

METIS

First Generation Instrument for the Extremely Large Telescope



Credit: ESO

Silvia Scheithauer, MPIA, Heidelberg

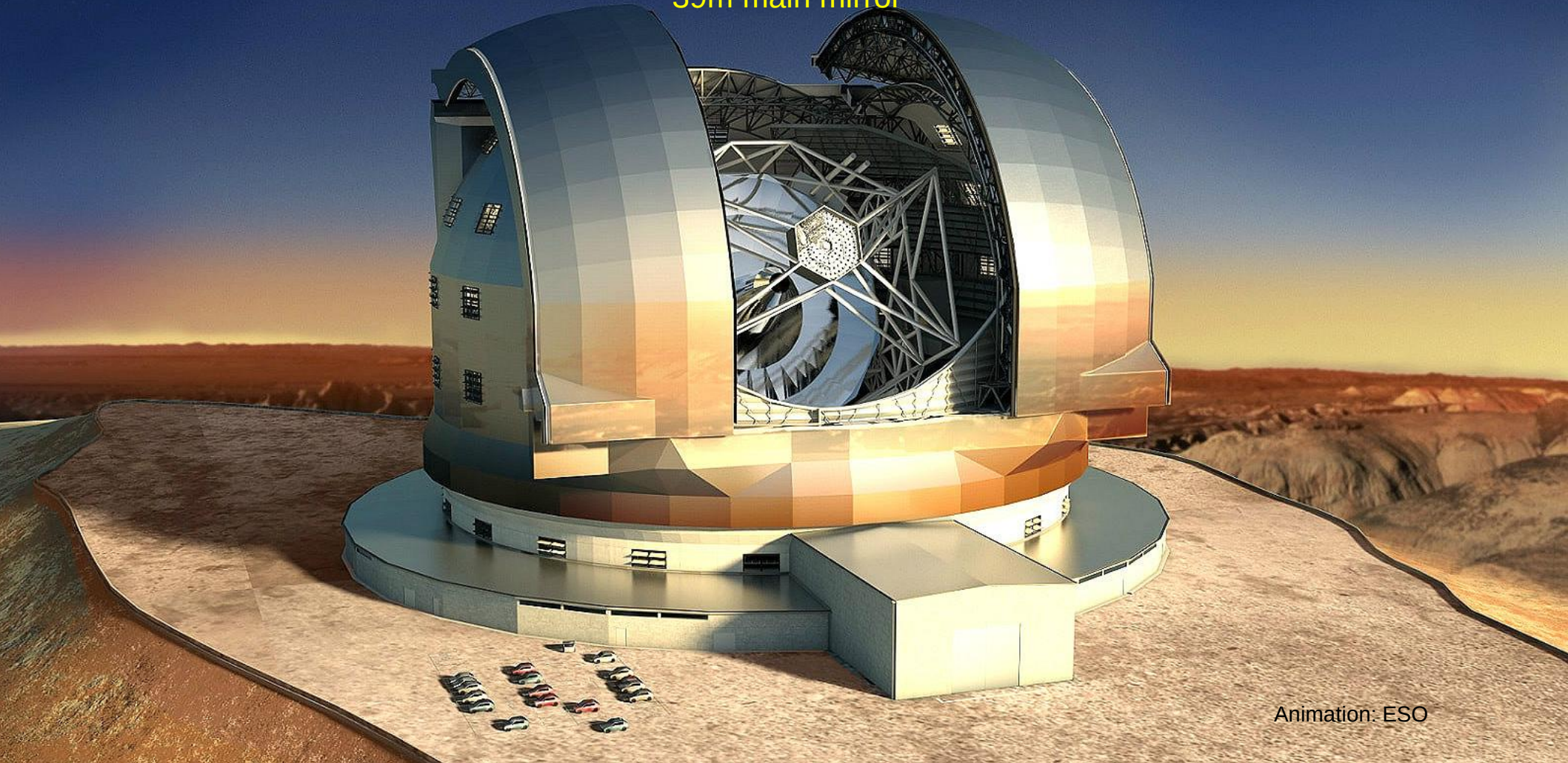


ELT construction site, Cerro Armazones

Courtesy: ESO

Cerro Armazones, Extremely Large Telescope (ELT) in 2029

39m main mirror



Animation: ESO

October 2009, ELT site visit



Courtesy: Thomas Henning

June 2012, ESO council approves ELT program



Courtesy: ESO

December 2014, ESO council specifies ELT program



Courtesy: ESO



**Mid-infrared
ELT Imager and
Spectrograph**

METIS Consortium

