Near Earth Autonomy to develop low cost, high performance system for improved passive terrain sensing

June 18, 2014
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PITTSBURGH—The Office of Naval Research (ONR) has awarded a development contract to Near Earth Autonomy Inc. (Near Earth) to advance Low-Light, Low Cost Passive Terrain Sensing.

Helicopter flight in support of military operations is often conducted at night under low light conditions, where loss of situational awareness can lead to accidents such as controlled flight into terrain (CFIT). Current terrain sensing systems used to aid pilots in maintaining situational awareness use active sensors, such as millimeter-wave radar and flash or scanning lidar, but active sensors pose a signature risk in threat environments.

To address the trade-off between enhancing situational awareness and reducing the electronic threat signature, Near Earth proposes to develop passive terrain sensing explicitly for use in low-light conditions. The technology, which will be applicable to both manned and unmanned flight, will consider a variety of imaging solutions customized for use in low-light situations. Special consideration will be made for cost since the objective is to develop both low-cost and high performance sensing systems. Near Earth will identify design points appropriate to micro, small and full-scale helicopter unmanned aerial vehicles (UAV). Near Earth will develop a design concept using the low-light sensors coupled with machine vision algorithms. The effort will culminate in a breadboard demonstration of the resulting design that will produce accurate real-time terrain data.

The Research or development of a low-light, low-cost passive sensing system will provide improved pilot situational awareness and threat reduction that applies across the span of the rotary wing military market. The system's safety enhancements (terrain and obstacle detection) apply to both the military and civilian markets. Loss of situational awareness and the resultant controlled flight into terrain are a major cause of helicopter accidents, and Near Earth’s design concept directly addresses the problem.

In addition to the manned helicopter market, the technology represented in the Near Earth design concept is applicable to the military and civil UAV markets. The civil UAV market is poised for significant growth with the public safety and precision agriculture segments leading the way. Additional civil market segments that would benefit from this technology include urban planning, environmental monitoring, infrastructure inspection, forestry, and inspections of wires, pipelines, mines and other structures in the energy industry.

Near Earth (http://nearearth.aero) is a privately held, spin-off from Carnegie Mellon University. The company develops comprehensive solutions for manufacturers and users of low-flying aircraft that need to operate in all weather conditions, and in hostile unprepared environments. Near Earth bridges the gap between aerospace and robotics with complete systems that improve efficiency performance and safety and expands the types of missions where aircraft are used, enabling manned and unmanned operations. Currently, the company leads key efforts in perception, motion planning, and human-machine interfaces as applied to cutting edge programs developing next generation capabilities for aviation.