The Southern African Large Telescope 'SALT'

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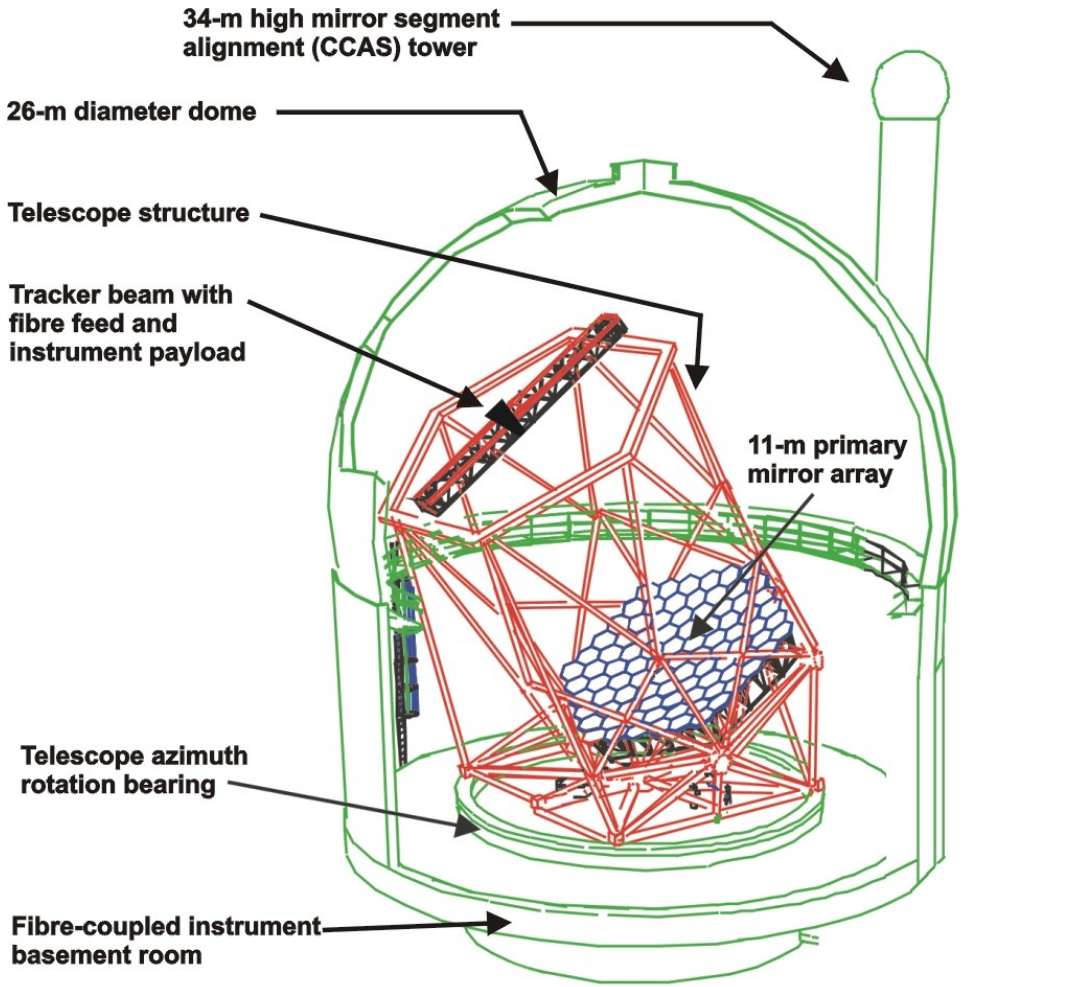
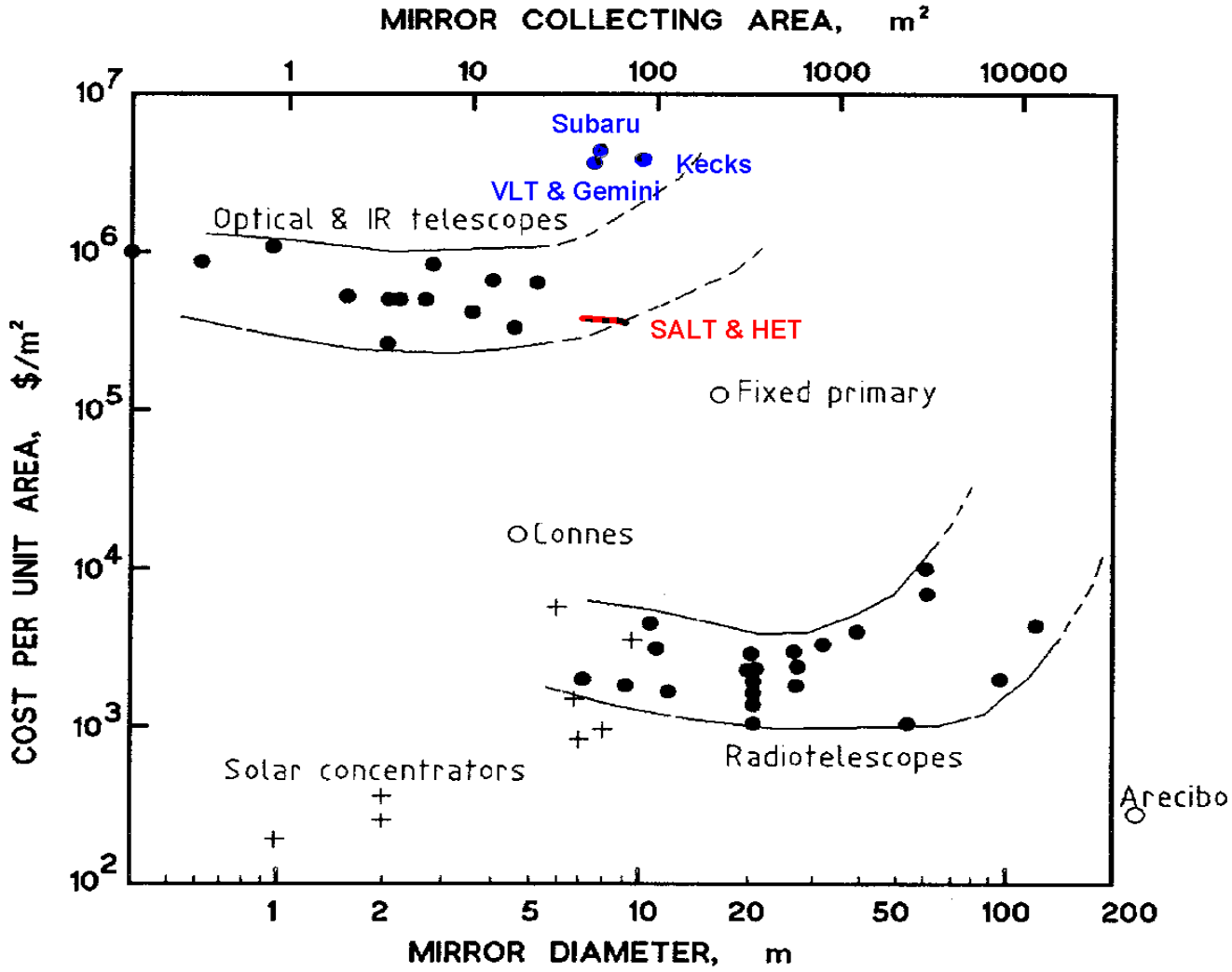
Design Features

