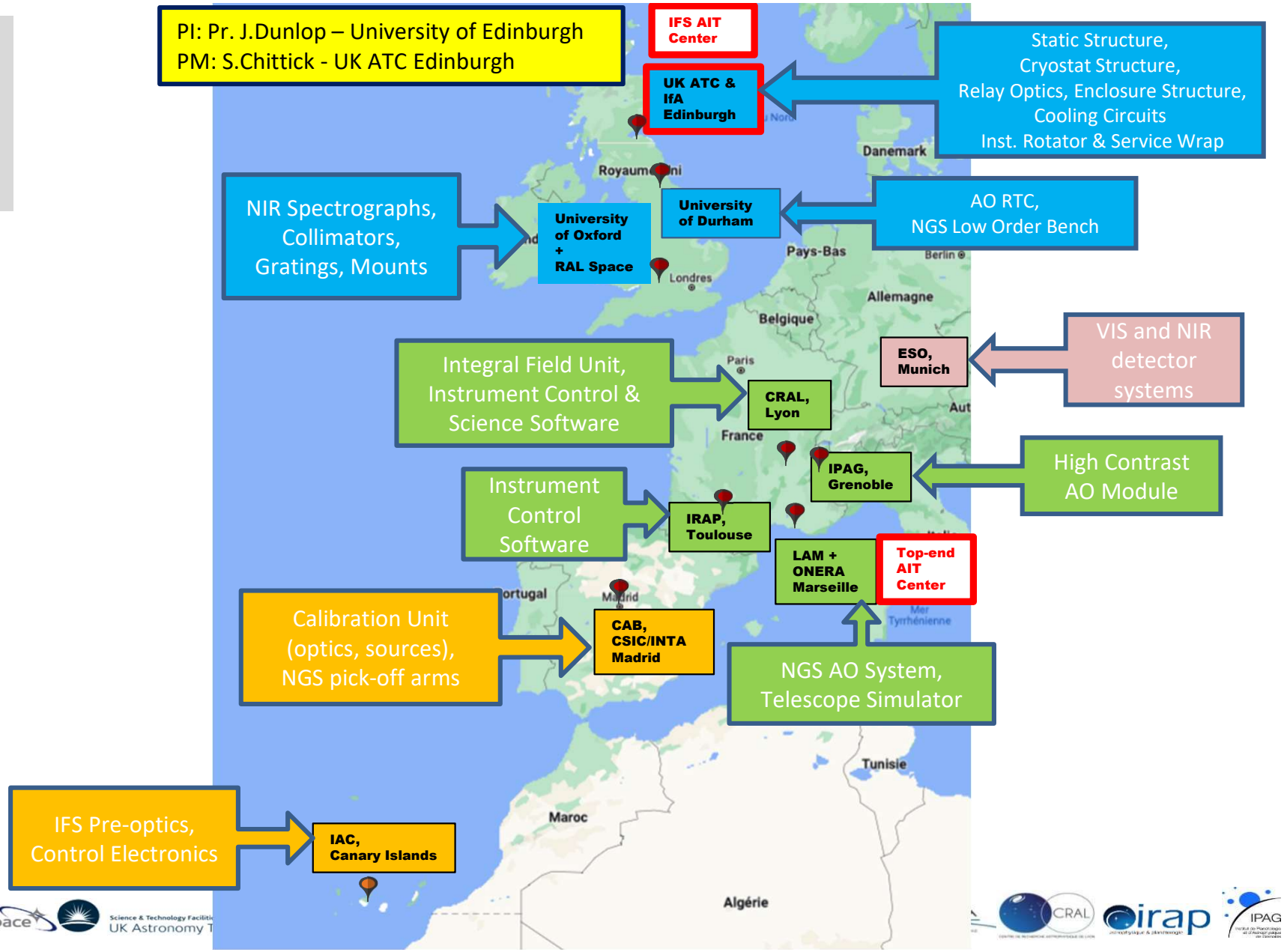
IFS

The Spectrograph

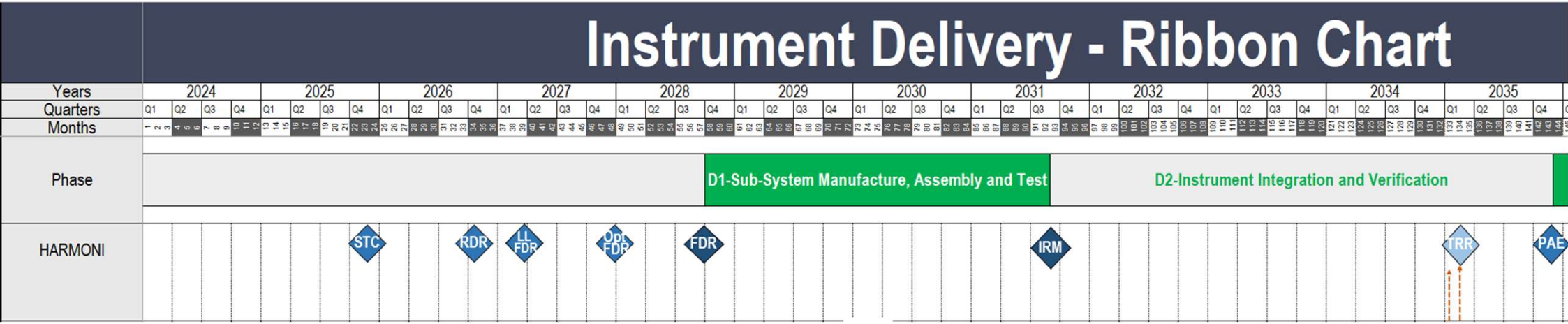
(in fact 4, one for each quandrant of the IFU)



Glossary:
IFU: Integral Field Unit
AO: Adaptive Optics
RTC: Real Time Control
LGS: Laser Guide Star
NGS: Natural Guide Star
WFS: wavefront sensor



HARMONI - Schedule