PI institute: NOVA, Leiden, Netherlands
+ 12 partner

KU Leuven

NOVA

U. Köln

UK ATC

MPIA

U. Liège

ESO

CEA Saclay

U. Michigan

CENTRA

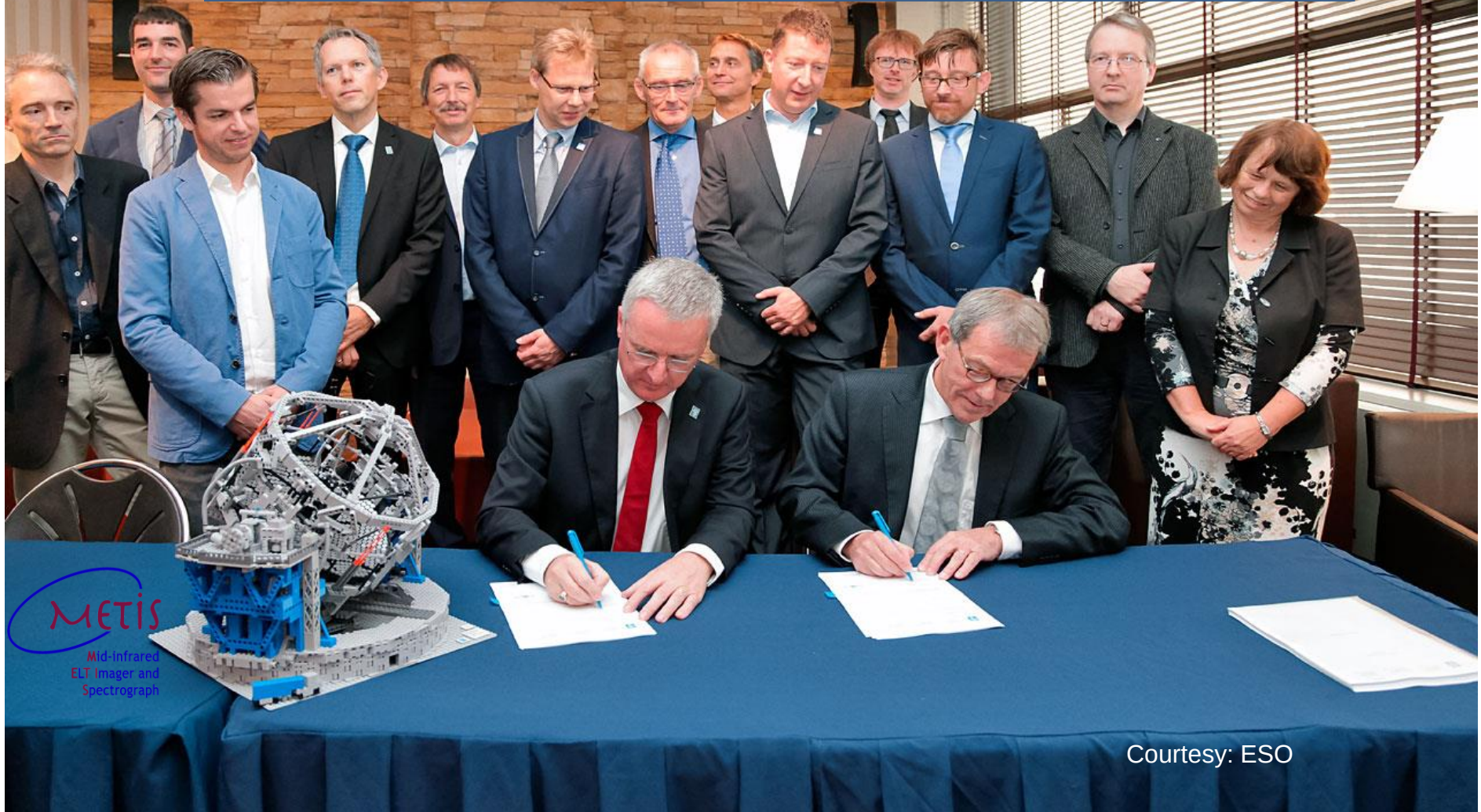
ETH Zürich

A-Star

ASIAA



28 September 2015: Signature of agreement between ESO and consortium for the design and construction of METIS



METIS
Mid-Infrared
ELT Imager and
Spectrograph

Courtesy: ESO



Schedule

2007-2009: METIS Phase A study

Kick-off: 1st October 2015

Preliminary Design Phase: Oct 2015 - May 2019

Final Design Phase: June 2019 – Nov 2022

Manufacturing, Assembly, Integration, Testing (MAIT)

