

## **US Navy awards MicroStrain, Inc. a \$917,000 Phase II SBIR Contract for the Development of a Miniature, Vibro-Mechanical Energy Harvester for Powering Wireless Sensors**

Release Date: Immediate

Williston, Vermont, March 31, 2009 - The US Navy (NAVAIR) has recently awarded MicroStrain, Inc. a Phase II SBIR contract to further develop a suite of miniature vibro-mechanical energy harvesters for powering wireless sensors on Navy aircraft.

Recent developments in combining sensors, microprocessors, and radio frequency (RF) communications holds the potential to revolutionize the way we monitor and maintain critical systems [1]. In the future, literally billions of wireless sensors could be deeply embedded within machines, structures, and the environment. Sensed information would be automatically collected, compressed, and forwarded for condition based maintenance.

The U.S. Navy's long term vision is to deploy distributed wireless sensor networks along with RFIDs to provide a wealth of usage information about an entire aircraft structure. As the fleet ages, there's an increasing need for embedded wireless strain sensors capable of detecting and tracking accumulated strains – "precursors" to crack initiation [2].

But wireless sensors need energy to operate, and battery maintenance, economic battery replacement, and safe battery disposal all remain major barriers. MicroStrain's miniature energy harvesters break down these barriers by efficiently converting a machine's vibrations into power. This will enable the next generation of wireless sensor networks to provide continuous health monitoring of our critical structures, such as aircraft and bridges, without requiring batteries.

During Phase I, MicroStrain's engineers designed, built, and tested novel miniature energy harvesters that scavenged ambient vibrations from a helicopter gearbox. Continuous power output from a four cubic centimeter, 40 gram energy harvester was 40 milliwatts - enough to power MicroStrain's high sample rate wireless sensor node, which records strain and vibration data continuously at rates of up to 50,000 samples per second. The Phase II effort will support further development of these systems in preparation for flight tests.

"We're excited to be selected by the Navy to advance our vibration energy harvesting systems. This new round of SBIR funding complements our current developments in advanced, wireless structural health monitoring systems for rotary and fixed wing aircraft", said Steven Arms, President of MicroStrain.

The Navy SBIR Phase II award will provide up to ~\$917K over a two year period. The Federal SBIR program is highly competitive, and funds only those small

businesses innovations with significant commercial potential. More information on the Navy's SBIR program is available on-line at [www.navysbir.com](http://www.navysbir.com).

MicroStrain is a leading manufacturer of inertial measurement systems, micro-displacement transducers, and wireless sensing networks. MicroStrain's sensing systems are used in a wide variety of applications, including testing new designs, controlling critical processes, navigating unmanned vehicles, and monitoring the health of structures and machines. Recognized as an innovator in the sensors industry, MicroStrain has received nine (9) Best of Sensors Expo Gold awards for its new products. For further information please visit MicroStrain's website at [www.microstrain.com](http://www.microstrain.com) or call 802-862-6629.

References:

[1] The Economist, *"When Everything Connects"*, Special Report on Telecoms, April 28th-May 4th 2007, pages 3-18

[2] Maley, S., Plets, J., Phan, N.: *"US Navy Roadmap to Structural Health and Usage Monitoring – The Present and Future"*, Proc. American Helicopter Society 63rd Annual Forum, Virginia Beach, VA, May 1-3, 2007, CONF 63; VOL 2, pages 1456-1467, ISSN 0733-4249

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