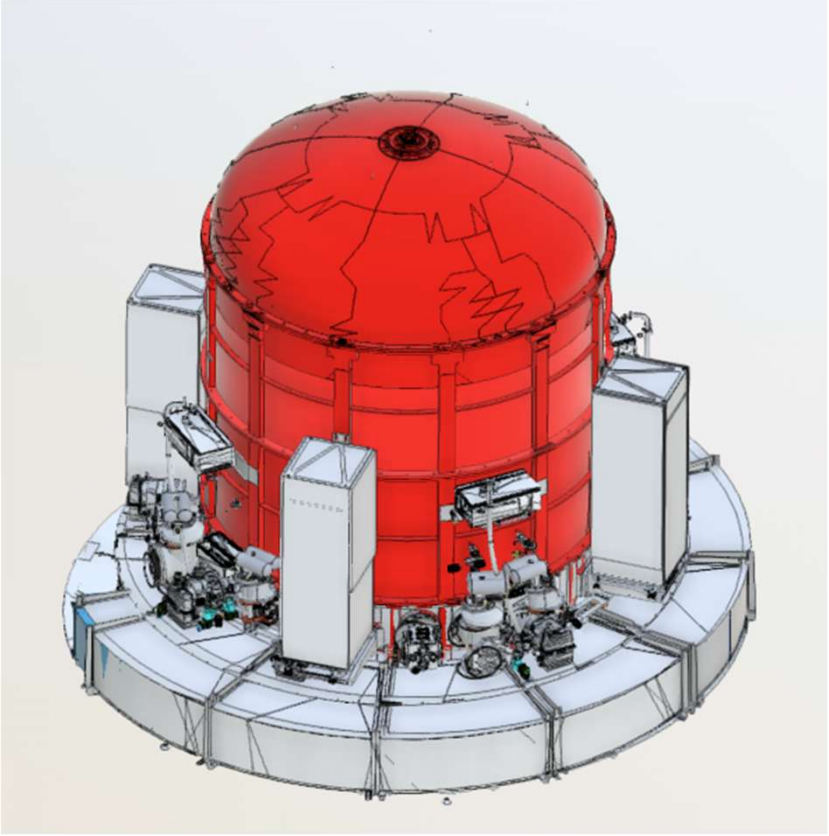


- Currently exiting a “rescope” phase, with formal approval for new Instrument expected Oct 25
- Additional RDR milestone added in Oct 26 to allow early procurement to commence on mature sub-systems
- New “bottom-up” schedule for rescoped project created - opportunities to pull forward PAE are being investigated

