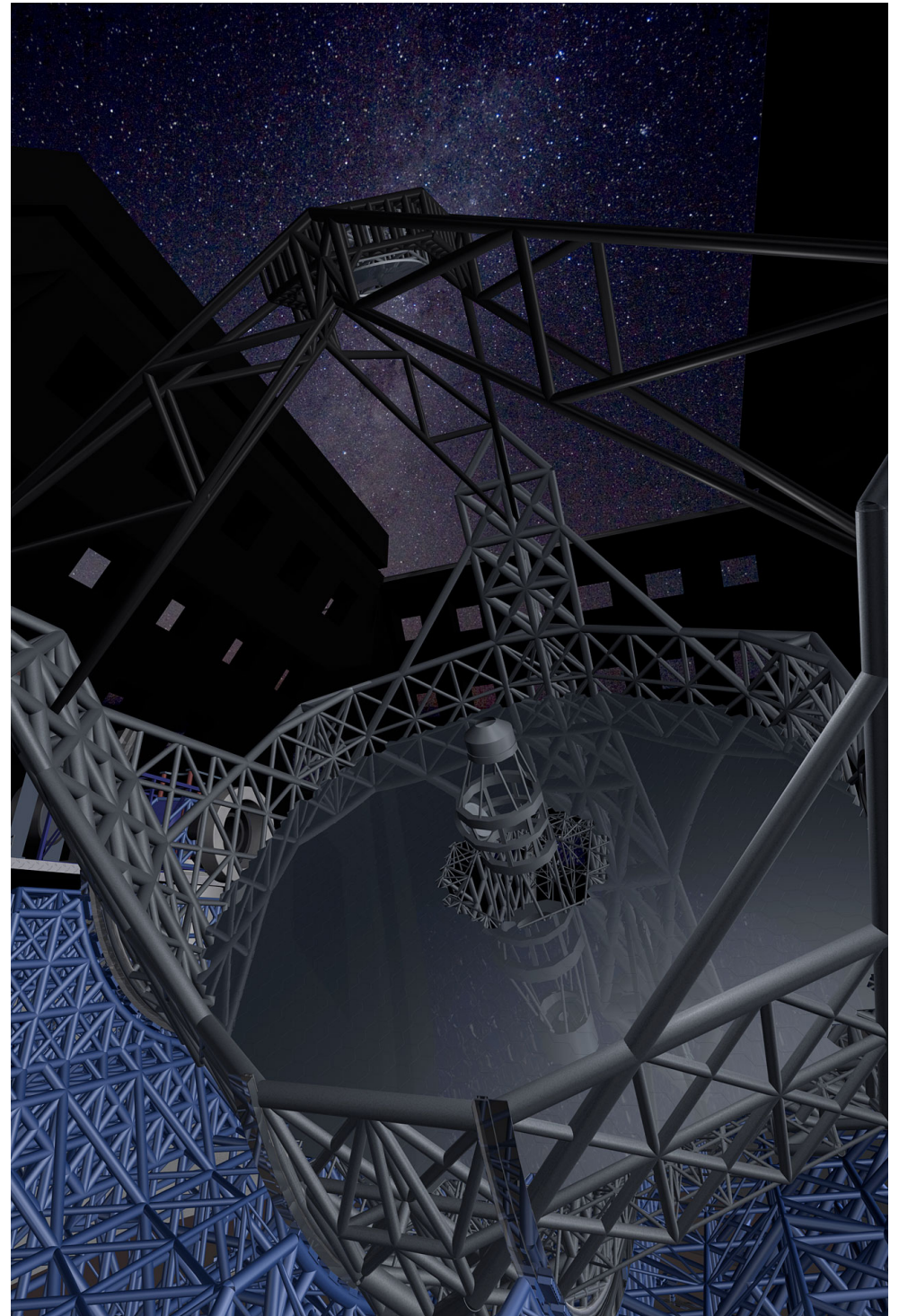


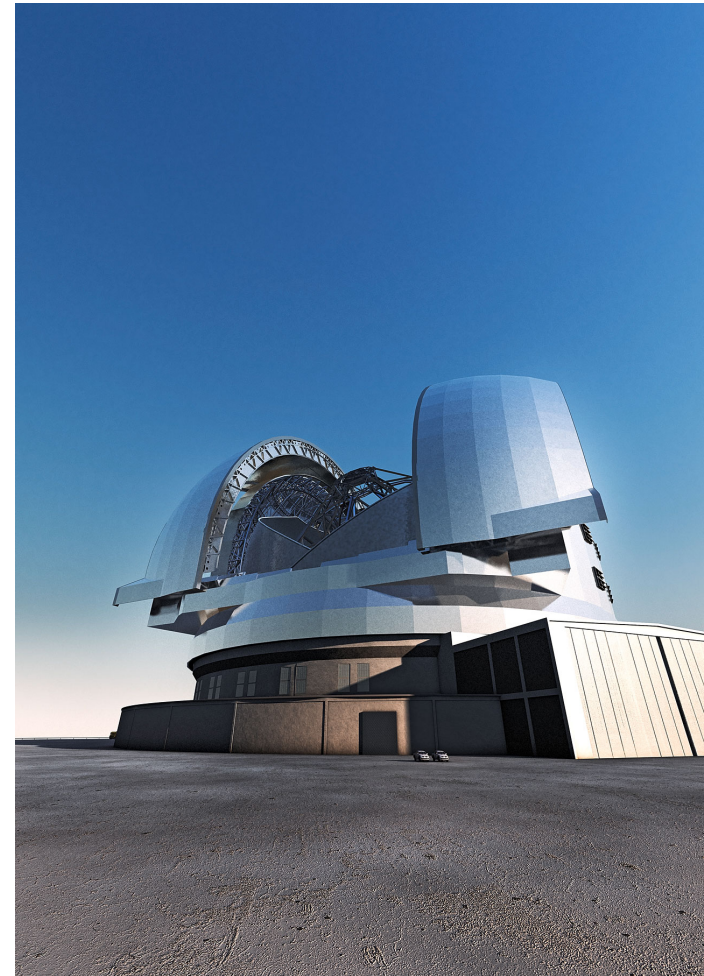
E-ELT Status

Isobel Hook



