Project Introduction

Design a low-cost, cube-sat class infrared radiometer to observe and provide real-time upper atmosphere radiative cooling data for input to “nowcasts” of space weather. Draw on advances in detector arrays, mini cryo-coolers, on-board processing, and CubeSat buses. Solicit industry partner to develop instrument design for proposal to NASA, DARPA, etc.

Anticipated Benefits

Improving forecasts of aerodynamic drag on orbiting assets and space debris during geomagnetic storms. Current models known to fail. Failure has been tied to lack of consideration of effects of atmospheric infrared radiative cooling in forecast models. Solving drag problem and IR radiation recognized as a “Key Science Goal” in 2012 Heliophysics Decadal Survey. NASA in 2016 constituted a “Virtual Institute” to report on state of art and methods to improve drag forecasts – PI of this CIF was Institute member. Infrared radiation measurements have been tied directly to changes in temperature and density in geomagnetic storm events.

Primary U.S. Work Locations and Key Partners

<table>
<thead>
<tr>
<th>Organizations Performing Work</th>
<th>Role</th>
<th>Type</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>♠Langley Research Center (LaRC)</td>
<td>Lead Organization</td>
<td>NASA Center</td>
<td>Hampton, VA</td>
</tr>
</tbody>
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Primary U.S. Work Locations

| Virginia |

Project Management

Program Director:
Richard T Howard

Program Manager:
Julie A Williams-byrd

Principal Investigator:
Martin G Mlynczak

Technology Maturity (TRL)

Start: 1
Current: 1

Technology Areas

Other/Cross-cutting:
- Communications, Navigation, and Orbital Debris Tracking and Characterization Systems (TA 5)
- Orbital Debris Tracking and Characterization (TA 5.7)

Target Destination
Earth

For more information and an accessible alternative, please visit: https://techport.nasa.gov/view/94038