

# OCCS

## OPTICAL COATING CHARACTERIZATION SYSTEM



The Space Dynamics Laboratory's Optical Coating Characterization Facility (OCCS) measures the transmittance and/or reflectance of flat optical components such as filters, beamsplitters, and windows, under temperature and optical conditions identical to those where the components will be used. These measurements ensure that optical components and coatings perform as intended and reduce the risk of unexpected effects that compromise system performance. The OCCS is designed to handle significant part volume to support production-level programs.

### OVERVIEW

#### PRECISION INFRARED (IR) SPECTRAL FILTER CHARACTERIZATION

- Cryogenic temperature (85 K minimum, up to room temperature)
- Surface sampling with high spatial resolution (0.5 mm)
- Wavelength coverage 1 to 14  $\mu\text{m}$  (MCT detector; InSb and Si photodiode options)
- Designed for efficient test schedule in production context

#### FOURIER TRANSFORM IR (FTIR) SOURCE

- High spectral resolution (2  $\text{cm}^{-1}$  typical)

#### LARGE CAPACITY FILTER WHEEL

- Accepts up to 18 parts, one inch in diameter, for spectral testing in one cold cycle
- Accommodates other part dimensions with custom fixturing
  - Larger numbers of small parts
  - Fewer numbers of large parts
  - 8" filter wheel handles parts up to 6" in diameter

#### VARIABLE F# TO MATCH TEST REQUIREMENTS

- F/2.3 minimum
- Collimated beam also possible

#### IN-SITU FILTER TEST ADJUSTMENTS

- 3" horizontal range, unlimited vertical range provided by filter wheel rotation
- Focus
- Angle of incidence

### PERFORMANCE

#### ANGLE OF INCIDENCE CALIBRATION

- Uncertainty 0.3° for angles up to 15°
- Uncertainty 2% for angles greater than 15°
- Angle range for transmission -15° to +50°
- Angle range for reflection + 45°  $\pm$  5°

#### SPECTRAL LINE POSITION CALIBRATION

- Atmospheric spectrum or NIST standard reference material
- Error < 0.5 nm from 2 to 5  $\mu\text{m}$

#### FILTER TEMPERATURE CALIBRATION

- Diode calibration accuracy  $\pm$  0.5 K
- Temperature stability 0.1 K (1 standard deviation)

#### CONTAMINATION MONITORING AND ANALYSIS

- In-situ Quartz-Crystal Microbalance (QCM)
- Analysis of measured spectra
- Consistent, stable outgassing rate (water)
  - Minimal build-up, no impact on measurements



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