



New VLRCOE Teams Announced

In December, the joint US Army, US Navy and NASA Vertical Lift Research Centers of Excellence (VLRCOE) program announced the academic teams selected for the next five years. The VLRCOE program, which continues the support of rotorcraft centers of excellence that started in 1982, is a collaborative effort between government and academia. Its goal is to develop, evaluate, demonstrate and test advanced vertical lift technologies. US government personnel maintain continuous involvement in the program; VLRCOE tasks are evaluated annually and redirected as necessary to keep them aligned with the government's long-term research goals.

The multi-university teams are composed of faculty researchers and students from institutions across the US, and for the first time will be collaborating extensively with international academic partners on fundamental research.

The **Georgia Institute of Technology** VLRCOE team includes:

- **Iowa State University** in Ames, Iowa
- **Ohio State University** in Columbus, Ohio
- **Purdue University** in West Lafayette, Indiana
- **University of Michigan** in Ann Arbor, Michigan
- **Washington University** in St. Louis, Missouri

The **University of Liverpool** in Liverpool, England, is collaborating with Georgia Tech.

The **Pennsylvania State University** VLRCOE team includes:

- **Embry Riddle Aeronautical University** in Prescott, Arizona
- **University of California, Davis** in Davis, California
- **University of Tennessee** in Knoxville, Tennessee

Technion – Israel Institute of Technology in Haifa, Israel, is collaborating with Penn State.

The **University of Maryland** VLRCOE team includes:

- **United States Naval Academy** in Annapolis, Maryland
- **University of Texas at Arlington** in Arlington, Texas
- **University of Texas at Austin** in Austin, Texas
- **Texas A&M University** in College Station, Texas

The **Technical University of Munich** in Munich, Germany, **Roma Tre University** in Rome, Italy, and **Technion – Israel Institute of Technology** are all collaborating with the University of Maryland.

Tasks undertaken at the VLRCOEs span several research areas, including aeromechanics, structures and materials, flight dynamics and control, advanced vertical takeoff and landing design and concepts, vibration and noise control, propulsion, affordability, safety and survivability, and human factors engineering.

The five-year VLRCOE agreements are funded annually by the Army (\$3M), Navy (\$1M) and NASA (\$0.5M). The international partners are not funded by the VLRCOE program, but bring in their own funding to the partnership.

“The program focuses on expanding the frontiers of knowledge in research areas where the vertical lift community has enduring needs,” said Dr. Mahendra Bhagwat, program manager for the VLRCOE and basic

research focus area lead at the Aviation Development Directorate, part of the US Army's Aviation and Missile Research, Development and Engineering Center (AMRDEC). “It couples state-of-the-art research programs at academic institutions with broad-based graduate education programs to increase the supply of scientists and engineers in vertical lift technology.”



Georgia Tech, Penn State and the University of Maryland have been renewed as the lead VLRCOE universities. (Penn State photo by Jared Soltis)

“NASA and our military partners have made a major commitment to advancing vertical lift research and training of the next generation of vertical lift researchers,” said Susan Gorton, project manager for NASA's Revolutionary Vertical Lift Technology Project at the Langley Research Center in Hampton, Virginia. “Our joint investment of more than \$22M over five years will help improve the safety, performance and affordability of civilian and military helicopters and other vertical lift aircraft, and lead to innovative concepts that are quieter and easier to fly.”

“The Navy is also interested in advanced rotorcraft research,” said Dr. Ken Iwanski, program officer for the Office of Naval Research. “Additionally, our needs include the study of how helicopters are employed and can be better integrated into shipboard operations and other naval applications.”

The VLRCOE program provides a challenging research and educational environment, and helps the universities to attract top students. Over the last five years, more than 100 master's degree students and over 125 PhD students graduated from the VLRCOE universities, and most of them continue to contribute to vertical lift research. Many Vertical Flight Foundation scholarship recipients also hail from these schools.

The VLRCOE universities produce award-winning work for the vertical flight community and have been recognized by AHS International in the past five years with numerous awards including the AgustaWestland International Fellowship Award (2014), the François-Xavier Bagnoud Award (2012, 2016), the Howard Hughes Award (2014), the Igor I. Sikorsky International Trophy (2012), the Robert L. Lichten Award (2016), and the Alfred Gessow Award for the Best Paper at the AHS Annual Forum (2016). Six faculty members from the VLRCOEs have been recognized as AHS Technical Fellows. In addition, VLRCOE teams have won the AHS Student Design Competition three out of the last five years in the undergraduate division and all five years in the graduate division.

