SPACE DYNAMICS LABORATORY

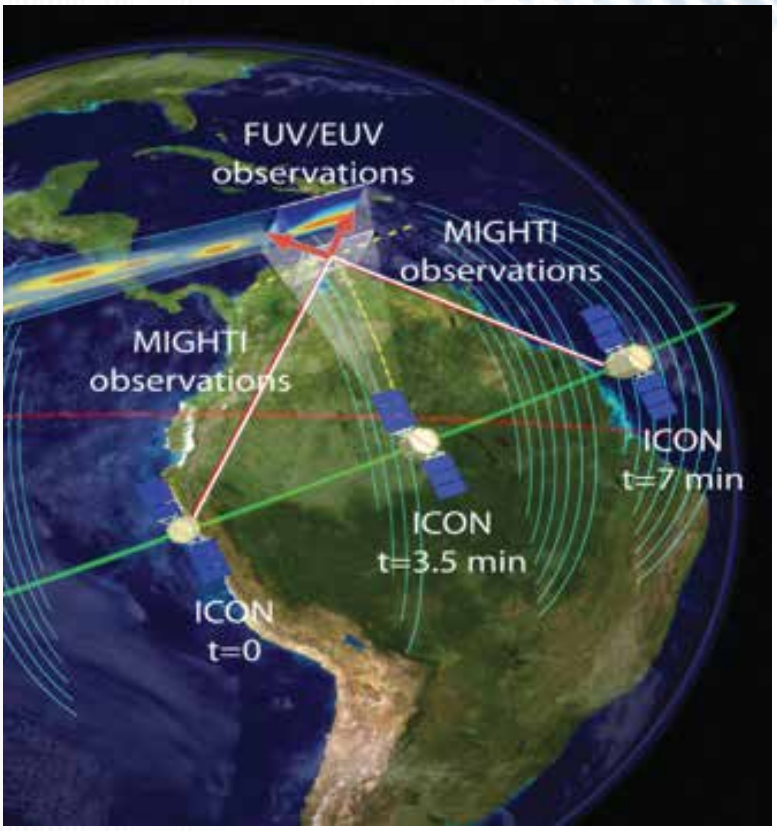
ICON

IONOSPHERIC CONNECTION EXPLORER

The purpose of NASA's Ionospheric Connection Explorer (ICON) mission is to explore how both terrestrial and space weather affect conditions in the ionosphere, the region of plasma forming the boundary between Earth and space. The ionosphere is energetically coupled to the thermosphere through collisions between ions, electrons, and neutral gas. These interactions often show extreme temporal and spatial variability, which can be very disruptive to global positioning satellites (GPS) and radio communications.

The ICON payload is comprised of four highly sensitive instruments: 1) the Michelson Interferometer for Global High-Resolution Thermospheric Imaging (MIGHTI) to measure neutral winds and temperatures; 2) the Far Ultraviolet Imaging Spectrograph (FUV) to measure daytime thermospheric and nighttime ionospheric density profiles; 3) the Extreme Ultraviolet Imaging Spectrograph (EUV) to measure daytime ionospheric density profiles; and 4) the Ion Velocity Meter (IVM) to measure ion drift velocities, temperatures, and densities.

The Space Dynamics Laboratory (SDL) is proud to participate on the ICON team. SDL's primary role is to develop CCD cameras for the MIGHTI and FUV instruments. SDL will also lead the payload integration and test (I&T) efforts. SDL has extensive experience flying space-qualified cameras, optical sensors, and electronics, and brings this legacy of success in space to the ICON mission.



SDL is providing CCD camera systems for the MIGHTI and FUV instruments on ICON, which will make continuous limb-viewing observations of the Ionosphere-Thermosphere system. Image courtesy of UC Berkeley.

This image of the Earth's limb, taken from the International Space Station, highlights various atmospheric emissions that will be observed by ICON. Image courtesy of NASA.

SDL Contributions to ICON

ICON PAYLOAD I&T	MIGHTI INSTRUMENT	FUV INSTRUMENT
Payload integration	Two synchronized cameras	Two cameras
Vibration testing	Camera electronics	Camera electronics
EMI/EMC testing	CCD TEC control electronics	Electronics board for turret control
Thermal vacuum testing		

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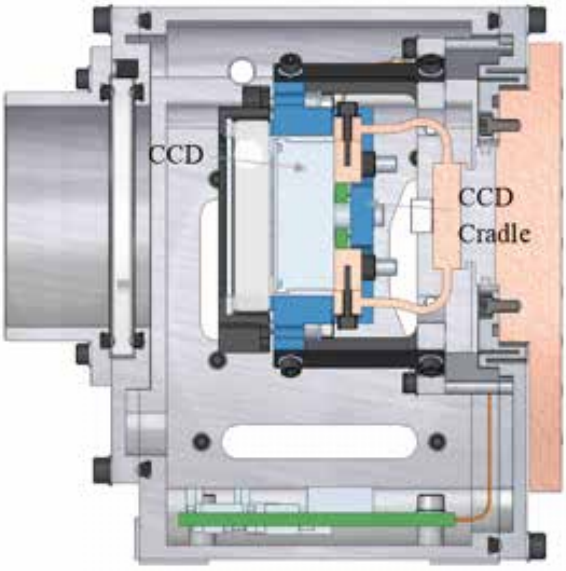


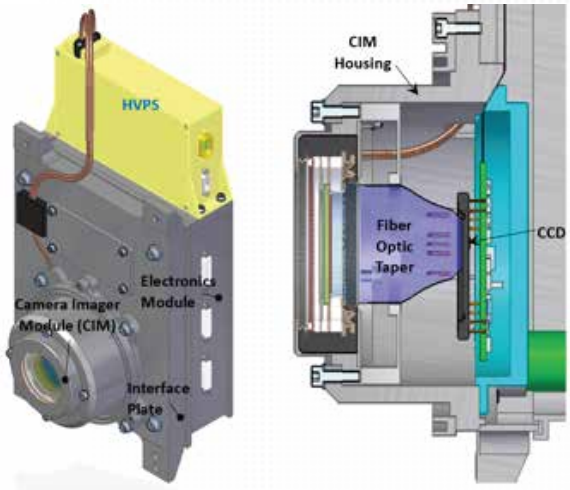
Drawing of the MIGHTI camera design

MIGHTI

SDL is designing, fabricating, and testing the Charge-Coupled Device (CCD) cameras and control electronics for the two MIGHTI instruments.

KEY FEATURES OF THE MIGHTI CAMERAS ARE:

- 2048 × 2048 binnable CCD sensor
- Frame transfer, back-illuminated
- Synchronized camera systems
- Ultra-low system noise (10 e-)
- TEC-controlled



Drawings of the FUV camera design

FUV

SDL is designing, fabricating, and testing two CCD camera systems for the FUV instrument.

KEY FEATURES OF THE FUV CAMERAS ARE:

- 1024 × 1024 binnable, frame transfer CCD sensor
- UV converter for single photon detection at 136 and 155 nm
- Dual thermal zones to enable passive sensor cooling

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