Project Introduction

The existing state-of-the-art for physics-based, data-driven, climatological specification of the global radiation environment is the capability embodied by Nowcast of Atmospheric Ionizing Radiation for Aviation Safety (NAIRAS) and supported by the validation activity in the Automated Radiation Measurements for Aviation Safety (ARMAS) project Phase I. In Phase II the ARMAS team will: i) integrate, fly, and operate two micro dosimeters on aircraft; ii) validate and calibrate the micro dosimeters with a tissue equivalent proportional counter; iii) retrieve the micro dosimeter dose and dose rate data in real-time via an automated downlink system; iv) use the dose and dose rate measurements in a data assimilation algorithm to correct the NAIRAS model dose and dose rate output along the flight track; and v) report the corrected dose and dose rate via server, web, Google Earth, and smart phone apps for aviation safety.

Anticipated Benefits

Potential NASA Commercial Applications: NASA has a demonstrated interest in quality, cutting-edge research that leads to revolutionary capabilities for the airspace system and the aircraft that fly within it. Aviation safety has been a strong concern for those developing the nation's Next Generation Air Transportation System (NextGen), particularly in the area of technologies for improved aviation crew safety. ARMAS, when automated and operational in Phase III will provide data for assimilation into the NAIRAS system and will facilitate a safer and more efficient air transportation system. ARMAS will enable the airline industry, crew, frequent flyers, and FAA to more quickly and accurately mitigate radiation exposure risk due to cosmic rays and solar energetic particle events. ARMAS will provide the accuracy and timeliness of measurements that can be assimilated into advanced physics-based models for global effective dose rate specification and radiation risk mitigation.

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Primary U.S. Work Locations and Key Partners

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<th>Organizations Performing Work</th>
<th>Role</th>
<th>Type</th>
<th>Location</th>
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<tr>
<td>✨ Langley Research Center (LaRC)</td>
<td>Lead Organization</td>
<td>NASA Center</td>
<td>Hampton, VA</td>
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<tr>
<td>Space Environment Technologies, LLC</td>
<td>Supporting Organization</td>
<td>Industry</td>
<td>Pacific Palisades, CA</td>
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</tbody>
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Primary U.S. Work Locations

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<th>States</th>
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<tbody>
<tr>
<td>California</td>
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<td>Virginia</td>
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Organizational Responsibility

** Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**
Langley Research Center (LaRC)

**Responsible Program:**
SBIR/STTR

Project Management

**Program Director:**
Jennifer L. Gustetic

**Program Manager:**
Carlos Torrez

**Project Manager:**
Christopher Mertens

**Principal Investigator:**
William Tobiska

Technology Maturity (TRL)

Start: 7  
Current: 8  
Estimated End: 8

For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/9372
Technology Areas

Primary:
- Human Health, Life Support, and Habitation Systems (TA 6)
  - Radiation (TA 6.5)
    - Monitoring Technology (TA 6.5.5)

Other/Cross-cutting:
- Science Instruments, Observatories, and Sensor Systems (TA 8)
  - In-Situ Instruments and Sensors (TA 8.3)