- Fixed tilt
- Azimuth rotation
- Spherical mirror array
- Optimised for spectroscopy



Based on Hobby-Eberly Telescope

Cost comparison



Who owns SALT?

- ~1/3 SA (NRF)
- ~1/3 US (Wisconsin; Rutgers, Dartmouth, UNC, CMU, Texas)
- ~1/3 Europe (Poland, Goettingen, UK) + NZ (Canterbury)

How much did it cost?

Total Cost is ~$36M

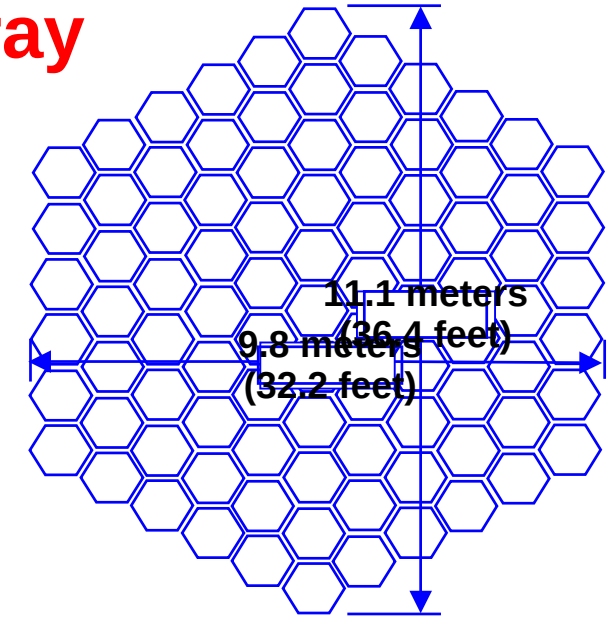
$20M: telescope construction

$6M: three first-generation instruments

$10M: 10 years operations

- New partners likely in future
- Need $'s for future developments

Primary Mirror Array



Attributes:

- **segmented array of hexagons (Astro-Sitall), each 1 m wide (edge-to-edge) and 50 mm thick**

- **maximum mirror diameter (entrance pupil diameter):**
  11 m

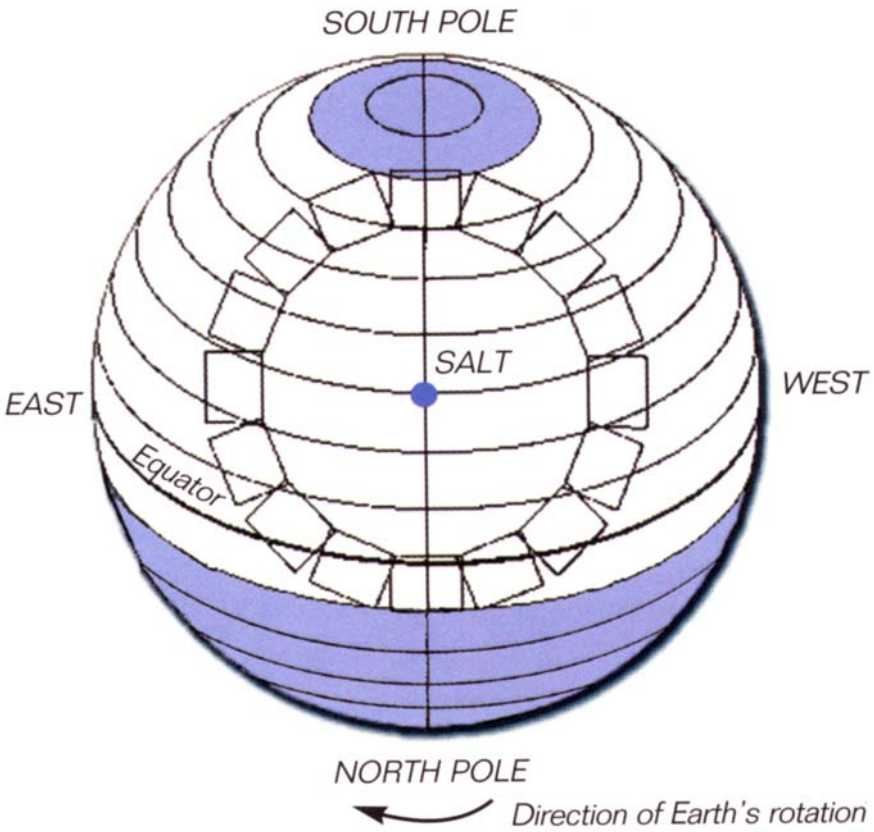
- **accuracy of mirror surface:**
  < 1/15th wavelength of light (@ 630 nm)

- ***Science* field of view:**
  8 arcmin

- **Resolution:**
  0.6 arcsec (EE50)

Mirror array supported on steel 'space frame' truss containing 1,747 struts and 383 nodes, precise to 4 mm over the entire truss.

