

GUVI Instrument Description

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GUVI Instrument Description

- Functional Description
- Design Heritage
- Open Design Issues
- Operating Modes
- System Performance
- S/C Interface Requirements

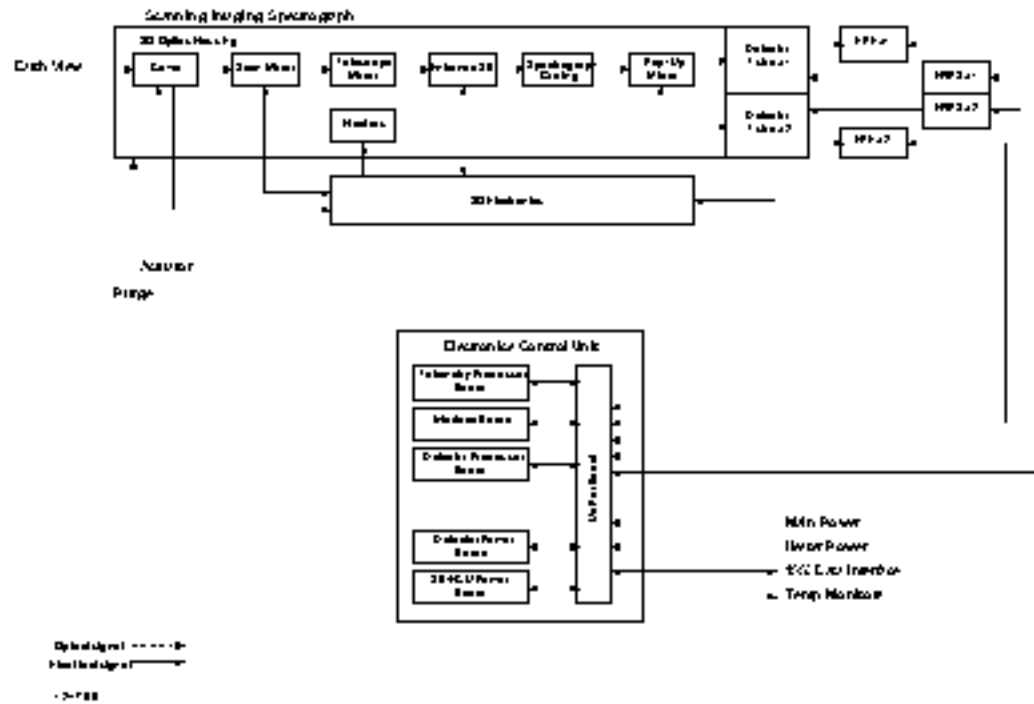
Global Ultraviolet Imager

- Far-UV Scanning Imaging Spectrograph
- Global Measurements of Earth's Far-UV Airglow
- 5 Simultaneous Monochromatic Images
 - Spectral Range: 115 to 180 nm
- Cross Track Line Scan with Overscan onto Limb
 - Field of View: 140° by 11.8°
 - Scan Period: 15 sec

GUVI Components

- SIS Optics Housing
 - Two redundant detector tubes
- SIS Electronics
- Focal Plane Electronics (FPE)
 - Redundant units
- High Voltage Power Supply (HVPS)
 - Redundant units
- Electronics Control Unit (ECU)
 - Dual processors

GUI Functional Block Diagram



GUVI Design Heritage

- SIS Housing
 - SSUSI design with modified mounting feet
 - Pinpuller improvements
 - Sun sensor removed
- SIS Electronics
 - SSUSI design
 - No major changes

GUVI Design Heritage

- Detector Tube
 - SSUSI design
 - Move HV bias boards outside tube potted assembly
- HVPS
 - Modified NEAR HVPS design
 - Input voltage ± 15 V
- FPE
 - SSUSI design

GUVI Design Heritage

- ECU
 - SSUSI chassis design
 - Telemetry processor : Aerospace new design
 - IO Board : Aerospace new design
 - Detector Processor : SSUSI design
 - Power Boards : NEAR design

GUVI Open Design Issues

- Maximum instrument height above S/C deck
- Effect of faster scan rate on scan motor coupling
 - Gearhead lifetime
 - Step settling time
- Location of tube HV bias boards
 - Mount in third module on HV stack

