MAVIS

Deeper than HST, Sharper than JWST

4 Slides Status @ Start of phase B

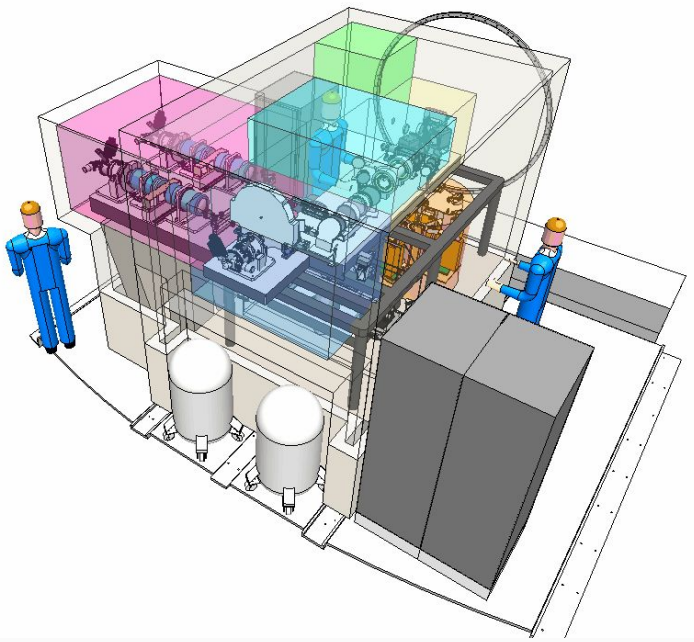
Prof Francois Rigaut (ANU, Principal Investigator)

A/Prof Richard McDermid (MQ, Project Scientist)

Dr Giovanni Cresci (INAF, Deputy Project Scientist)

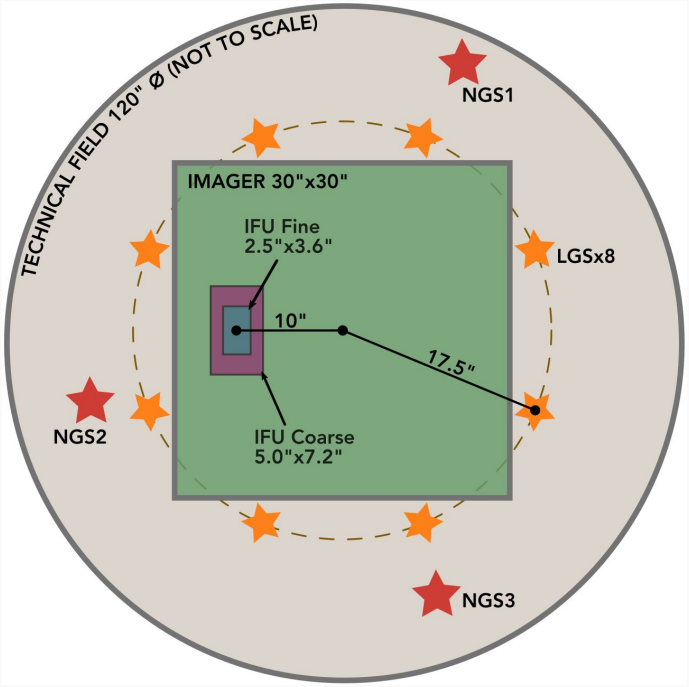
MAVIS: DEEPER THAN HST, SHARPER THAN JWST

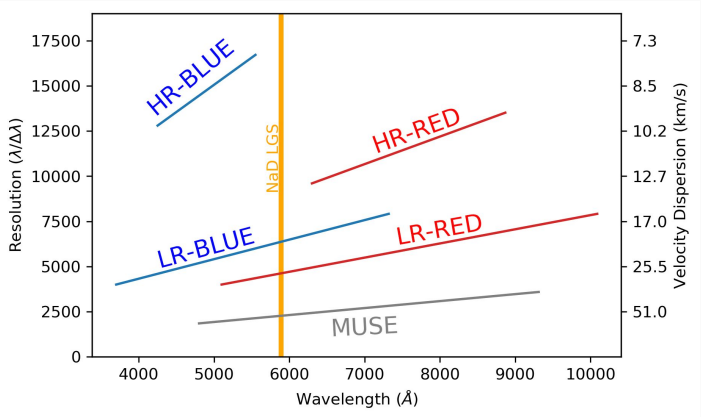
- **Multi-conjugate Adaptive Optics** system for correction in the **visible**
  - complete with an **4k✕4k imager** @ 7.3mas pixels
  - and an **IFU w/ 4 spectral resolution modes** (4-12k), ¼ number of MUSE spaxels
- Expecting > **10% Strehl** (goal 15%) **at V band** over **30”x30”**
- Consortium **Australia** (**AAO Consortium**, lead) / **INAF / LAM / ESO**
- Passed phase A 06/2020, **first light expected Sem 2 2027**
- For the ESO VLT AOF (UT4)
  - 4x2 Laser Guide Stars;
  - 3 Near-IR NGS Wavefront Sensors (using SAPHIRA);
  - 3 Deformable mirrors (DSM + 2 post focal DMs);
- A **brilliant science case** for a **facility instrument** (publicly available on arXiv), with themes:
  - Emergence of Hubble sequence
  - Resolving galaxy contents
  - Star clusters as tracers of galaxy evolution
  - Birth, life, death of stars and planets