Procurement Items - Cryostat

Contact: Tassos Aretos UKATC
tassos.aretos@stfc.ac.uk

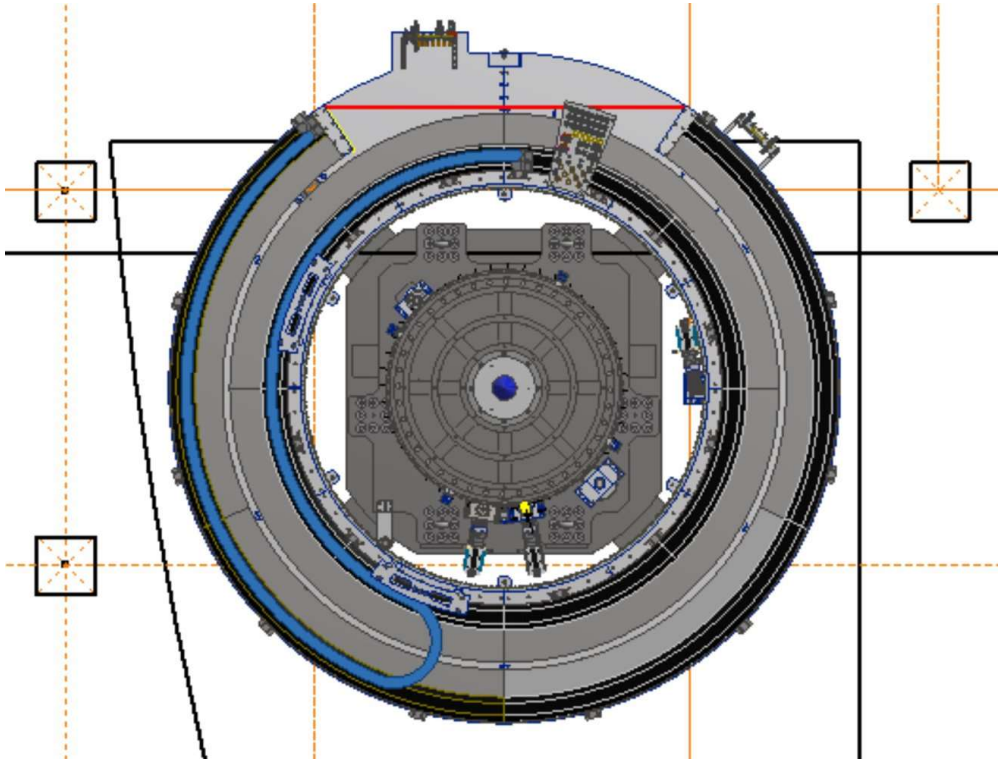
- 3.6m height, 3.75m diameter, Aluminium cryostat
- Internal cold structure supports key optical sub-systems
- Vacuum (turbo and roughing pumps) and cooling system (nitrogen pre-cool and helium coldheads)
- Procurement start date – Q2 2027
- Required Q1 2030 (MAIT completed on empty Cryostat)