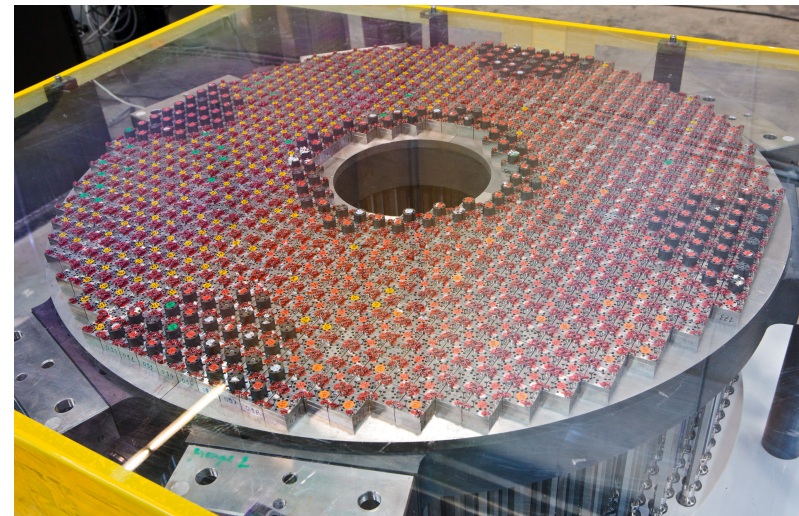
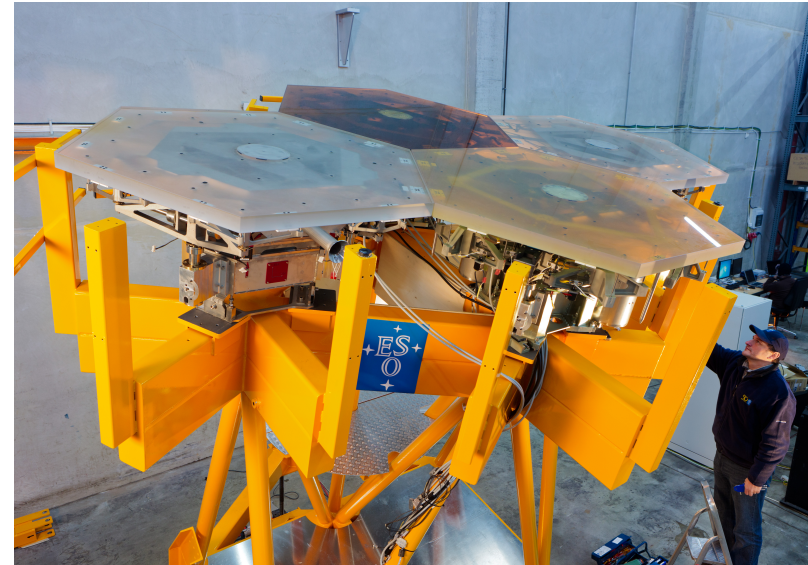
The European ELT status summary