MAIT phase sub-systems Dec 2022 – Jan 2028

System Assembly in Leiden: 2025-2029

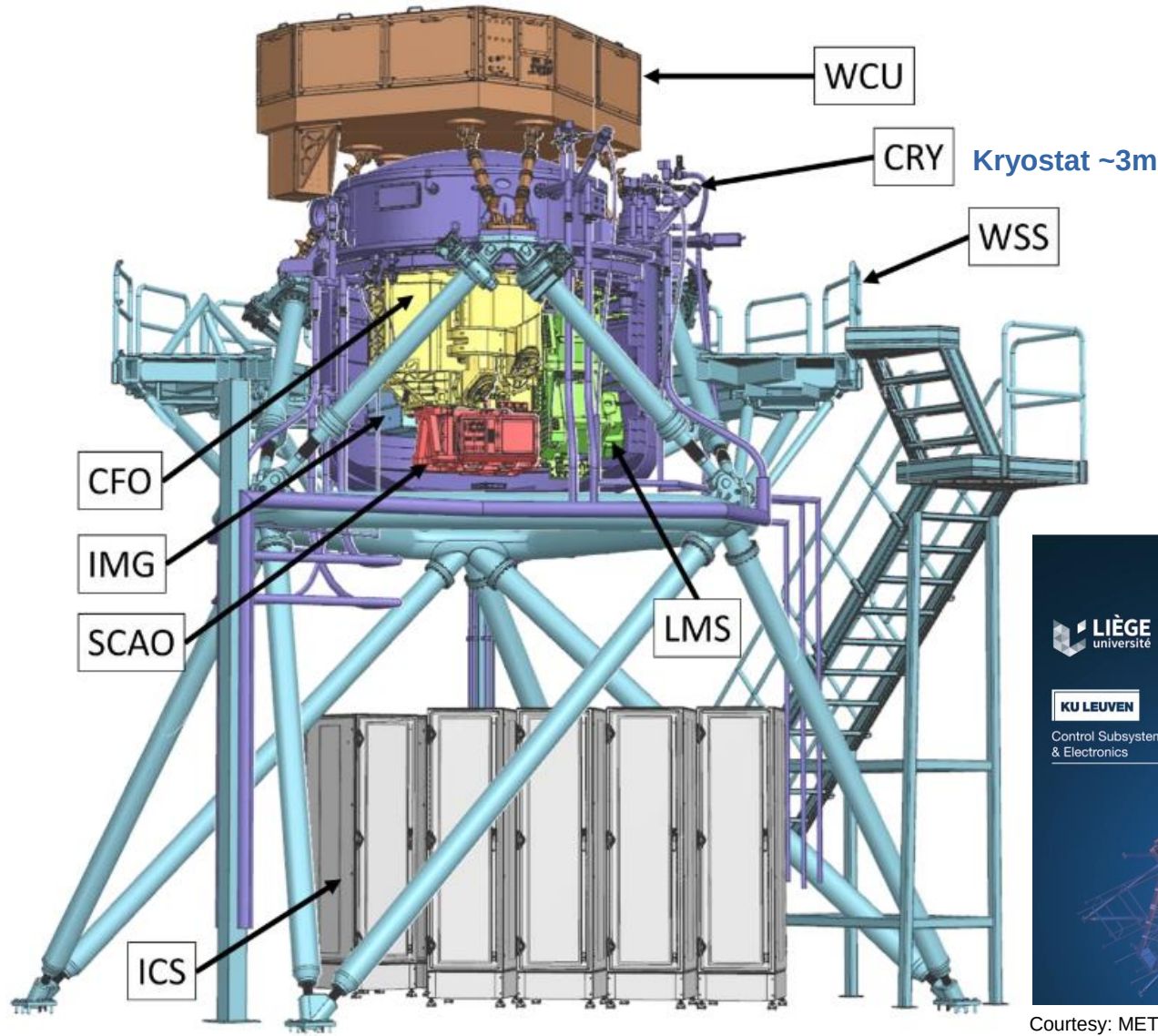
Preliminary Acceptance Europe (PAE): end 2029

