**WHEN**

**Contract Number:** N68335-18-C-0187  **Ending on:** February 10, 2020

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Risk Level</th>
<th>Measure of Success</th>
<th>TRL</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hybrid sensor layer and connector</td>
<td>Low</td>
<td>Design and manufacturing of layer</td>
<td>5</td>
<td>April 2018</td>
</tr>
<tr>
<td>Integration of PZT and FO hardware</td>
<td>High</td>
<td>Integration flows smoothly</td>
<td>5</td>
<td>November 2019</td>
</tr>
<tr>
<td>Software development</td>
<td>Low</td>
<td>Hybrid software functions well</td>
<td>5</td>
<td>September 2019</td>
</tr>
<tr>
<td>Interface to VSLED system</td>
<td>Med</td>
<td>Interface functions well</td>
<td>5</td>
<td>November 2019</td>
</tr>
<tr>
<td>Combined system testing</td>
<td>Low</td>
<td>Acceptance criteria is met</td>
<td>5</td>
<td>January 2020</td>
</tr>
</tbody>
</table>

**WHAT**

**Operational Need and Improvement:**
- Navy aircraft and commercial aircraft will benefit from development of a hybrid SHM system that accurately tracks damage data for structural components throughout the aircraft component’s life.
- More precise fatigue/damage tracking can lead to reduced maintenance downtime and cost due to targeted, less frequent inspections and part replacement.

**Specifications Required:**
- HYBRID SYSTEM COMPONENTS: 1) hybrid PZT-FO sensor network, 2) connectors, and 3) data acquisition hardware/software
- CAPABILITIES: damage detection, damage quantification, static/dynamic loads monitoring in real world loading environments, hardware and software for data acquisition and processing are packaged as a single unit, are as small and lightweight as possible and interfaced with the current V-22 Vibration/Structural Life and Engine Diagnostics (VSLED) system.

**Technology Developed:**
- KEY TECHNOLOGY DEVELOPED INCLUDES:
  - Integrated hybrid SHM system consisting of a hybrid PZT – FO sensor network, monolithic connector for both sensor types, and data acquisition hardware/software integrated into a single unit.
  - Hybrid sensors designed and manufactured in a single sensor layer for ease of integration with the structure
  - Ability for damage detection, quantification, and loads monitoring capabilities in real world operating environments.
  - Miniaturized lightweight hardware and software for data acquisition and processing interfaced with the current V-22 VSLED system.

**Warfighter Value:**
- Increase in operational efficiency
- Prevent structural downtime
- Minimize operation/maintenance cost
- Prolong life span of valuable assets

**HOW**

**Projected Business Model:**
- The system developed with subcontractor IFOS is positioned to sell directly or through prime contractors for existing and new Navy aircraft platforms as a complete system.
- Acellent and IFOS will be the primary supplier for the system and will also provide support and provide services including system updates, training, installation, data analysis and data management.

**Company Objectives:**
- Acellent is committed to commercializing the hybrid SHM system.
- The overall goal is to develop and commercialize the Integrated Hybrid PZT-FO system.
- Preliminary testing will be conducted with Bell Helicopters and NAVAIR
- Additional partners for testing and trials using the system are sought.

**Potential Commercial Applications:**
- The hybrid SHM system can provide a complete solution for a wide range of structural analysis, evaluation, and maintenance requirements and enable a number of high value economic benefits to markets such as
  - Military Aircraft/Rotorcraft
  - Commercial Aircraft/Rotorcraft
  - Pipelines/Refineries
  - Other markets (heavy machinery)

**Contact:**
- Dr. Amrita Kumar, Executive Vice President
- akumar@acellent.com  
  408-307-4189, 408-745-1188