GLUV – A High-Altitude Ultra-Violet Telescope

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AMES Research Center

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Texas A&M University

The University of Arizona
Earth 2.0?

KEPLER-452b:
EXOPLANET MOST LIKE EARTH

10% LARGER THAN SUN

ORBITS
IN HABITABLE ZONE
OF G2-TYPE STAR

365 DAYS IN A YEAR

1.6 TIMES THE SIZE
OF EARTH

385 DAYS IN A YEAR

JULY 23, 2015

WE’RE OUT THERE

#NASABEYOND
Rayleigh Scattering in Exoplanets

Image Credit: NAOJ
What's in the Universe

- Dark Matter: 26.8%
- Ordinary Matter: 4.9%
- Dark Energy: 68.3%

Credit: ESA/Planck
Standard Candles and Rulers
Gravitational Waves

LIGO, NSF, Illustration: A. Simonnet (SSU)
Gravitational Waves

Ridden-Harper+ (in prep)
Current/Past UV Missions

GALEX – All Sky

HST

SWIFT - UVOT
UV from Near Space
Ozone Absorption of UV

Winter hemisphere → higher column density, lower layer height

Summer hemisphere → lower column density, higher layer height
Provisional Tube Concept

Camera ≈ 5 kg
Lenses/mirrors ≤ 5 kg
Tube and snout ≤ 10 kg
<table>
<thead>
<tr>
<th>Component</th>
<th>Mass - Light Design</th>
<th>Mass - Heavy Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirrors</td>
<td>4.23</td>
<td>4.23</td>
</tr>
<tr>
<td>Camera</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Onboard Disks and Misc.</td>
<td>2.50</td>
<td>2.50</td>
</tr>
<tr>
<td>Tube Sections</td>
<td>1.60 (Carbon Fibre)</td>
<td>2.75 (Aluminum)</td>
</tr>
<tr>
<td>Mounts, Fittings, etc.</td>
<td>1.60 (Carbon Fibre)</td>
<td>2.75 (Aluminum)</td>
</tr>
<tr>
<td>Snout</td>
<td>0.75 (Open Mylar)</td>
<td>1.50 (Carbon Fibre)</td>
</tr>
<tr>
<td>Total</td>
<td>11.68</td>
<td>14.73</td>
</tr>
</tbody>
</table>
# Stability and Tracking

## Terma HE-5AS

<table>
<thead>
<tr>
<th>ROLL ACCURACY</th>
<th>PITCH/YAW ACCURACY</th>
<th>FIELD OF VIEW</th>
<th>MASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 arcseconds (RMS)</td>
<td>&lt;1 arcsecond (RMS)</td>
<td>22°</td>
<td>Camera: 1kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Processor: 1.2kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIZE</th>
<th>POWER</th>
<th>UPDATE RATE</th>
<th>SLEW RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cam: 120x120x33 mm</td>
<td>Cam: 1.5W</td>
<td>4Hz Maximum</td>
<td>0.5°/s - 1.0°/s</td>
</tr>
<tr>
<td>Pro: 245x165x29 mm</td>
<td>Pro: 5.5W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GLUV – Timeline

Pre-GLUV = October/November

GLUV-1 = 2019 – 2020

30 – 50 GLUVs = 2021 - 2022

Wavelength = 250nm - 350nm

FOV= 7 Sq. Degrees

Survey Area = ~2000 Sq. Degrees / night

Sensitive = ~m=19 (AB) @ 90s @ 4”