A Highly Integrated Multi-Parameter Distributed Fiber-Optic Instrumentation System

Submitted by admin on Wed, 2016/04/13 - 6:33pm

In the future, exploration missions will benefit greatly from advanced metrology capabilities, particularly structural health monitoring systems that provide real time in-situ diagnostics and evaluation of structural integrity. Safety- and mission-critical components and systems will be instrumented with embedded sensors to provide a real-time indication of health, helping to ensure that America's space exploration remains safe and cost efficient. One of the most promising technologies for accomplishing this is fiber-optic sensors. Due to their light-weight and multiplexing potential, fiber-optic sensors are highly desirable for employment in this fashion. However, most commercial fiber-optic sensor interrogators are bench sized units and are too large and heavy to be easily integrated for space-based applications.

To address this shortcoming, Luna Innovations proposes to develop a compact, light-weight, multi-parameter distributed fiber-optic instrumentation system based on the OFDR technique. The interrogator will incorporate photonic integrated circuit technology, a highly integrated swept-wavelength laser, and state-of-the-art integrated processing technology to dramatically reduce the size, weight, and cost and to dramatically increase the performance and robustness relative to existing technology. This interrogator will interface with fiber-optic strain, temperature, and shape sensor arrays, enabling simultaneous interrogation of a multitude of sensors, dramatically reducing the per sensor cost of instrumentation.

Has the technology developed under this project been used in a fielded Federal system or acquisition program?: Yes
User has started updating award?:
Update Agency: Department of Defense
Award: A Highly Integrated Multi-Parameter Distributed Fiber-Optic Instrumentation System
Additional commercialization by 3rd Party Revenue: $0.00
Export Markets: $0.00
Total Sales: $6,805,651.00
Total Investment: $3,342,136.00
Proposal: A Highly Integrated Multi-Parameter Distributed Fiber-Optic Instrumentation System
Firm Commercialization: LUNA INNOVATIONS INCORPORATED
DoD Contracts or DoD Subcontracts: $1,861,767.00
DoD or DoD prime contractors: $26,657.00
Is the technology developed under this project related to Manufacturing?: Yes
Select the one that most applies: Systems Level Manufacturing
Has the technology developed under this project achieved a cost saving or cost avoidance for the government or end user?: No
Cost Savings Type: None
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Explanation how cost savings was calculated: 
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Indicate agency/end user realizing the savings: 
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Enter the system or program realizing the savings: 
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c) If funded by a federal agency, provide the Phase III contract number: N66001-09-P-7033 product order
 |
a) indicated the primary agency using it: Navy
 |
b) Specify the system or program: Aircraft R&D
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Private Sector: $6,638,185.00
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Other Federal contracts/grants: $350,123.00
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Other Sources: $0.00
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Private Sector: $1,130,246.00
 |
Other Customers: $0.00
 |
Other Federal Agencies: $140,809.00
 |
Enter the cost savings:: $0.00
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comm_migration_year: 2007