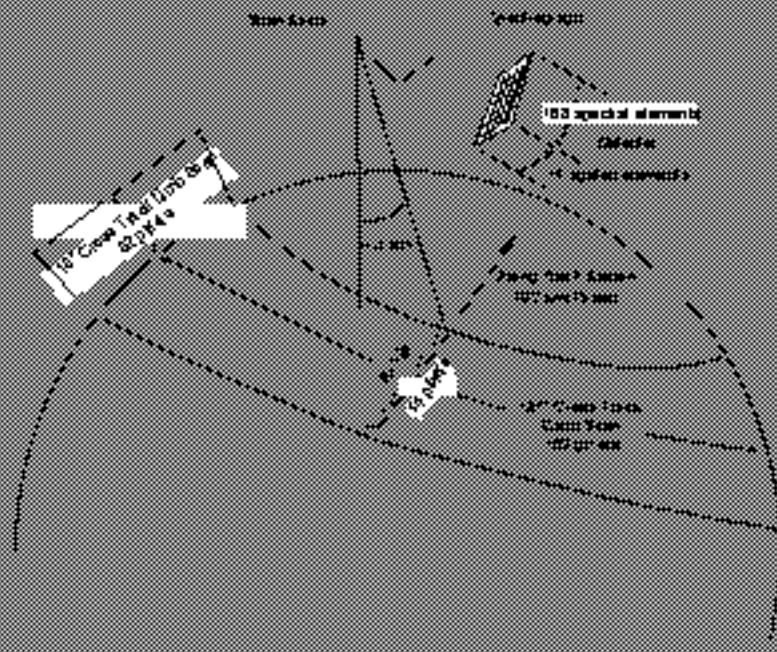
GUVI Operating Modes

- Maintenance
 - Set-up
 - Dayside Imaging
 - Nightside Imaging
 - Sun Avoidance Imaging
 - Wavelength Calibr Spectrograph
 - Star Calibration Spectrograph
 - Test
 - Sun Safe
- Memory upload
 - Initialize spectrograph
 - Full scan
 - Full scan
 - Reduced scan
 - Mirror points toward Earth
 - Mirror points over horizon
 - Detector pulse height samples
 - Triggered by sun event

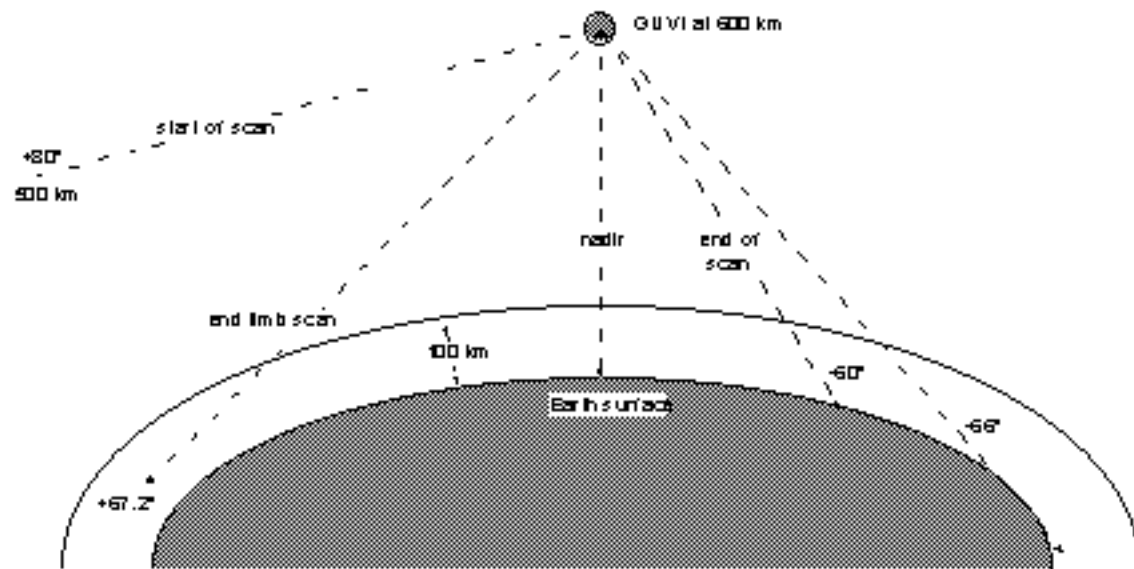
GUVI Imaging Mode

- Main Operating Mode
- Cross Track Horizon to Horizon Scan
- Limb Overscan on Anti-Sun Side
- 191 x 14 Spatial Pixels
- 5 Spectral Colors
- 15 Second Scan Period