Installation at ELT & start of commissioning: 2030

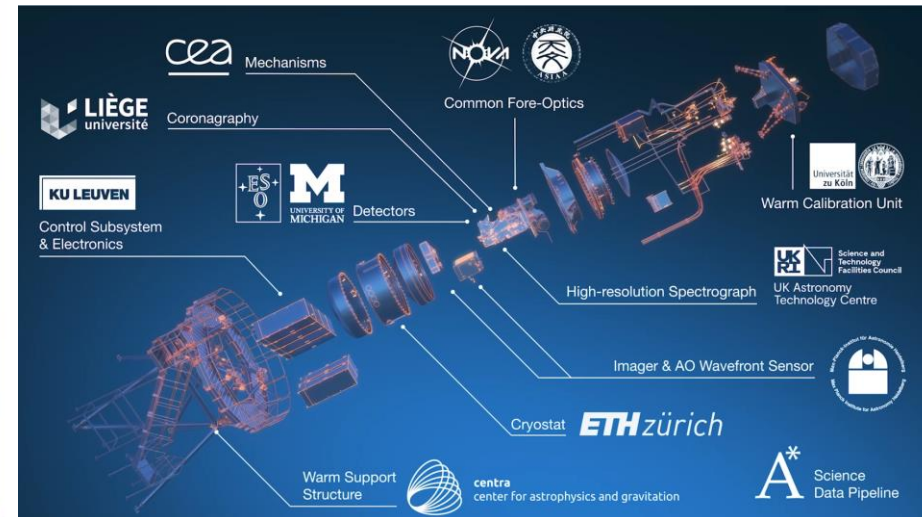


Final Design 2022

Final Design 2022



- Imaging, coronagraphy, spectroscopy at 3-13.5 micron
- High-resolution spectroscopy at 3-5 microns