Sky Coverage



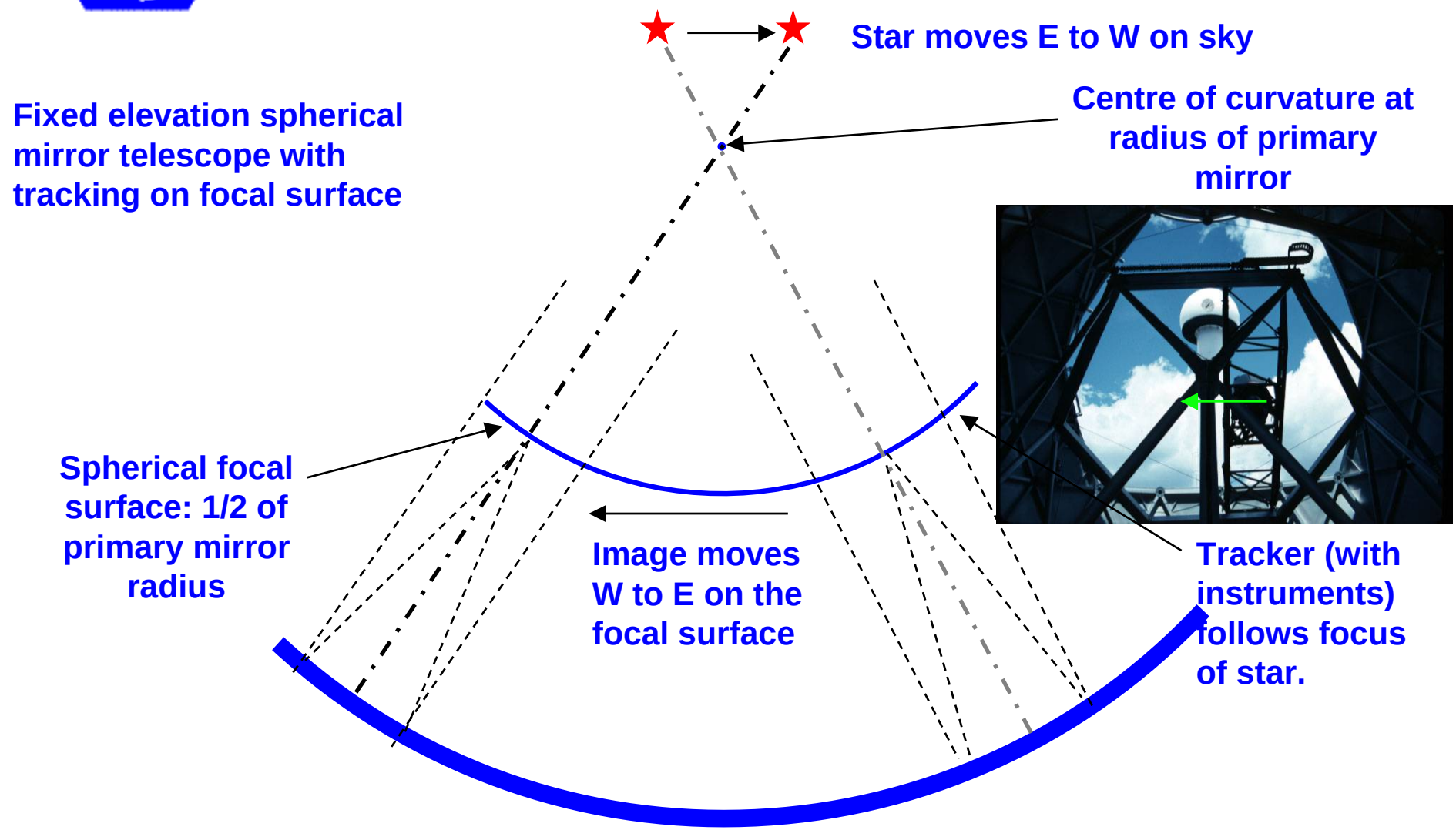
SALT rotates in azimuth to define an annulus of visibility 12 degrees wide centered 37 degrees from the zenith.

