

# Operational Land Imager

*presented by*

**Jeanine Murphy-Morris**

**OLI Instrument Manager  
NASA Goddard Space Flight Center  
Greenbelt, Maryland USA**

**Landsat Science Team Meeting  
USGS EROS  
Sioux Falls SD  
January 8, 2008**

# Overview

**LDCM**

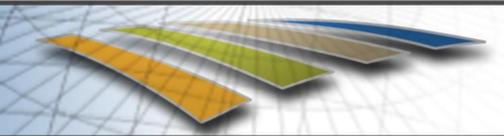
- **OLI Characteristics**
- **OLI Development Status**
- **OLI Schedule**

# OLI Specifications

LDCM

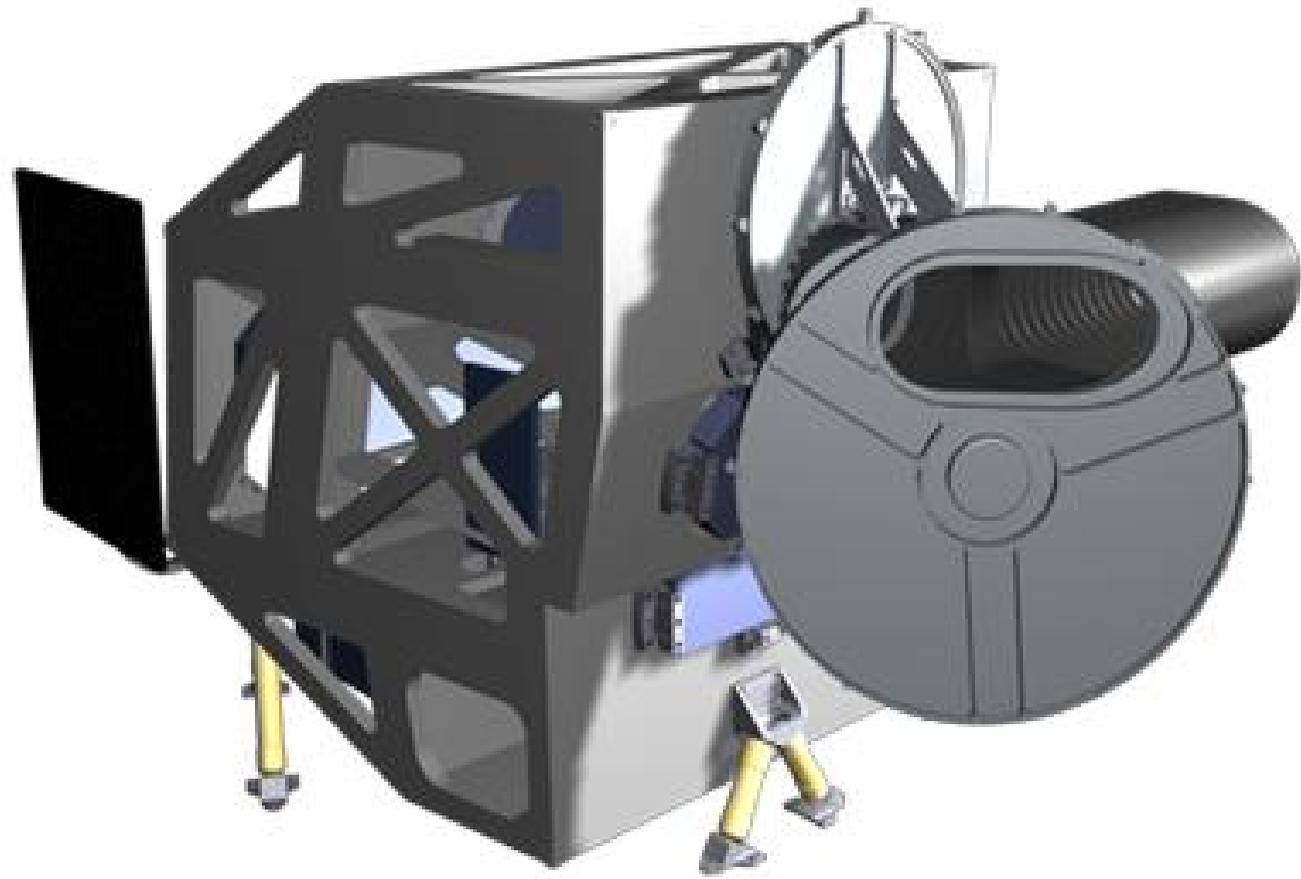
**Table 1. Required Spectral Bands and Spatial Resolution**

