ESO

- Intergovernmental treaty organisation for astronomy
  - Founded in 1962, by 5 countries
  - Currently 14+2 Member States, may increase further

- Mission
  - Develop and operate world-class observing facilities for astronomical research
  - Organise collaborations in astronomy
ESO’s Programme

- Visual/infrared light
  - La Silla telescopes incl. 3.6m and NTT
  - VLT, VLTI, VISTA and VST on Paranal
  - E-ELT construction on Armazones
  - Instrumentation development

- Submillimeter radio waves
  - APEX & ALMA partnerships at Chajnantor

- High-quality user support
Paranal System

UT1 (Antu)
- CRIRES
- FORS2
- KMOS

UT2 (Kueyen)
- FLAMES
- UVES

UT3 (Melipal)
- SPHERE (2014)
- X-SHOOTER
- VIMOS

UT4 (Yepun)
- AGF (2015)
- SINFONI
- NACO
- MUSE (2014)

VST
- OmegaCAM

VLT
- Incoherent combined focus: ESPRESSO (2016)

VLTI
- MIDI
- AMBER
- PRIMA
- Visitor instrument GRAVITY (2016)
- MATISSE (2018)

LGS

VISTA
- VIRCAM
Paranal Instrumentation

- MUSE and SPHERE arrived in 2014
  - Tremendously powerful instruments

- More instruments to come
  - ESPRESSO, CUBES, CRIRES\(^+\), ERIS, MOONS for VLT
  - GRAVITY & MATISSE for VLTI
  - 4MOST for VISTA

- Ongoing infrastructure upgrades
  - Adaptive Optics Facility on UT4
  - Key components for VLTI
  - Incoherent combined focus for ESPRESSO

- Long-range plan
  - Upgrades and new instruments in budget through 2030
Atacama Large Millimeter/submillimeter Array
- 54 x 12m + 12 x 7m antenna’s on Chajnantor at 5050m
- 7 – 0.35 mm (30-900 GHz) in 10+ atmospheric windows
- World’s most powerful radio interferometer
- Cold Universe: formation of planets, stars and galaxies

Construction essentially completed
- All equipment procured by Partners
- ESO contribution corresponds to ~485 MEUR
- Transition to full operations will take few more years
Transformational facility

- Superb Chajnantor site (5000m), state-of-the-art receivers
- 66 antennas, baselines larger than 15 km
E-ELT

- Largest optical/infrared telescope in the world
  - 39m segmented primary mirror: transformational step
  - Science: exo-earth, deep universe, resolved populations
  - On Cerro Armazones, as part of the Paranal system

- Construction has started
  - Cost-to-completion 1104 MEUR (2014 prices)
  - Includes contingency and contribution to first instruments

- Funding
  - Regular ESO income
  - ~30% increase of contributions by 14 Member States
  - Accession of Brazil and Poland
    - Parliamentary ratification moving forward
Armazones and Paranal
Construction in Two Phases

- Council approved E-ELT construction in two Phases
  - Phase 1 affordable without Brazil
    - 39m E-ELT but not all instruments and capabilities at first light
    - First light late 2024 or soon after; cost 1012 MEUR
  - Phase 2 (92 MEUR) will complete baseline E-ELT

- Council authorized spending on Phase 1

- The two-phase approach is a back-up plan
  - Path to the E-ELT without Brazil, without additional MS contributions and without any new MS other than Poland
  - By design, Phase 1 starts deviating from baseline in 2017
  - Provides time for Brazil to join ⇒ return to baseline
    - This is the preferred way forward
This Workshop

- Current programme
  - Will deliver tremendous scientific results
    - Incl. synergy with GAIA, JWST, PLATO, EUCLID, Athena, …
  - Commits ESO’s income for ~15 years

- Many ideas for new ground-based facilities
  - Some would be natural to do at ESO
    - Optical, radio or other ‘messengers’
    - Can be ‘all ESO’ or in partnership
  - Would require additional funding
    - From new MS or provided for the project by current MS, or both
    - Will need very powerful arguments in current financial climate

- Important to start planning now
  - Develop consensus on scientific priorities, taking into account global context