Courtesy: METIS consortium

Scientific Goals

Circumstellar Disks &
Planet Formation



Star Formation &
Stellar Clusters



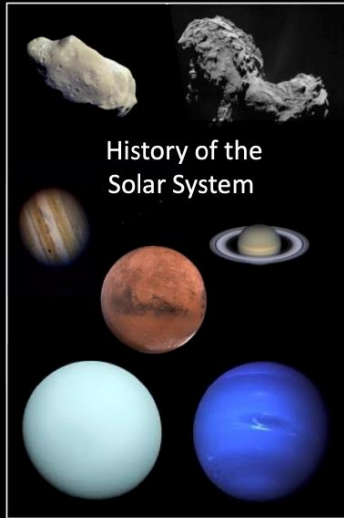
The Physics
of Galaxies



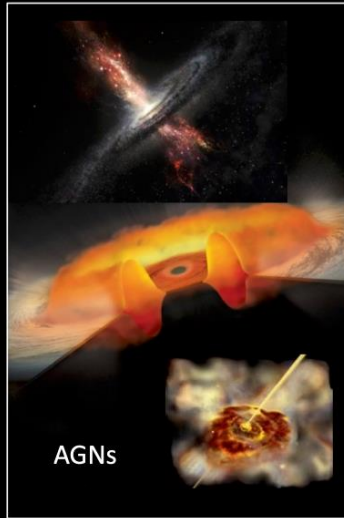
Exoplanets
High
Contrast
Imaging



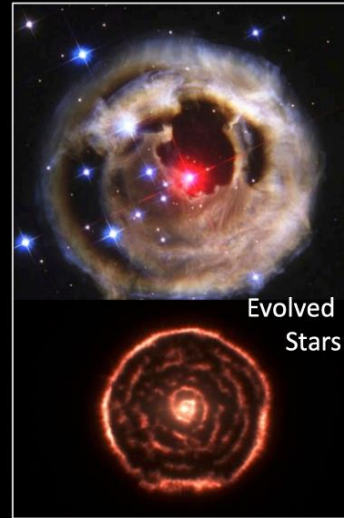
History of the
Solar System



AGNs



Evolved
Stars



The Galactic
Center



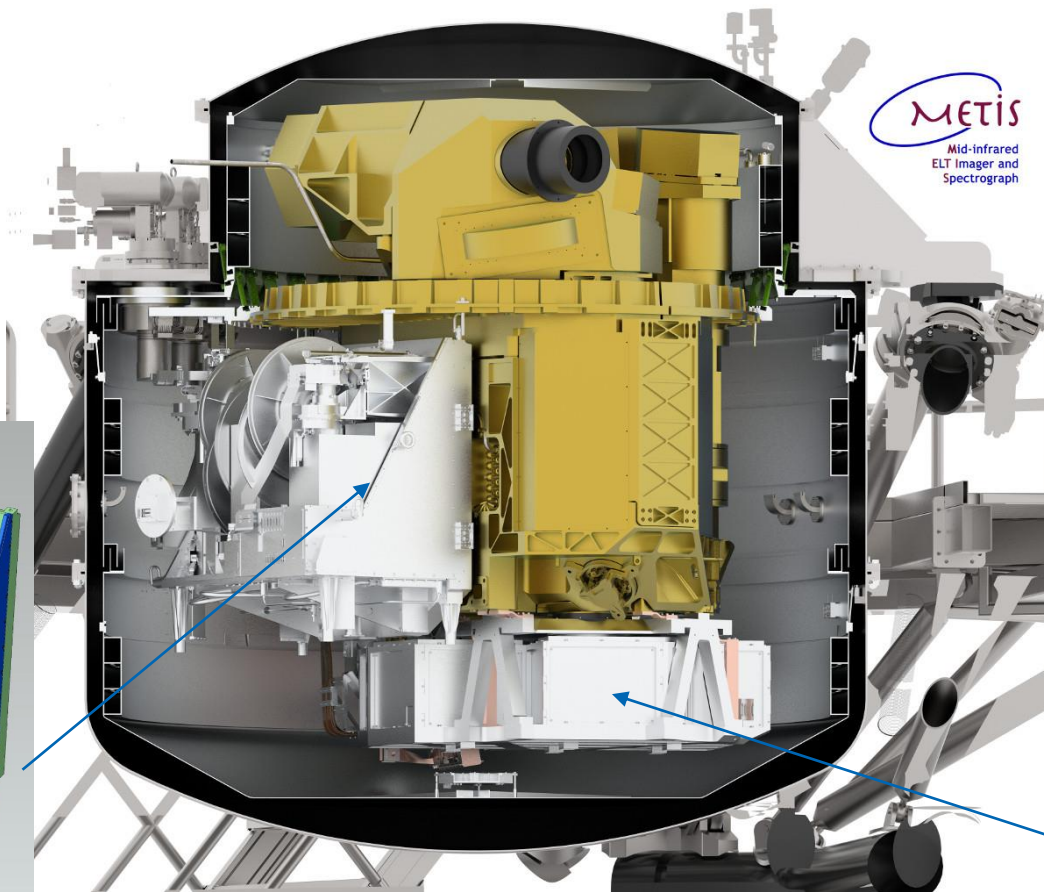
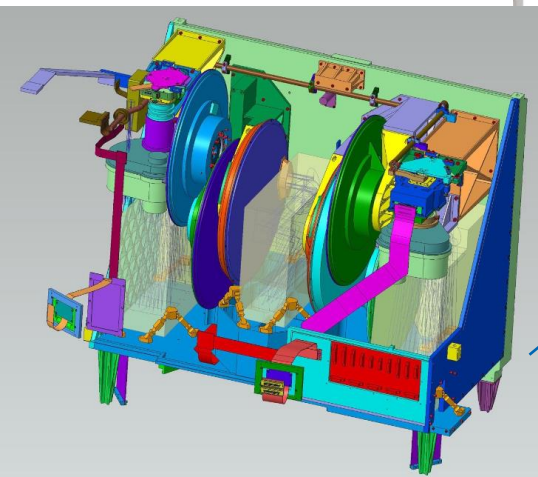
METIS in a nutshell video, M. Feldt

