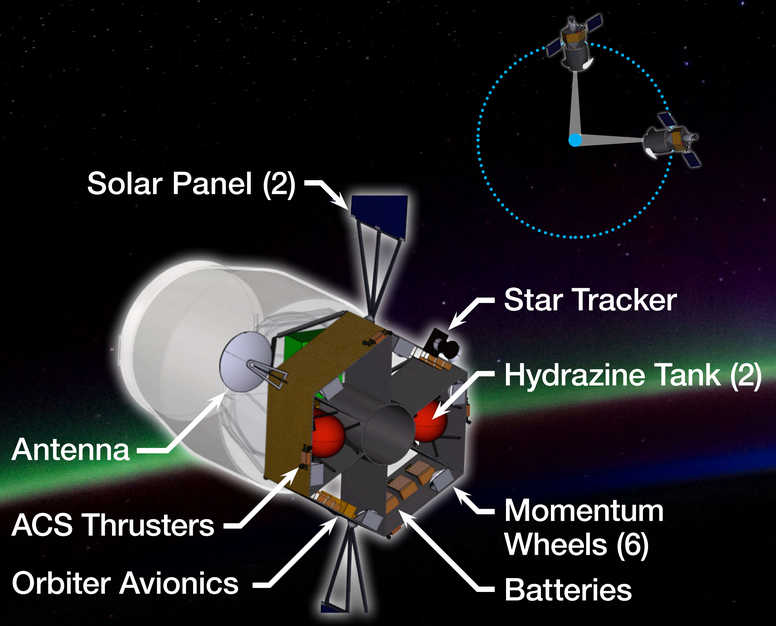
The Geospace Dynamics Observatory (GDO)

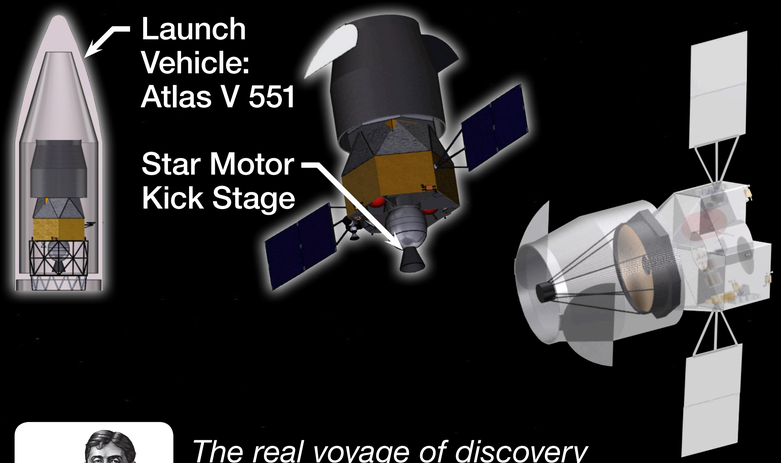
A paradigm-changing geospace mission

National Aeronautics and Space Administration

GDO Mission Concept

- Orbit: 60-Re circular polar orbit = 27-day period, long-term viewing of regions of interest
- 2.4-m optics = required sensitivity for faint signals
- 1.5-degree FOV = full access to near-Earth space





The real voyage of discovery consists not in seeking new landscapes, but in having new eyes.

—Marcel Proust, 1871–1922

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GDO Optics & Instruments

The GDO mission observes geospace with unprecedented resolution, scale, and sensitivity using:

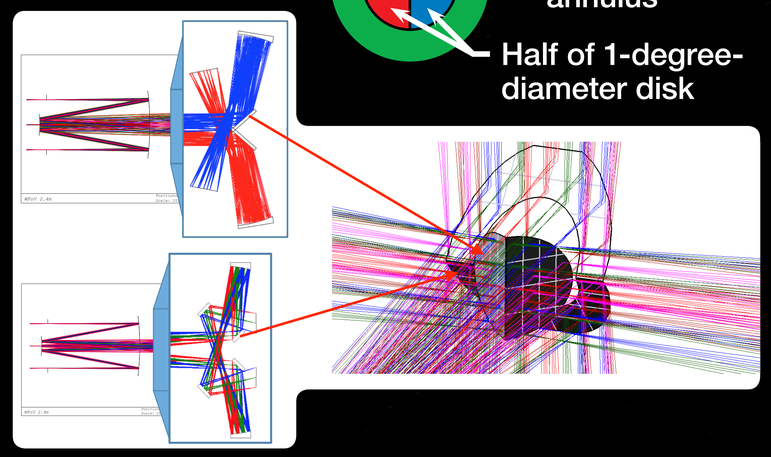
- Three far ultraviolet, co-aligned simultaneous auroral imagers—135, 150, 170 nm, 4 nm FWHM
- An extreme ultraviolet, wide field-of-view plasmasphere imager—30.4 nm
- A spectrometer in the near to far ultraviolet range that will probe any portion of the disk and simultaneously observe the limb—120–300 nm, 1 nm resolution

The GDO optical design

- Separates the FOV into reduced regions
- Each region can be corrected individually

The GDO measurement characteristics

- Full Earth disk image composite
- Spatial resolution of <2 km at nadir
- Pointing accuracy 0.2 arcsec
- Pointing resolution 0.5 km, knowledge 0.2 km
- Integration time of 1 sec
- Sensitivity of 100 R with SNR = 5 per pixel, per 1-sec image



Revolutionary scientific advances enabled by GDO

- Unparalleled advances in the connection of the upper atmosphere to the Sun
- Advances in the influence of waves and tides on the upper atmosphere
- The ability to probe the mechanisms that control the evolution of planetary atmospheres

GDO provides the first...

- Full near-Earth imagery of the storm and circulation systems of the upper atmosphere
- Observations of the ionosphere on a global and long-time scale basis with unprecedented resolution
- Probe of the mechanisms that control the evolution of planetary atmospheres
- Test of our understanding of how the Earth is connected to our own star on a global scale

Value Proposition

- Provides revolutionary observations of geospace required for scientific understanding the coupled Sun-Earth System—the key theme of the 2012 Solar and Space Physics Decadal Survey
- Serves the nation by enabling predictive space weather capability for the near-Earth space environment where the nation's space assets and ground systems reside and are impacted

UV/Optical/IR Space Telescopes & Instruments: Innovative Technologies and Concepts VI
Paper 8860–40

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

James F. Spann, NASA Marshall Space Flight Center, jim.spann@nasa.gov
Patrick J. Reardon, Kenneth Pitalo, The Univ. of Alabama in Huntsville
H. Philip Stahl, Randall C. Hopkins, NASA Marshall Space Flight Center

G-24084