



SUCCESS

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT

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ADVANCED STRUCTURAL HEALTH Monitoring Technology for Weapon Systems is One Goal of New AFRL Agreement

Eglin Air Force Base, Florida – A new agreement between the Air Force and academia will help advance critical technologies, such as those used to reliably monitor structures of the next-generation munitions airframes and other weapons systems.

The Air Force Research Laboratory Munitions Directorate (AFRL/RW) recently signed an educational partnership agreement (EPA) with Iowa State University of Science and Technology. The 28-month agreement will allow AFRL/RW to collaborate with the university on the development of basic research programs



Cornerstone Research Group's aeromedical evacuation stretcher is shown during a compatibility test on a KC-135. (Photo courtesy of Cornerstone Research Group)

that support the Air Force mission. The agreement also provides a unique and beneficial experience for students of the university to gain hands-on experience working on real-world defense laboratory research projects.

“The partnership agreement with Iowa State University gives the Air Force an amazing opportunity to establish a formal collaboration with excellent young professors whose technical expertise and background can supplement AFRL researchers in the development of future Air Force technology,” said Dr. Jacob Dodson, AFRL/RW research mechanical engineer and technical program manager for the EPA.

An EPA is a technology transfer agreement between a defense laboratory and an educational institution for the purpose of encouraging and enhancing study in scientific disciplines at all levels of education. The technology transfer agreements are put in place with the help of Air Force Technology Transfer specialists.

One focus area of this latest collaboration is the development of microsecond structural health monitoring systems for high-speed structures such as weapon systems and weapon airframes. Current inspection methods cannot be used as they are only implemented when the systems are not in operation.

Structural health monitoring (SHM) would integrate sensor networks and structures to autonomously examine and detect damage during operations. While SHM systems allow for continuous measurement of gradually changing structures on the order of milliseconds to minutes, there is a lack of real-time methods that can detect, and characterize, damage in the microsecond time scales. The development of SHM into microsecond structural health monitoring (μ SHM) systems is critical for the reliable operation of next generation high-speed complex structures (e.g. hypersonic air vehicles and weapon airframes). The ability to continuously monitor the structural integrity and predict remaining life weapon systems is vital to monitoring the response of these systems, increase functional reliability and decrease maintenance costs. Iowa State may use this technology as a stepping stone for development of methods to apply to civil structures, future aircraft, and spacecraft.

“Collaboration with academic partners is key to growing the unique technical area addressing μ SHM,” said Dr. Dodson.

Under the agreement, Dr. Jacob Dodson and Dr. Simon Laflamme, Associate Professor of Civil, Construction, and Environmental Engineering at Iowa State and the program manager for the university, have collaborated on proposals dealing with the development of μ SHM technology. Dr. Dodson has also visited the university and met with other engineering faculty to discuss further potential collaborations.

The laboratory will also assist the university in developing a program under which students may be given academic credit for work on defense laboratory research projects. AFRL/RW personnel may also teach courses at both the undergraduate and graduate level, as well as assist in the course and material development for Iowa State University of Science and Technology. Currently, Dr. Dodson is serving on the Ph.D. committee of a graduate student.

“This agreement opens the door for continuing collaborations in various technology areas, while promoting a key tenant of technology transfer in leveraging partnerships to efficiently advance the state of the art. Partnerships with universities are a critical component in maintaining our leading edge in science and technology, directly impacting our national security,” said Mr. Lynn Zanow, AFRL/RW technology transfer specialist.

For more information on agreements like this, please call the Air Force Technology Transfer Program Office at Wright-Patterson Air Force Base, Ohio at (937) 904-9830.

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