<https://keeper.mpdl.mpg.de/d/1531ffe4aab6425a8282/>

MPIA Contributions

IMAGER

LM- and N-band
camera



METIS
Mid-infrared
ELT Imager and
Spectrograph

Adaptive Optics

Real Time Computer
SW & HW

+

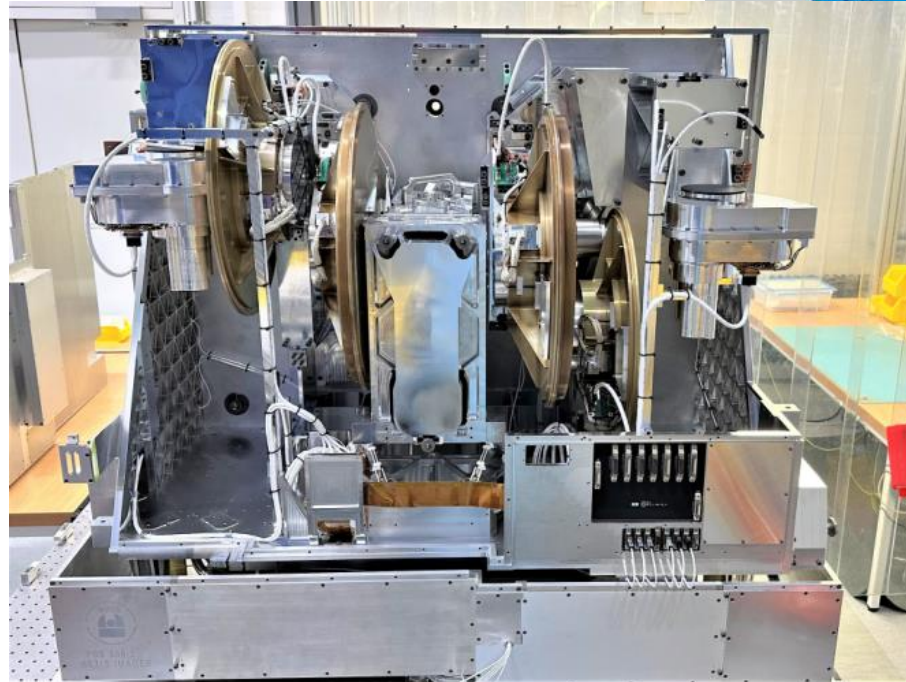
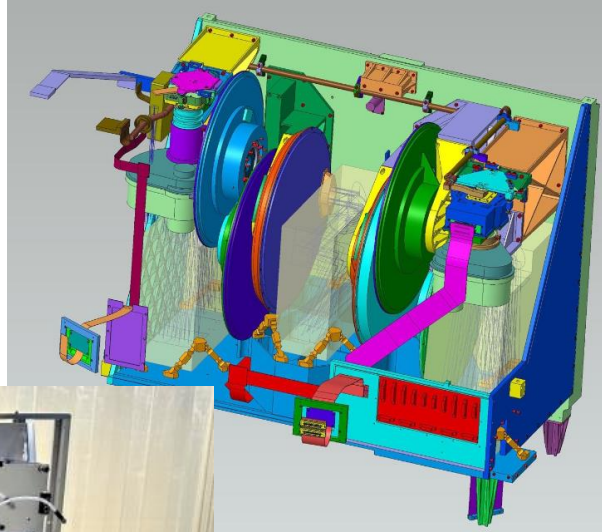
Wavefront sensor



Courtesy: MPIA

IMAGER

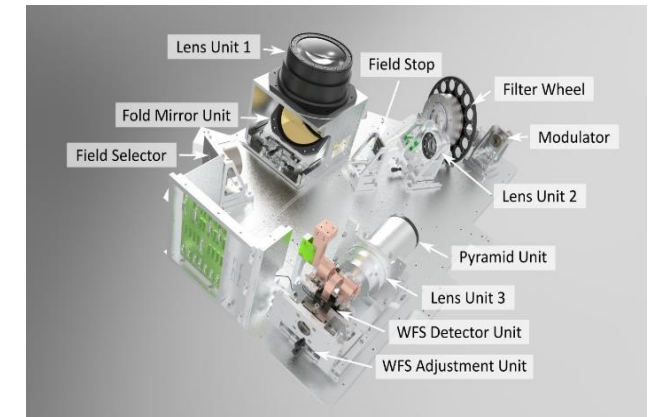
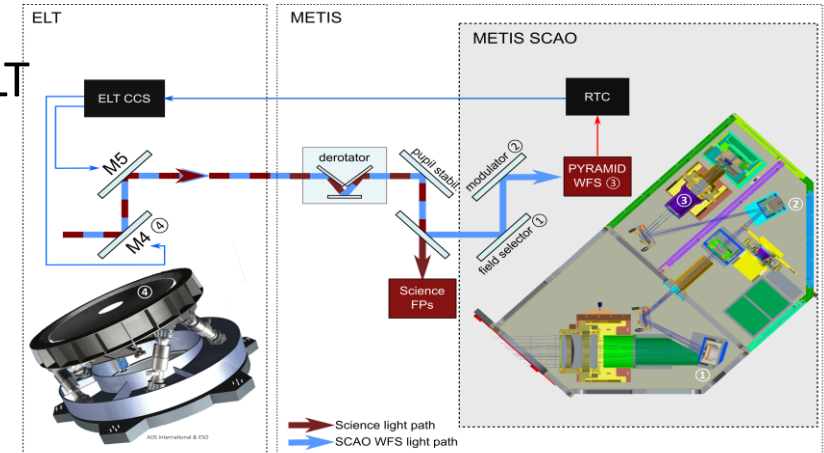
Scientific instrument
two cameras at 40K:
LM-band 3-5 μ m &
N-band 7.5-13.5 μ m