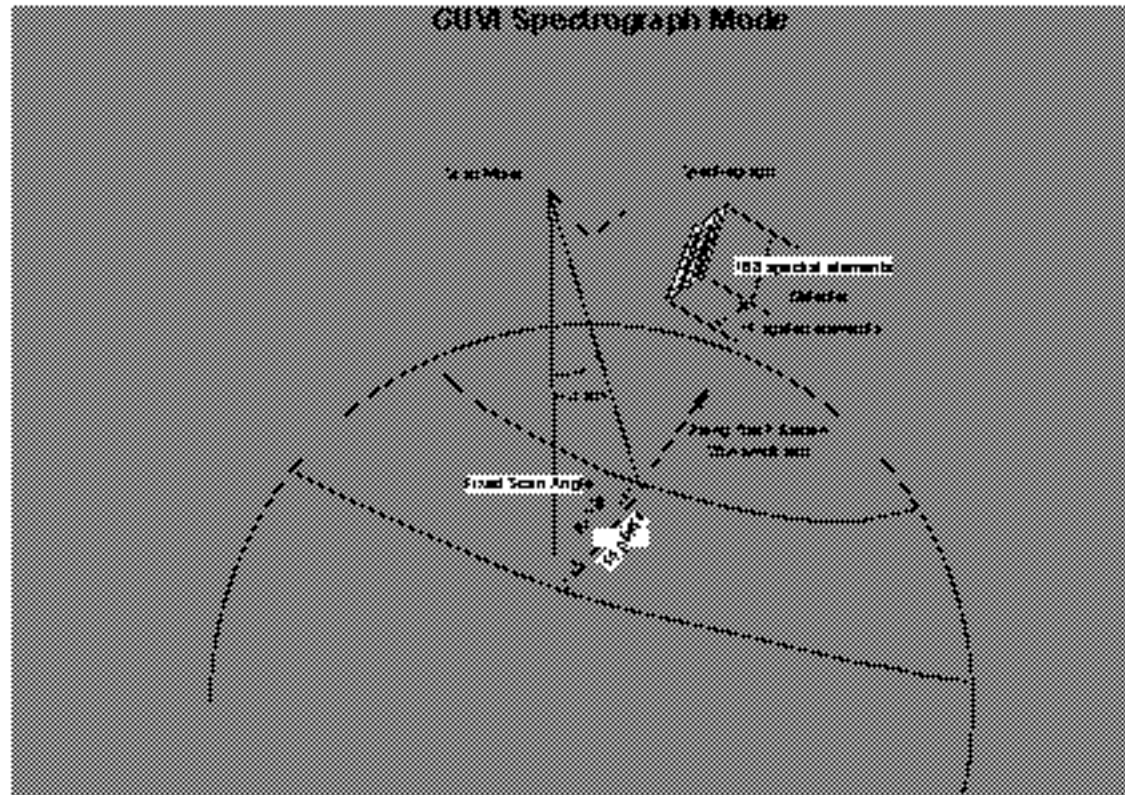
CTVI Imaging Mode



GUVI Scan Geometry



GUM Spectrograph Mode



GUMI SCAN FORMAT

Scan Angle	start +80°	+67.2°	radlr	-60°
	Limb Scan	Earth Scan		Flyback
	32 cross track pkt 14 along track pkt 0.4°/pkt 68 msec/pkt 2.176 sec	159 cross track pkt 14 along track pkt 0.8°/pkt (2 motor steps) 68 msec/pkt 10.812 sec		10 pkt return to start 350 steps 5 msec/step 2.012 sec
	◀	12.988 sec		▶
	◀	15 sec		▶

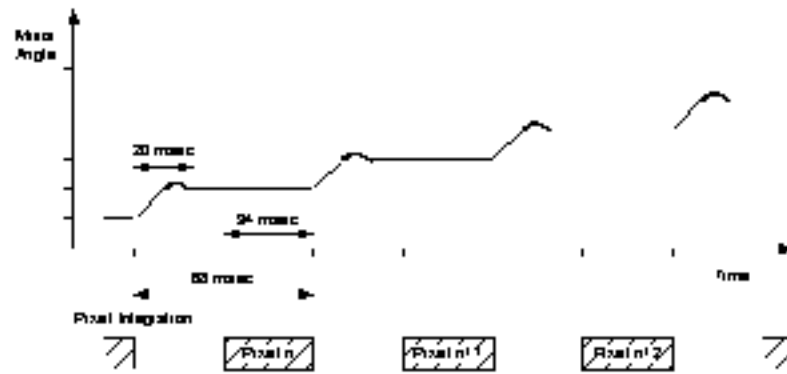
GUVI Spectrograph Mode

- Calibration Mode
- Fixed Cross Track Look Angle
- 14 Along Track Spatial Pixels
- 168 Spectral Bins
- 3 Second Frame Period

GUVI Requirements Flowdown

<u>Parameter</u>	<u>Science Requirement</u>	<u>GUVI Performance</u>
Altitude Coverage (Limb)	100 - 500 km	50 - 500 km
Spatial Resolution (Limb)	0.4 deg	0.4 deg
Scan Range (Disk)	± 60 deg	+67 to -60 deg
Spatial Resolution (Disk)	1.0 x 1.0 deg	0.8 x 0.85 deg
Pointing Knowledge	0.3 deg	0.3 deg
Spectral Range	121 to 180 nm	115 to 180 nm
Spectral Resolution	4 nm	2 nm (medium slit)
Responsivity at 135.6 nm	0.06 cnt/sec/R	0.2 cnt/sec/R (med slit)
from 140 - 150 nm	0.21 cnt/sec/R	0.26 cnt/sec/R (med slit)
Interscene Dynamic Range	500	4000
Photon Count Rate	100 KHz	200 KHz
Compression Error	2%	1%

GUVI LIMB SCAN TIMING



GUVI EARTH SCAN TIMING