#	Band	Minimum Lower Band Edge (nm)	Maximum Upper Band Edge (nm)	Center Wavelength (nm)	Maximum Spatial Resolution At Nadir (m)
1	Coastal /Aerosol	433	453	443	30
2	Blue	450	515	482	30
3	Green	525	600	562	30
4	Red	630	680	655	30
5	NIR	845	885	865	30
6	SWIR 1	1560	1660	1610	30
7	SWIR 2	2100	2300	2200	30
8	Panchromatic	500	680	590	15
9	Cirrus	1360	1390	1375	30



# OLI Model

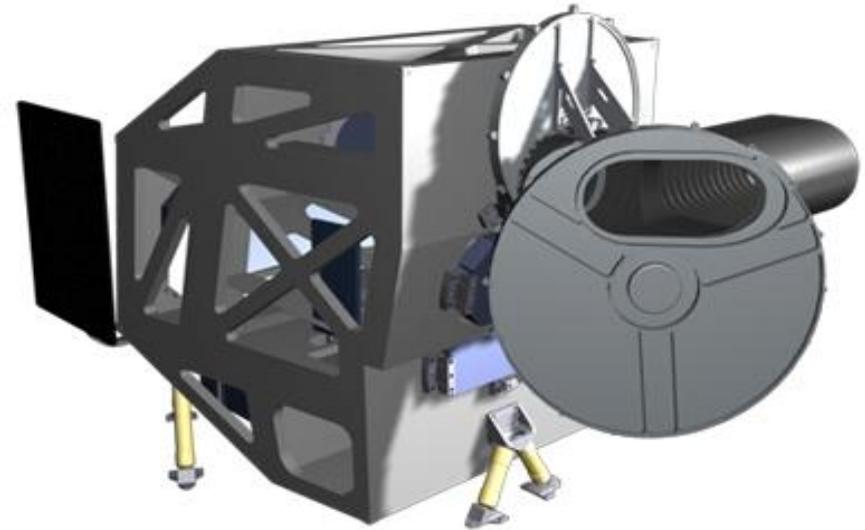
**LDCM**



Courtesy of Ball Aerospace



- **Pushbroom VIS/SWIR sensor**
  - 9 channels from 443 nm to 2200 nm
- **Four mirror telescope**
- **FPA consisting of 14 sensor chip assemblies**
- **Solar Calibrator used once/week**
- **Stim Lamps used to check intra-orbit calibration**
- **Dark Shutter for offset calibration**
- **12 bit resolution**