- Detailed design completed in 2011
 - Industrial contracts resulting in several fixed-price offers
 - Detailed science simulations: DRM
 - Passed external reviews
- Dec 2011: Construction proposal published
- Dec 2012: approval of the ELT Programme by ESO Council
- Now awaiting Brazil to complete ratification procedure
- Preparatory work going ahead
 - detailed design of M4 and access road



Current technical work

- Dome & Main structure specifications
 - Updated & discussed with industry
- Work on prototypes at the Hochbrück warehouse
 - M4 mirror support
 - Primary mirror segments
 - M5
- Work on design of AO systems and interfaces
- Definition of instrument requirements



E-ELT Organisation Updates

- Project staff changes at ESO
 - Project Manager: Alistair McPherson
 - Project Engineer: Peter Gray
 - Project Scientist: Jason Spyromilio
- New ESO E-ELT Project Science Team formed
 - Meetings every 2-3 months
 - Current focus: science requirements for ELT-CAM and IFU
 - Next: ELT-MIR, then MOS / HIRES

E-ELT Project Science Team

Giuseppe Bono (Chair)

Jordi Cepa

Gael Chauvin

Thérèse Encrenaz

Roland Gredel

Tom Herbst

Isobel Hook

Christoph Keller

Oleg Kochukhov

Rubina Kotak

Carlos Martins

Didier Queloz

Roberto Ragazzoni

E-ELT Project Scientist

E-ELT Instrument Scientist

PIs of approved instruments

- Replaced the SWG as expected at end of Phase B
- Advises the Project (not an oversight committee)
- Reports to Programme Scientist, R. Gilmozzi
- Tasks include
 - Develop the instrumentation plan for the E-ELT and set the scientific priorities for the instrument procurement.
 - Refine, as necessary, ... the science requirements for ... the instrumentation.
 - Liaise with astronomical community

Instrument roadmap: Overview

- Developed by ESO with input from SWG
- Reviewed by ESE, STC and Council: part of the construction proposal
- CAM (“MICADO”) and IFU spectrograph (“HARMONI”) selected as the two first light instruments
 - With associated AO systems
- Mid-IR, MOS and HIRES
 - Equal scientific merit
 - At least one of each will be included in the suite
 - Of these, mid-IR instrument sequenced first largely for practical reasons
- Exo-planet instrument is high priority and will be included in the suite
- One slot (#6) for new ideas or re-entry of a previous one

Instrumentation Roadmap

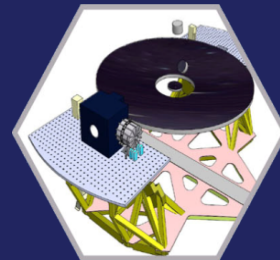
- First light instruments
 - ESO+PST now defining specs
- MID-IR instrument soon after
 - Subject to readiness review
- Decision point on MOS/ HIRES requirements and sequencing is approaching
- Several community workshops happening now
- ESO workshop in Feb 2013

