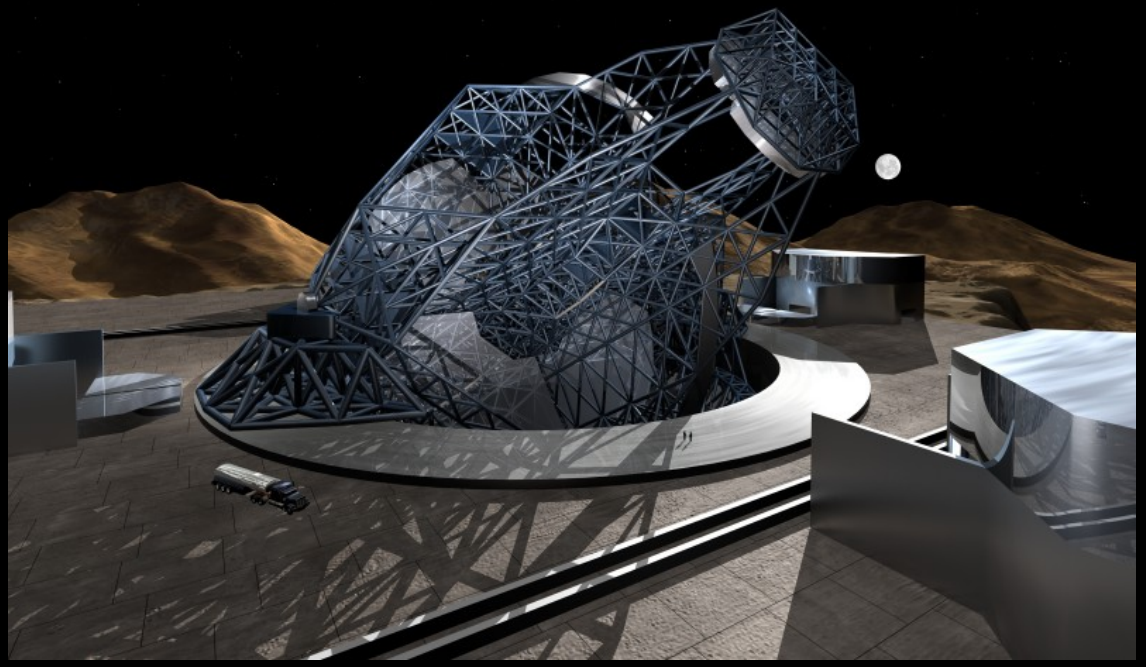
Science case for Extremely Large Telescopes



ELT science case – Development

- Leiden case *assumed* 100m OWL
- Now need to define science priorities
- Then define hard requirements on:
  - Telescope size
  - FOV
  - Wavelength range of operation
    - Shortest λ for AO, Longest wavelength – submm?
  - Telescope site (which hemisphere?)
  - Highest contrast required (e.g. for planet detection)
- Are there critical points among these parameters which enable key science?
- How does ELT compare with other facilities? (JWST, ALMA)

Then..

- Consider science that can be done with this facility
- e.g., Leiden 2001 science case
  - Took 100m (“OWL”) as starting point
  - Lists science projects that can be done
- But include more..
  - Quantitative calculations
  - Clear statements of assumptions

ELT science case – Design requirements

- For design study we need
  - List of science priorities
  - List of hard constraints
  - Quantitative assessment of requirements
    - Assumptions must be clear
  - A table of requirements by science project, e.g. elt_req3

- Then tradeoffs can be made

ELT science case timeline

- April 2003
  - OPTICON I3 proposal sent in (includes science case funding)
  - Oxford meeting
- July 2003
  - Draft FP6 design study proposal
  - Outline of essential science objectives
  - Plan for assessing main criteria (telescope size etc)
- October 2003
  - FP6 design study bid deadline
- End 2005
  - Draft set of top level requirements and priorities, possibly presented as a function of telescope diameter
- End 2006
  - Consolidated set of top level requirements (outcome of the I3)
  - = the basis of a fast-track preliminary design.

Science case subject areas

- Stars & Planets
- Stars & Galaxies
- Galaxies and cosmology