# OLI Characteristics

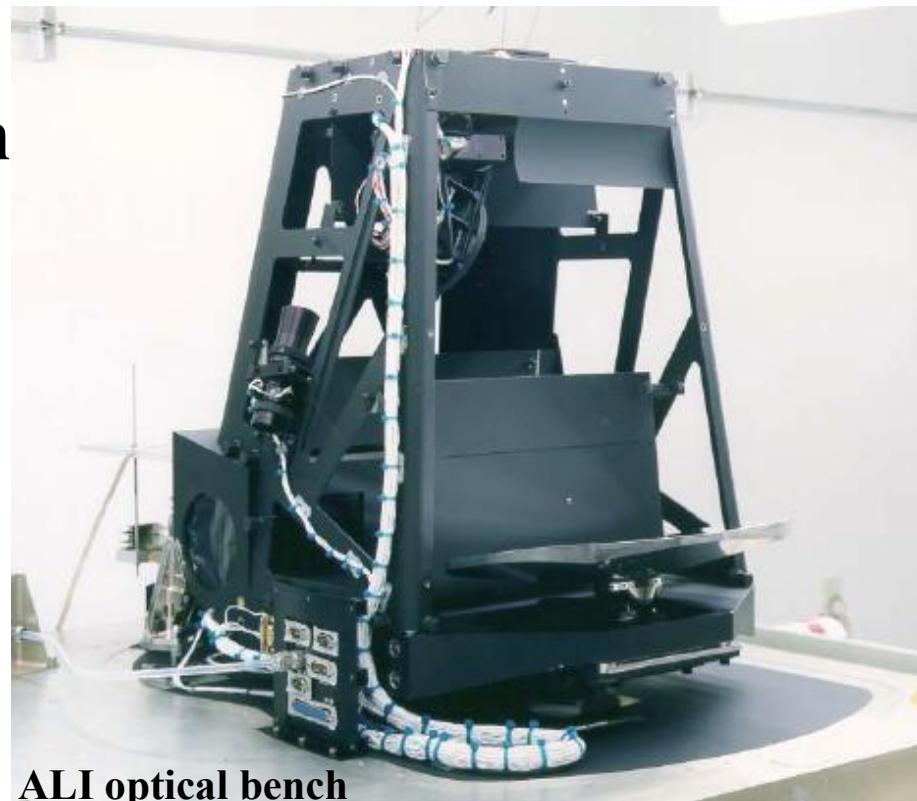
LDCM

## Telescope/Optical Bench

- **Four Mirror Compact with front aperture stop**
- **15 degree field of view**
- **Telecentric**
- **Excellent stray light rejection**

**OLI optical bench similar to ALI composite bench shown at right.**

**ALI telescope was a Three-Mirror Compact.**



ALI optical bench

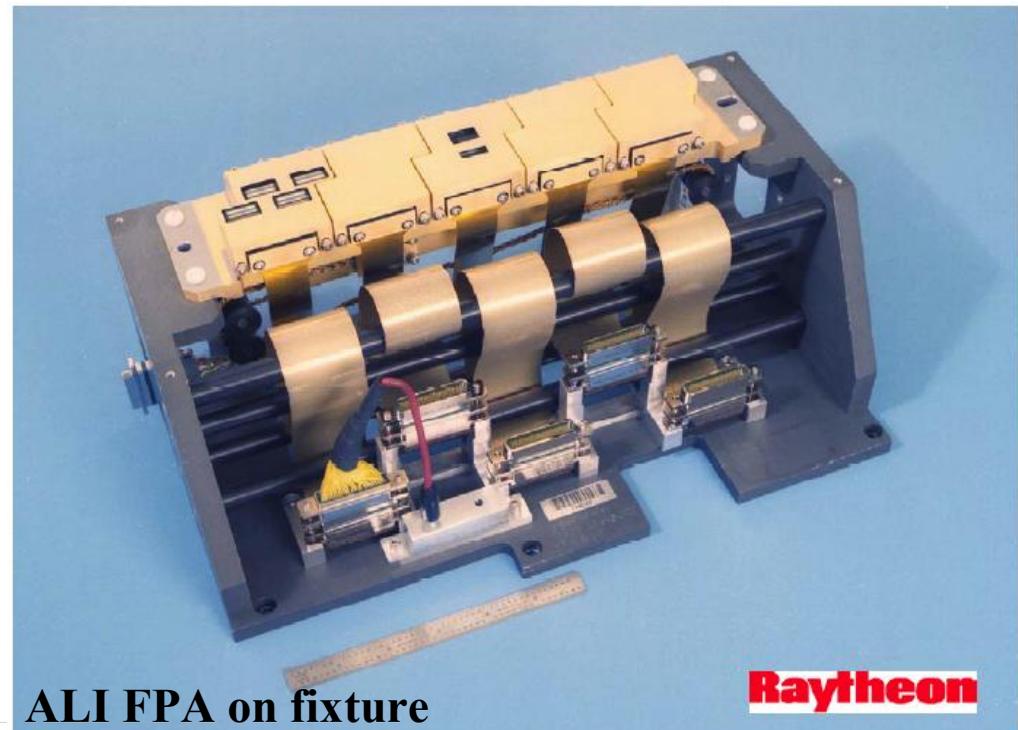
# OLI Characteristics

LDCM

## Focal Plane Array

- 14 sensor chip assemblies mounted on single plate
  - Hybrid Silicon/HgCdTe
  - Butcher block filter assembly over each SCA
- Passively cooled

