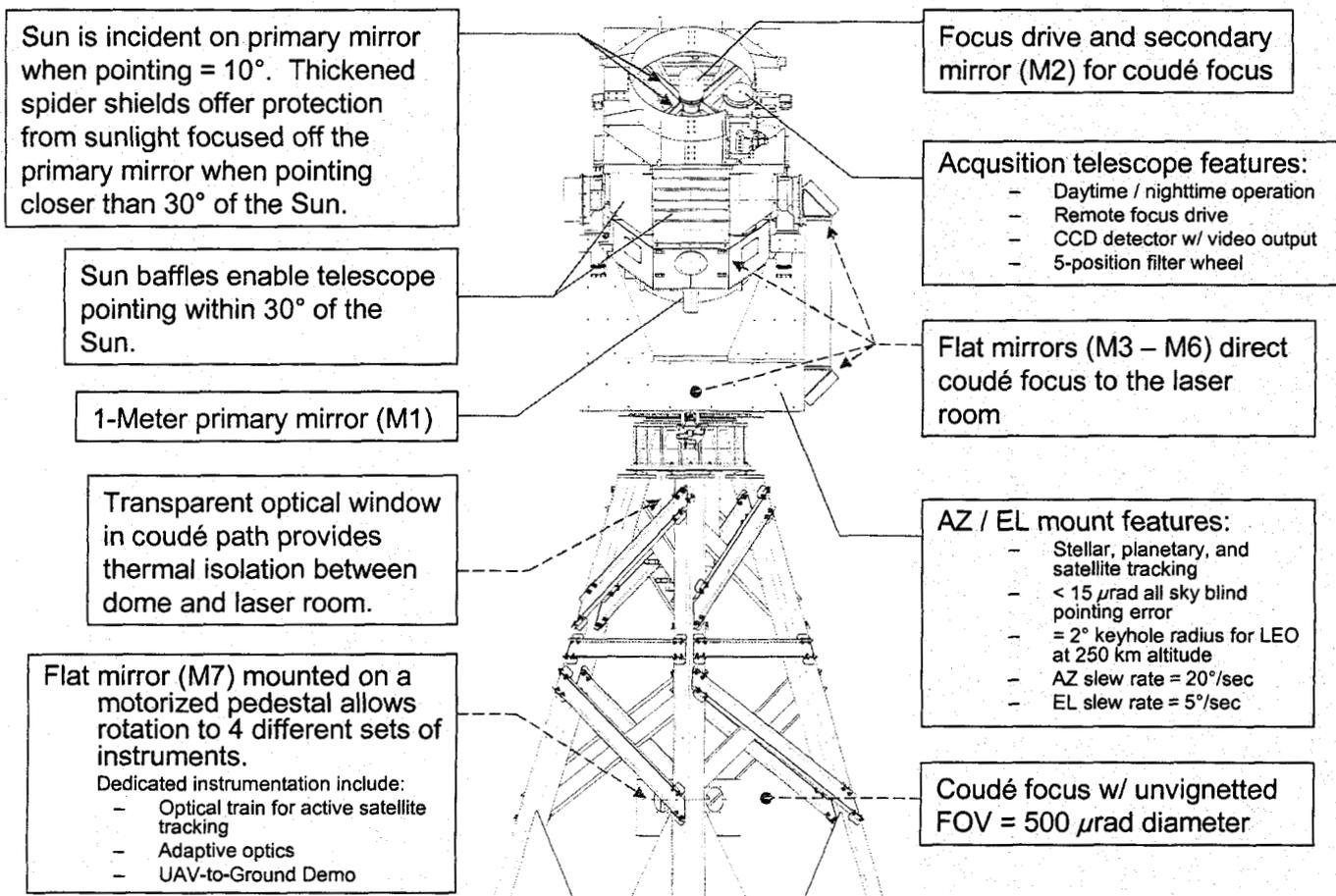


OCTL 1-Meter Optical Antenna

The OCTL 1-Meter telescope is a state-of-the-art R&D optical antenna designed for both daytime and nighttime communications. Built to support deep space communications links and near-Earth demonstrations, this optical antenna must meet more stringent optical and mechanical stability criteria than those required for a near-Earth antenna

Telescope Features

KEY:
 — Components as pictured
 - - - - Blocked from view



Optical Requirements

- Operational wavelength range: 500 – 2000 nm
- System f/# = 75.8
- Wavefront error (WFE) = 0.054 λ RMS @ 633 nm
- Total 1-Meter aperture obscuration < 10%
- Encircled energy
 - > 85% in 1.54 μ rad diameter (Airy disk)
 - > 80% in 2.81 μ rad diameter (Airy disk + 1st ring)
- Receiver efficiency
 - > 50% of energy incident on aperture (500 nm < λ < 600 nm)
 - = 60% of energy incident on aperture (λ > 600 nm)
- Field of view (FOV) = 500 μ rad diameter
 - = 37.8 mm diameter circle on CCD detector
- 0.2-Meter acquisition telescope
 - Alignment to main telescope < 50 μ rad
 - Operational wavelength range: 500 – 1500 nm
 - WFE = 0.125 λ RMS @ 633 nm
 - Encircled energy = 60% in Airy disk
 - FOV > 5.2 mrad diameter

Mechanical Requirements

- Baffling and shields
 - Maintain optical requirements @ Sun angles > 30°
 - Survive operations @ Sun angles < 10°
- AZ / EL mount travel limits
 - Azimuth: 200°
 - Elevation: -5° to 185°
- Pointing accuracy
 - < 15 μ rad error over entire sky
 - = 2.5 μ rad error within 5° of calibration reference
- Tracking
 - Stellar, planetary objects, and satellites
 - Keyhole = 6.5° radius for LEO at 250 km altitude = As built = 2° radius
 - Maximum slew rate = 20°/sec in AZ and = 5°/sec in EL
 - Jitter error < 10 μ rad (0.1 – 20 Hz) and < 1 μ rad (> 20 Hz)
- 6-Meter Dome
 - Not vignette main or acquisition telescopes during operation
 - Shutter width > 1.5 meter
 - Slaved to telescope motion
 - Elevation limit: -5° to > 90°
 - Operational under Table Mountain climate conditions
- Pier
 - Provide stable telescope mounting
 - Thermally isolate dome from laser room
 - optical window in coudé path (AR coated at 633 nm and 1064 nm)