Declination coverage
$+10^{o} < \delta < -75^{o}$

Tracking time
45 min to 2.4 hr

Observations must be queued.

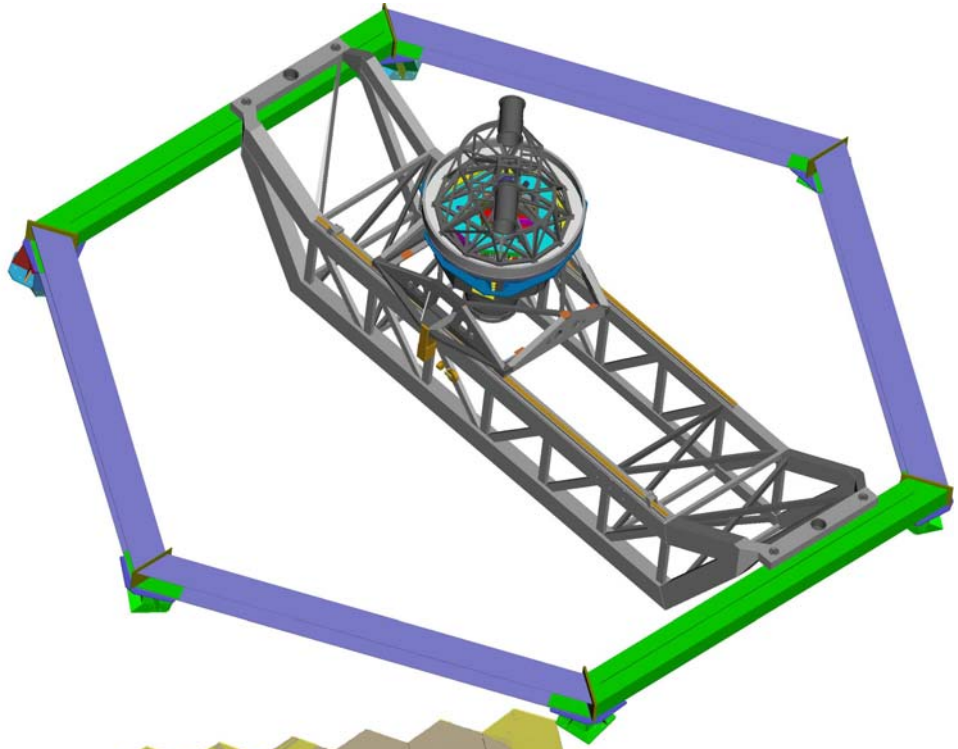
The Arecibo Concept:



