Project Introduction

This NASA Phase II SBIR program would develop comfortable garments with multiple integrated sensor functions for the monitoring of astronauts during long duration space missions. During Phase I, NanoSonic demonstrated the feasibility of using its patented Metal Rubber™ sheet and fabric materials as both sensor elements and highly flexible electrodes integrated into prototype instrumented garments. Heart rate and EKG data taken using the Metal Rubber™ sensors are essentially identical to those obtained using standard biomedical instrumentation. The combined high electrical conductivity, low mechanical modulus, and environmental robustness of the Metal Rubber™ materials make them a lightweight, stretchy and comfortable alternative to conventional metal wiring and cabling. During the proposed Phase II program, NanoSonic would work with a large-volume U.S. textile manufacturer, the sensor and electronics design group of a major aerospace company, and a biomedical sensor and devices laboratory of Food and Drug Administration. NanoSonic would improve the Metal Rubber™ materials and methods for their integration as sensor and interconnect materials into instrumented garments, design, fabricate and evaluate the performance of sensor jerseys based on the results of Phase I tests, develop data acquisition electronics needed to interface to standard storage and communication modules, and investigate requirements for scaled-up manufacturing.
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>Johnson Space Center (JSC)</td>
<td>Lead Organization</td>
<td>NASA Center</td>
<td>Houston, TX</td>
</tr>
<tr>
<td>Nanosonic, Inc.</td>
<td>Supporting Organization</td>
<td>Industry</td>
<td>Pembroke, VA</td>
</tr>
</tbody>
</table>

Closeout Documentation

Final Summary Chart
(https://techport.nasa.gov/file/14401)

Project Management

Program Director:
Jennifer L Gustetic

Program Manager:
Carlos Torrez

Technology Areas

Primary:
- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
  - TX06.3.4 Contact-less / Wearable Human Health and Performance Monitoring