Similar layout to ALI FPA shown at right, but with single-chip modules



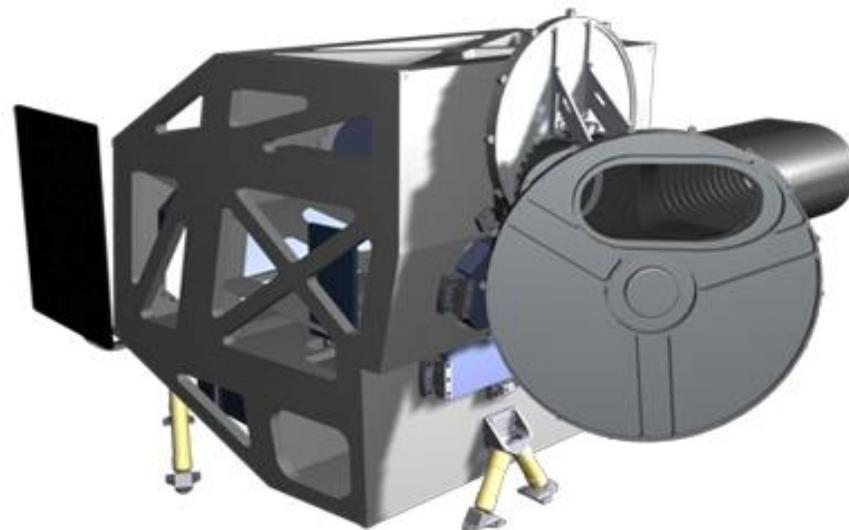
ALI FPA on fixture

# OLI Characteristics

LDCM

## Calibration

- **Solar diffuser**
  - **Full aperture**
  - **Once per week solar calibration**
  - **Pristine diffuser to check degradation of main diffuser**
  - **Requires spacecraft yaw maneuver**



# OLI Characteristics

## Calibration (continued)

- **Stim Lamps**
  - **For intra-orbit calibration/characterization**
  - **Also can be compared to Solar Diffuser measurements to check stability**
- **Dark Shutter**
  - **Used twice per orbit for offset calibration**
- **Dark detectors on focal plane to monitor offset drift**
- **Linearity checked by varying detector integration time**

# OLI Development Status

**LDCM**

## Major Milestones

- **Cost-plus-award-fee contract awarded to Ball Aerospace in July 2007**
- **Peer Reviews for subsystems held September and October 2007**
- **Systems Requirements Review held 6-7 November 2007**
- **Second round of peer reviews to be held January/February 2008**
- **Preliminary Design Review will be held 4-7 March 2008**

# OLI Development Status

**LDCM**

- **Telescope**
  - **Optical design complete**
  - **Flight and primary, secondary, and quaternary mirrors being polished at Tinsley**
  - **Flight tertiary mirror lightweighting near completion at Zygo**
  - **Optical Bench is under contract**
  
- **Focal Plane Array**
  - **Detector and ROIC PDRs complete**
  - **Filter peer review complete**
    - **Lessons learned from VIIRS angle resolved scatter issue being incorporated into filter design and testing**

# OLI Development Status

**LDCM**

- **Algorithm Development**
  - **Geolocation and Radiometric Calibration algorithms drawing on ALI heritage**
  - **Algorithm Description Documents completed by IPDR**
  
- **Integration and Test Development**
  - **Peer Review this month**
  - **I&T incorporates Special Calibration Test Requirements**
    - **SCTR document includes requirements for characterization of OLI performance**