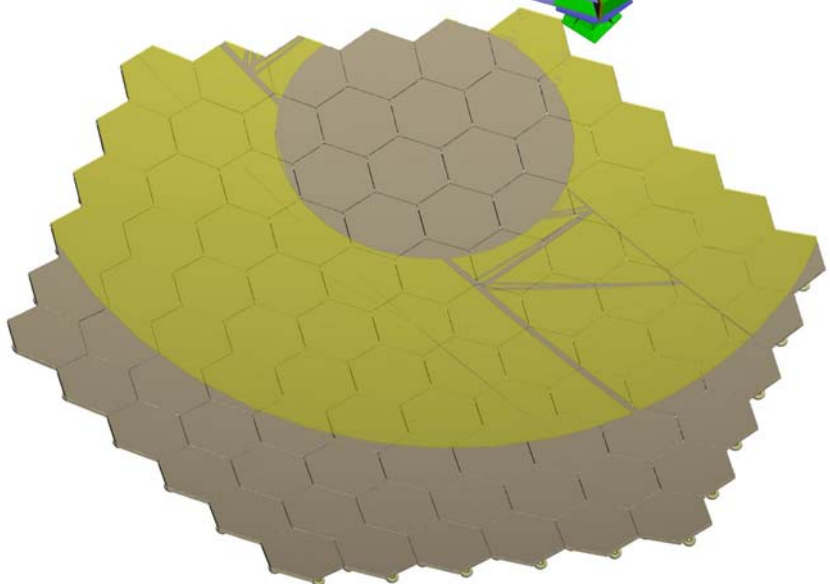
Spherical Primary Mirror

SALT/HET Tracking Principle

Tracker off-centre and pupil partially on primary mirror array. At worst extreme, still a ~7 m telescope.



With tracker and 11-m pupil centred on primary mirror array, use full diameter of telescope (HET only 9.1m pupil)



Pupil is always underfilled (→ baffled at exit pupil)

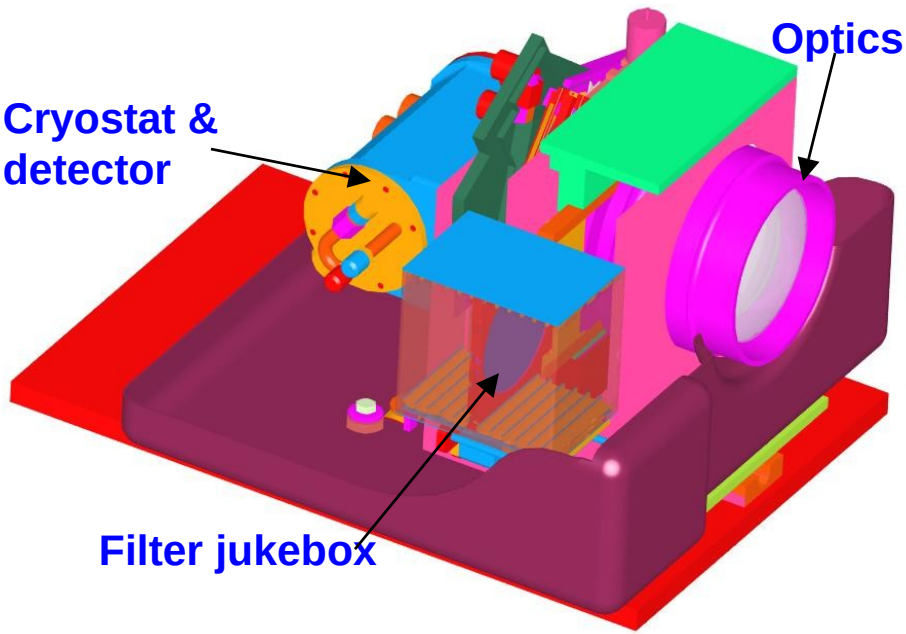
SALT Science Instruments

1. SALTICAM

An efficient CCD imager (8 arcmin FOV).

SALTICAM enables unique science with its good UV and visible sensitivity (320 – 900 nm) and fast photometry (~70-50 ms) capability.