Year	ELT-IFU	ELT-CAM	ELT-MIR	ELT-4 (MOS or HIRES)	ELT-5 (MOS or HIRES)	ELT-6	ELT-PCS
2012	Decide science requirements, AO architecture.		VISIR start on-sky	Develop science requirements for MOS/HIRES			Call for proposals for ETD
2013			TRL Review	Call for proposals for MOS/HIRES			
2014							
2015				Selection ELT-MOS/HIRES		Call for proposals	
2016							
2017							TRL check
2018							TRL check
2019						Selection	TRL check
2020							TRL check
2021							TRL check
2022 Tel technical first light							
	Pre-studies taking the form of phase A or delta-phase A work and/or ESO-funded Enabling Technology Development (ETD)						
	Decision point						
	Development of Technical Specifications, Statement of Work, Agreement, Instrument Start.						

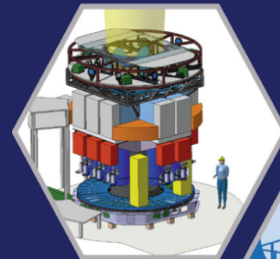
Instrumentation roadmap timeline

Year	Key Milestones
2012	<p>Development of specifications and AO architecture for first-light instruments.</p> <p>VISIR start on-sky. Aquarius performance to be evaluated.</p> <p>Develop science requirements for MOS and HIRES spectrometer.</p> <p>Commence technology development for ELT-PCS.</p>
2013	<p>ELT-MIR is reviewed for technology-readiness. Key areas are (1) performance of the Aquarius detector and (2) development of sky-chopping.</p> <p>A decision is made regarding the scientific capabilities required for a MOS, and for a HIRES spectrograph. A Call for Proposals is then issued based on these requirements.</p> <p>Further delta phase A design is then carried out and enabling technology development initiated.</p> <p>First-light instruments (ELT-IFU, ELT-CAM) start.</p>
2014	<p>ELT-MIR project starts, subject to 2013 review.</p> <p>Ongoing ELT-MOS and ELT-HIRES studies.</p>
2015	<p>The allocation of ELT-MOS and ELT-HIRES as ELT-4 or ELT-5 is made based on technical readiness.</p> <p>A Call for Proposals is made for ELT-6. Responses may include reworked designs that were not previously selected, or entirely new instrument concepts. A subset will be selected and funded as further phase A studies.</p>
2016	<p>Start ELT-4.</p> <p>Continue technology development of ELT-5.</p>
2017	<p>Possible start date for ELT-PCS.</p>
2018	<p>Start ELT-5.</p>
2019	<p>An instrument will be selected from completed phase A studies as ELT-6.</p>
2020	<p>Start ELT-6.</p>
2021	<p>Six instruments under construction at this point.</p>
2022	<p>Latest envisioned start for ELT-PCS.</p>

UK ELT Programme



1st light
instrumentation:
HARMONI



1st
generation
instruments



Public
Engagement



UK ELT Programme update (I): Project Office

- NAM 2012: Manchester, March 2012
 - Dedicated E-ELT session
 - Invited overview + contributed talks on instruments
- RAS meeting (see next slide)
- NAM 2013: St Andrews, July 2013
 - Aim to integrate several E-ELT talks into regular science sessions
 - E-ELT overview in “Future Facilities” session
- Talks, e-mail news updates, Outreach
- UK Industry meetings
 - Durham 21st June 2012
 - Belfast 25th September 2012
 - Cardiff 11th March 2013
- Supported UK involvement in ESO industry events
- Input to Programmatic Review

RAS specialist discussion meeting:
The E-ELT Instrumentation Roadmap

- 8-9 November 2012, London, organised by UK ELT PO
- ~80 people registered from 22 different UK institutes + 6 overseas
- Invited talks on E-ELT, UK role, HARMONI, MICADO & METIS
- Contributed talks on science & concepts for HIRES and MOS
- Main outcomes of discussion:
 - (i) general acceptance of the current UK strategy of leading one instrument, having major involvement in another one and minor involvement in others. However there was a strong push from HIRES advocates to have a bigger share of UK funding.
 - (ii) a general feeling that the policy for Guaranteed time needs to be clarified and well justified (both by ESO and at the UK level). Need to maximise science return for UK investment in instrumentation.