Procurement Items – Rotator and Cable Wrap

Contact: Dawn Wasley UKATC
dawn.wasley@stfc.ac.uk

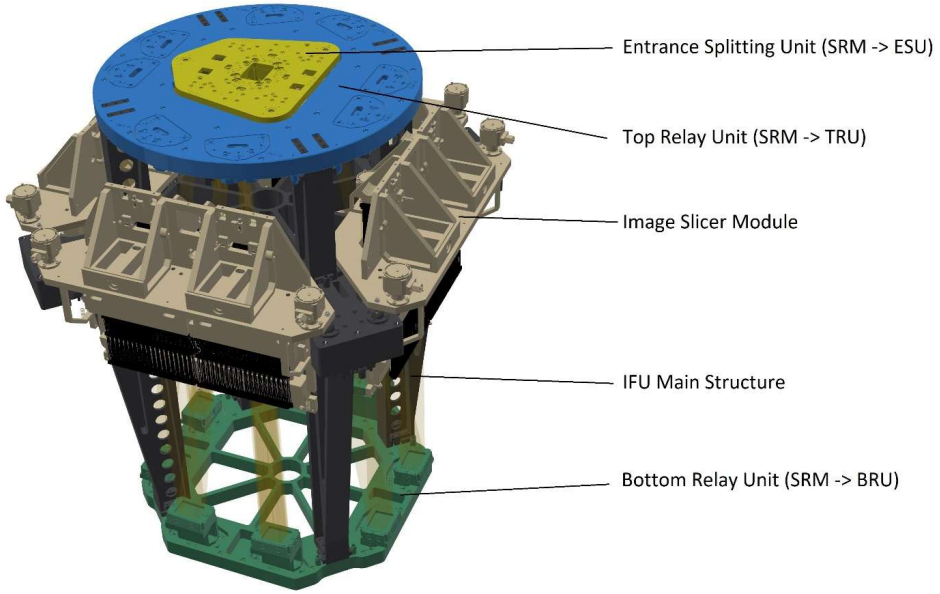
- Rotating base plate that attaches to the Nasmyth floor and rotates the instrument (IFS and NGSS)
- Approx 13 tonnes rotating mass moving at 8 deg/s
- Considering a full-service contract to take design from prototype phase to delivery
- Component required Q1 2030
- Cable wrap for helium hoses and electrical cables



Procurement Items – Integral Field Unit

Contact: Alban Remillieux CRAL
alban.remillieux@univ-lyon1.fr

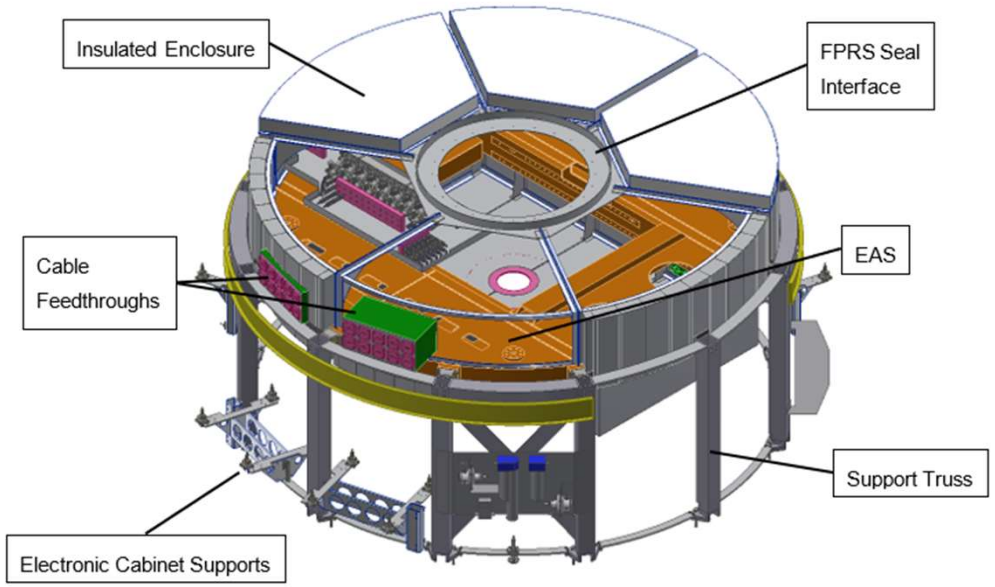
- Image Slicer Module procurement already completed
- Splitting and Relay Module is the next item to be procured (8 prisms plus 4 mirrors per path) – May 26
- IFU main structure (aluminium, needs to ensure alignment of ISM and SRM) – Oct 26



Procurement Items – External Support and Enclosure

- Provides structure to support NGSS sub-systems and a sealed volume cooled to 2 deg C
- 3.75m diameter
- Procurement to commence Q3 2028
- Required Q4 2030

Contact: David Le Mignant - LAM
david.lemignant@lam.fr



Procurement Items – Instrument Static Structure

Contact: David Montgomery - UKATC
david.montgomery@stfc.ac.uk

- Provides structural support for M12 relay and local calibration sub-system
- Provides access to electronic cabinets and LOWFS for maintenance
- 4.6 tonne aluminium structure, 6.5m height
- Procurement Q4 2028