Global-scale Observations of the Limb and Disk (GOLD) Mission – an Unprecedented View of the Thermosphere-Ionosphere System

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http://www.gold-mission.org/GOLD_EX_Factsheet.pdf
Weather in the Thermosphere-Ionosphere

**Forcing from Above**

1. How do geomagnetic storms alter the temperature and composition structure of the thermosphere?

2. What is the global-scale response of the thermosphere to solar extreme ultraviolet variability?

**Forcing from Below**

3. How significant are the effects of atmospheric waves and tides propagating from below on thermospheric temperature structure?

4. How does the nighttime equatorial ionosphere influence the formation and evolution of equatorial plasma density irregularities?
The View from Geostationary Orbit

GOLD images the disk and limb from geostationary orbit

Full images at 30-minute cadence

GOLD measures the composition and temperature of the thermosphere

GOES-13
2012-10-28
1302 UTC
### Instrument Summary

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Mass</td>
<td>30 kg</td>
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<tr>
<td>Power</td>
<td>24 W</td>
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<tr>
<td>Size</td>
<td>42 × 42 × 70 cm</td>
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### Imaging Spectrograph:
- Two independent, identical channels
- Microchannel plate, 2-D detectors
- Individual photon events recorded
- Spectral resolution: high (~0.3 nm), low and occultation (~3 nm)

### Heritage:
- Cassini UVIS
- MESSENGER MASCS
- MAVEN IUVS (launched Nov., 2013)

### Schedule:

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<tr>
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<td>Selection</td>
<td>SRR</td>
<td>PDR</td>
<td>CDR</td>
<td>PER</td>
<td>PSR</td>
<td>Launch</td>
<td>End of Ops</td>
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### Observations:
- Disk maps of $T_{\text{neutral}}$ and O/N$_2$ density ratio (dayside)
- $T_{\text{exo}}$ from limb scans (dayside)
- Disk maps of $N_e$ maximum (nightside)
- O$_2$ density by occultations
GOLD Mission Overview

• GOLD imager will be hosted payload on a commercial communications satellite in geostationary orbit

• University of Colorado’s Laboratory for Atmospheric and Space Physics will build the ultraviolet imager for the mission

• University of Central Florida is lead for the mission and home of Science Data Center for the mission

• Launches in 2017 for a two-year mission

• Coincident with ground based and LEO missions, ICON

GOLD provides a new view of T-I system