Courtesy: MPIA

Single Conjugate Adaptive Optics (SCAO) System

- Cancel out atmospheric disturbances -> essential to reach METIS science performance
- Wavefront sensor in cryostat at 70K
- Real Time Computer system communicates with ELT



Courtesy: MPIA

METIS SCAO tests in MPIA integration hall



Courtesy: MPIA



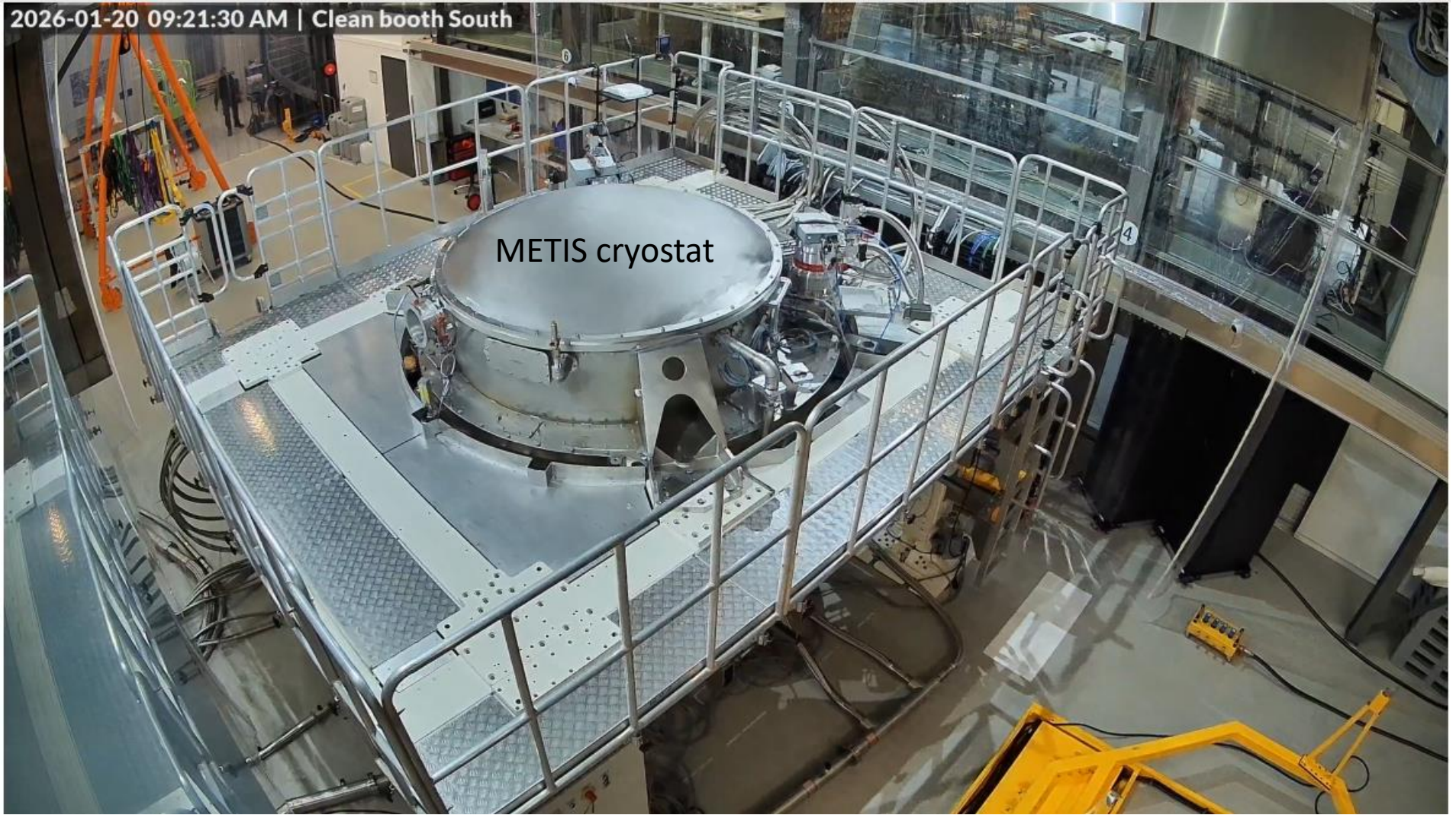