MAVIS TOP-LEVEL SPECIFICATIONS

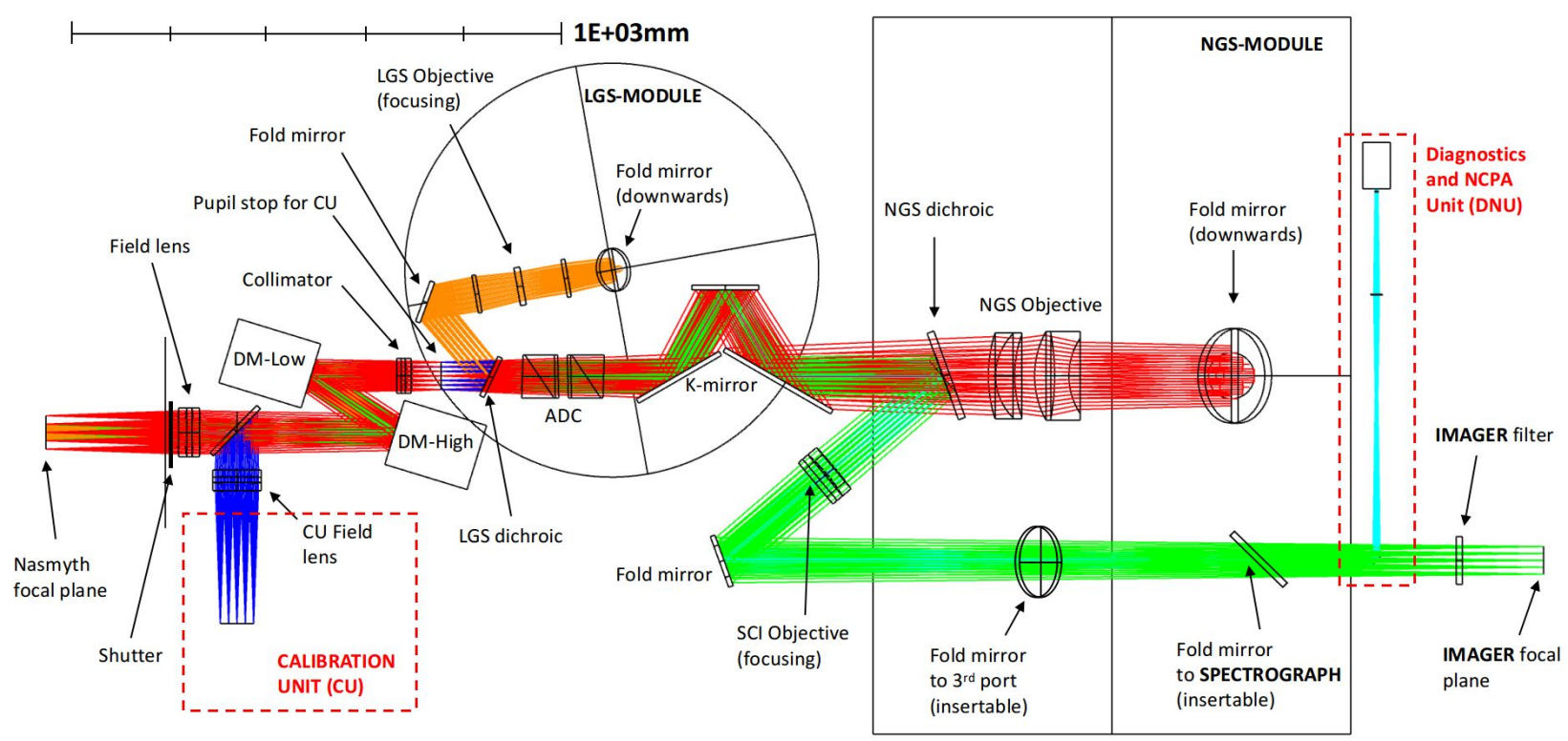
Science Field	30”x30”
Angular Resolution	FWHM ~ 20mas at V band
Strehl Ratio	>10% (15% goal) at V under median conditions
Sky Coverage	> 50% at the Galactic pole, 15% EE in 50mas spaxel
Wavelength Coverage	VRI (optimised); B-z (extended)
Imager	~ 7mas pixels. 7 broad and 15 narrow band filters, 1h 10σ for V ~ 29.5 (HST SNR x2)
Spectrograph	Image slicer. Two spatial modes: ~3”x3” @ 25mas and ~6”x6” @ 50mas. Four spectral modes: 370-1000nm, R=5,000-15,000
Visitor port	Potential for third instrument





An Innovative Optical Design

- Uses refractive elements in main path - essentially no field distortions
- No collimated beams
- Everything gravity invariant (except K mirror and ADC)
- Very “healthy” design, all zero-order principles of AO design are there.



THE MAVIS CONSORTIUM

- Australia/INAF/LAM/ESO
- First ESO instrument led by Australia

AAO-INAF-LAM-ESO