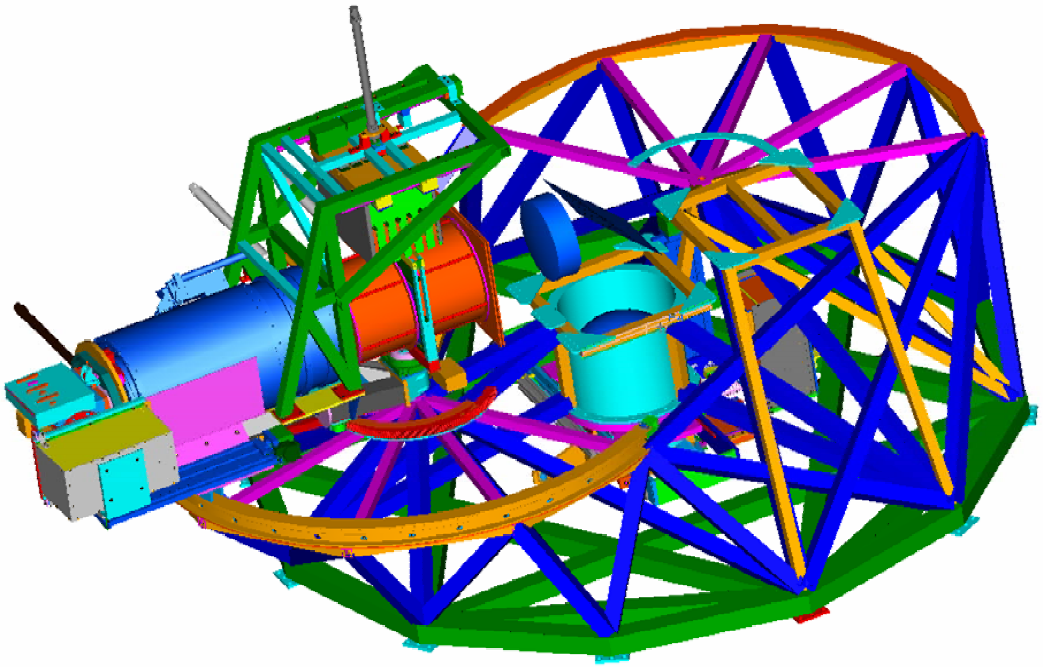
SALTICAM

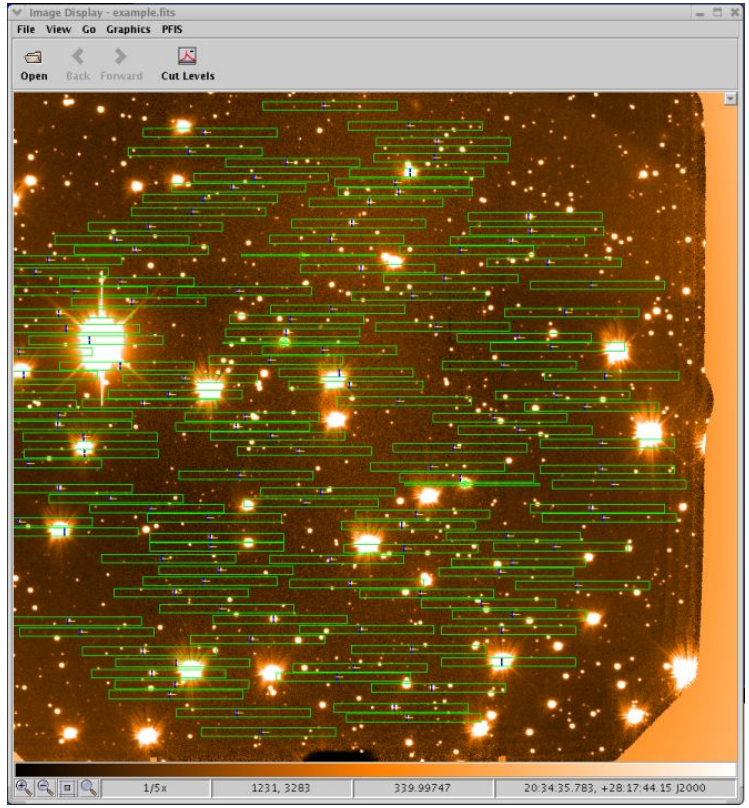


SALT Science Instruments

Robert Stobie Spectrograph

- Built by University of Wisconsin-Madison
- Wavelength range 320 – 900 nanometres
- Resolutions R = 320 to ~9000 available
- Simultaneous multi-object capability