UK E-ELT Programme update (II): instrumentation

- UK currently has major roles in the following:
- **HARMONI** - Diffraction-limited, near-IR IFU with optical extension
 - UK PI (Thatte)
 - Passed management review
 - Preparing for TLR, SoW and contract negotiations with ESO for construction
- **EAGLE** - Multi-IFU, AO-fed near-IR spectrometer
 - Delta phase A for Nasmyth port
 - Investigating merger with EVE
- **CANARY** - AO demonstrator on WHT
 - Successful on-sky runs with mixed LGS+NGS demonstrating open-loop MOAO mode
- **OPTIMOS EVE** - Seeing-limited/GLAO high-multiplex spectrograph
 - Investigating merger with EAGLE

UK E-ELT Programme update (III): instrumentation

- UK currently has minor share of the work in the following:
- METIS - Mid-IR (3-14 μ m) imager & spectrometer
 - UK work now includes spectrometer (and not polarimeter)
- EPICS – XAO imager/spectro-polarimeter for exo-planets
 - UK work focused on slicer IFS
 - On-sky tests with SWIFT + Palm3k AO system on Palomar

- [HIRES] – High resolution spectrograph
 - Not currently in the UK programme but gathering momentum in UK!
 - Merger proposed between CODEX (optical) and SIMPLE (near-IR) studies

E-ELT and the STFC PR2012

- SSAP listed E-ELT as key to the “Planets and Life” theme
 - (facilities were not ranked)
- AAP placed E-ELT in within highest priority band
 - Maintaining access to ESO facilities (including future E-ELT)
 - ELT R&D (instrument development)

Highest priority:

1. Exploitation grants. The grant line supports all of the astronomy science and technology activities in the UK (including science exploitation of space missions). This funding line is under intense pressure and requires an increase pro-rata to any uplift in the total astronomy programme.
2. ESO. STFC should continue to provide access to ESO facilities (VLT, ALMA, VISTA, VST and La Silla) and provide access to the E-ELT. These facilities are vital to the entire science programme.
3. SKA and ELT R&D. STFC should continue to support SKA development at current levels and should support a major UK role in E-ELT instrumentation.
4. High Performance Computing. STFC should support future bids to BIS for upgrades to HPC hardware and negotiate an affordable scheme to fund HPC running costs.

High priority:

1. Complete the JCMT/SCUBA-2 survey. STFC should support continuation of the survey to 2016 but only if a low-cost operational model can be developed and implemented as soon as possible.
2. Complete the e-MERLIN legacy surveys and then review its role as an SKA pathfinder.
3. Participate in and preferably lead a Multi-Object Spectrograph project. STFC should follow the recommendations of the forthcoming review of MOS options when selecting which MOS(s) to support

Next step: ESO workshop in Feb 2013

- From the announcement: *“In particular, the project aims at gathering input on the science case and requirements for a mid-infrared instrument, a multi-object spectrograph, and a high spectral resolution spectrograph.”*
- Very strong response [registration now closed]

Shaping E-ELT Science and Instrumentation



25 February – 1 March 2013
ESO HQ, Garching bei München, Germany

Contact: eelt2013@eso.org
www.eso.org/sci/meetings/2013/eelt2013

Science Organising Committee

Giuseppe Bono (Università di Roma Tor Vergata)
Johan Fynbo (Niels Bohr Institutet)
Roberto Gilmozzi (European Southern Observatory)
Tom Herbst (Max-Planck-Institut für Astronomie)
Isobel Hook (INAF-Osservatorio Astronomico di Roma/University of Oxford)
Anne-Marie Lagrange (Observatoire de Grenoble)
Suzanne Ramsay (European Southern Observatory)
Jason Spyromilio (European Southern Observatory)
Monica Tosi (INAF-Osservatorio di Bologna)

Local Organising Committee

Iris Bronnert
Noé Kains
Samantha Milligan
Suzanne Ramsay
Jason Spyromilio

The End

