Telescope System Overview

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Telescope Systems Overview

- **Telescopes are used to collect photons**
  - **Must define a target volume of the atmosphere**
  - **Efficiently collect the available photons from the volume of interest**
  - **Effectively reject photons from outside the volume of interest**
  - **Rapid step and settle times from one volume to the next**
  - **Accurate knowledge of the location of the target volume**
  - **Operate in a predictable way over all environmental conditions**

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Telescope Requirements

- Target volume is defined by the telescope field of view
- Collection area and fov is set to match the profiler etendue
- Low roughness mirrors to limit small angle scatter, sun shade to limit large angle contamination
  - Use high reflectivity mirrors, AR coat all lenses
- Voice coil to drive telescope to new volume position
- LVDT to read telescope boresight position
  - calibrated over operating temperature to give boresight relative to the spacecraft coordinate frame
- Athermal optical design

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Telescope Requirements (cont)

- Field of view = 0.05° x 2.5°
- Clear aperture = 7.5 cm
- Operating wavelength = 550-900 nm
- Numerical aperture = 0.22 (matching fiber optic)
- Primary mirror roughness = 15-20 Å rms

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Telescope interfaces

- **Mechanical interfaces**
  - Voice coil to telescope and pedestal
  - LVDTassembly to pedestal and telescope body
  - Fiber optics to cannister housing
  - Fiber optic cable connector (female) to secondary optics housing
  - LVDT preamp board to APL housing
- **Electrical interfaces**
  - Voice coil to flex circuit
  - LVDT to preamp connector
  - Control harness to LVDT connector
  - Control harness to Shutter/voice coil/ op heater connector

ICD's

- **APL drawing 7372-0010 sheet 1**
  - **Mass properties, mechanical**
- **APL drawing 7372-0010 sheet 2**
  - **Fields of view**
- **APL drawing 7372-0010 sheet 3**
  - **Interfaces (Fiber optic, electrical, purge, GSE)**
- **APL drawing 7372-0010 sheet 4**
  - **Spacecraft**
- **APL drawing 7372-0010 sheet 5**
  - **Thermal**