Lagoon
Nebula
U-120s
V-20s
I-40s

SALT First Light : Sep 1, 2005

COPUOS S&T Subcommittee, Vienna, 22 February, 2006


NGC6744
d=10Mpc
U-10s
V-10s
I-10s

47 Tuc

U-120s
V-20s
I-20s

Science Programme Guidelines

SALT WILL BE MOST COMPETITIVE WHEN USED WITHIN THE FOLLOWING CRITERIA

- **Spectroscopy from 0.32 to 2.5 microns**
- **Multi-object capability**
- **Astronomical targets uniformly distributed on the sky**
- **Astronomical targets have sky surface densities of a few per square degree OR are clustered on a scale of a few arc minutes (the field of view of the SALT/HET)**
- **Time variability on time scales of a day or longer**

Queue scheduled mode of operation gives SALT a unique ability to conduct time-sampled programs

Science with SALT

Study of the early Universe & cosmology

- Hubble medium deep survey, luminosity functions
- *XMM & Chandra* surveys

Synoptic observations of variability

- gamma ray bursters, support for satellite observations (e.g. *SWIFT)*
- stellar variability (e.g. accretion, proto-stellar activity)

Stellar Populations in the Milky Way and Nearby Galaxies

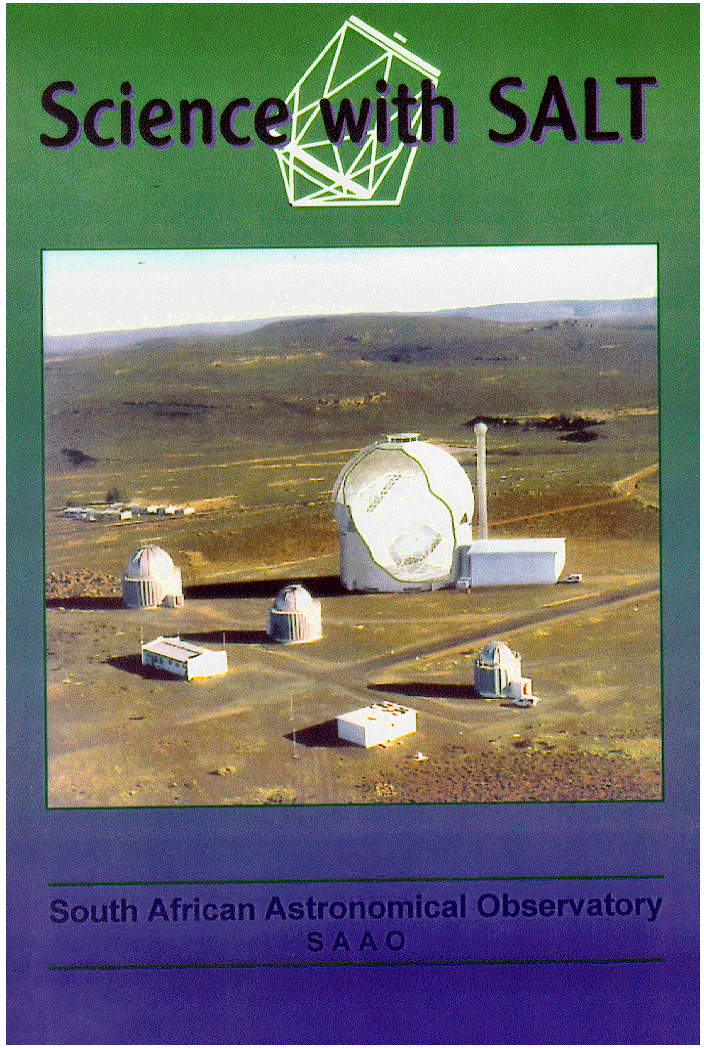
- Magellanic Clouds, nearby dwarf galaxies
- galaxies with different evolution, mergers - interactions - cannibalism

Dynamical studies of stellar systems

- globular clusters and galaxies
- dark matter searches

Planetary Searches

- discovery of planets around other stars



Spectroscopy of the Universe

SALT First Science