Courtesy: MPIA



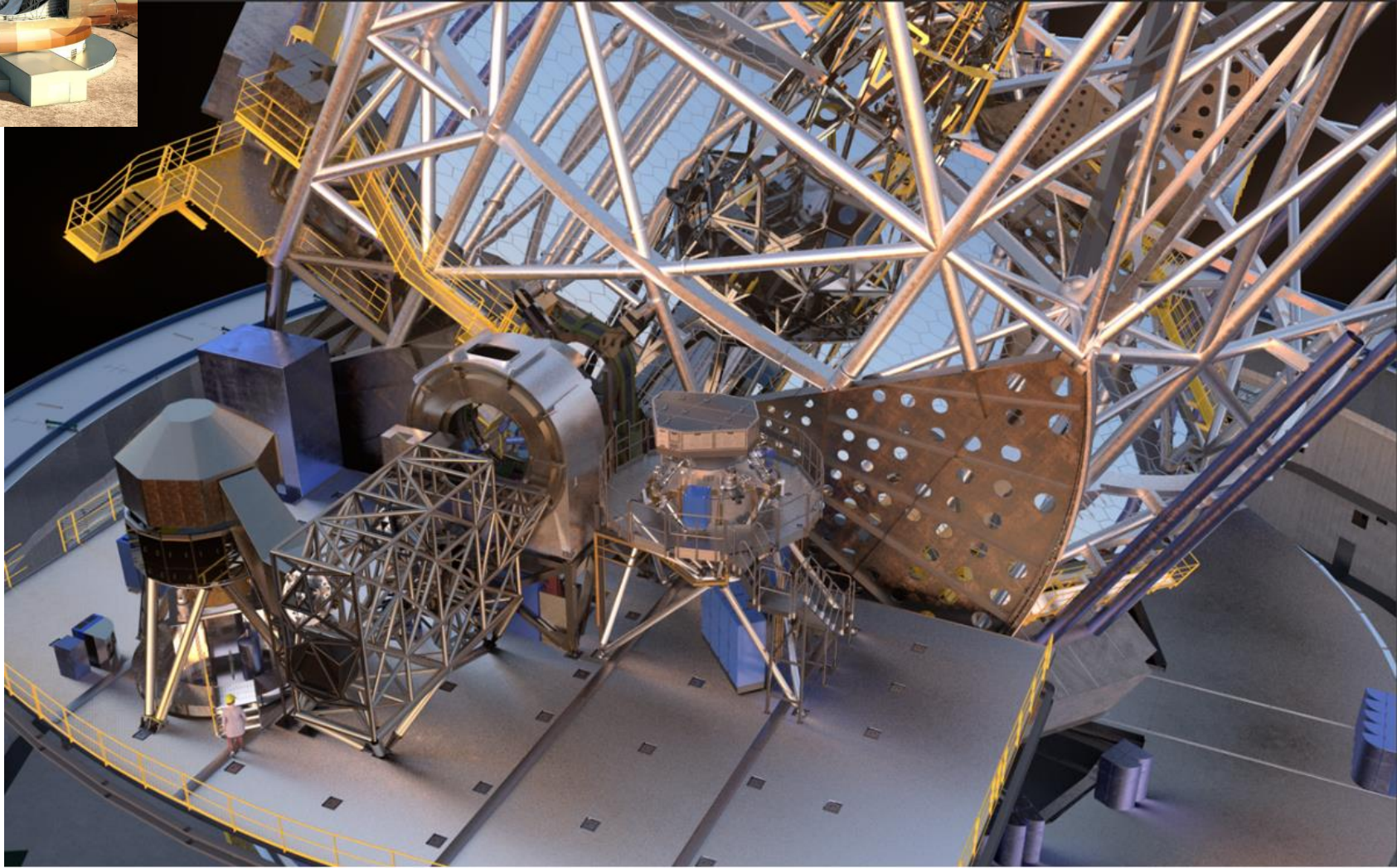
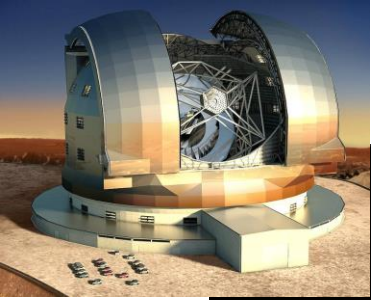
METIS integration hall in Leiden 2026

2026-01-20 09:21:30 AM | Clean booth South

METIS cryostat



METIS at the ELT in 2030



METIS becomes real



<https://keeper.mpd.l.mpg.de/f/bf37fce86ecd49ffb1c9/>

Video: Markus Feldt

June 2026, METIS integration hall at MPIA

