



Transition Impact

Simplified Manual Flight Control System for UAVs



- Making UAV systems easier to fly than autos are to drive
- New technology simplifies manual control of UAVs to eliminate the need for highly trained pilot operators
- SBIR sponsored technology greatly reduces costs of the UAV program while dramatically increasing capability

Air Force Requirements

The Air Force Research Laboratory was searching for new Unmanned Aerial Vehicles (UAV) control systems technology that greatly simplified the manual control of UAVs and eliminated the requirement for highly trained, rated Air Force pilots to operate the UAV systems. The Air Force was also looking for a solution that significantly reduced the UAV operator workload and training requirements, thus significantly reducing the training and logistics costs associated with the operation of UAVs. As the dependence on UAVs for military operations grows and UAV technology is integrated into the emerging global military command and control architecture, the cost and complexity of managing and controlling these systems must be bounded. The Air Force has recognized this need and has begun addressing the problem by funding new UAV technology development programs, such as Geneva Aerospace's Small Business Innovation Research Program (SBIR) project, that focuses on the human factors associated with managing and controlling UAVs. With the Air Force's needs defined, Geneva developed the underlying control technology that will facilitate the emergence of new UAV systems that are easier to fly than automobiles are to drive.

SBIR Technology

Geneva Aerospace continues to develop a system that greatly simplifies the control of UAVs for remote operators. With this new UAV control technology, unskilled operators with no piloting or aviation experience can fully control an unmanned aerial vehicle. This control simplicity enables a larger community of military operators, beyond the small group of highly trained aviators, to control UAVs, while at the same time allowing a single operator to manage multiple UAVs at one time. This original technology focus has grown exponentially. The result has been an entire family of new UAV technologies that are currently being moved to production, transitioning to DoD and other government agency programs, and adapting to larger scale advanced research through Defense Advanced Research Projects Agency (DARPA).

Air Force Transition Payoff

1. Geneva was funded to integrate its Variable Autonomy Control System (VACS) software into SDS International's LitFlite simulation to perform Uninhabited Combat Air Vehicle (UCAV) Human-Systems Interface (HIS) research under a program funded by the AFRL Human Effectiveness Directorate.

2. An adaptation of the VACS flight control software package, supporting data link system, and supporting ground control station software package has been inserted into the Navy's Affordable Weapon (low-cost cruise missile) program, which is slated to begin engineering, manufacturing and development in the '04 to '05 time frame.

3. Another adaptation of VACS was picked up by the Office of Naval Research (ONR) for use in the development of an autonomous "see & avoid" (air collision avoidance) system for UAVs to support the integration of UAVs into our national airspace.

4. DARPA's Information Exploitation Office (DARPA/IXO) has picked up VACS to provide the underlying multi-vehicle control system architecture to support advanced research in multi-vehicle control of heterogeneous UAV teams to support next generation technologies for Urban Area Warfare. This work involves cooperative control of diverse UAV teams and autonomous tracking and following of ground moving targets in urban terrain.

To date, the results of this AFRL SBIR has generated over six million dollars in captured business for Geneva and continues to grow exponentially each year. The technology has been inserted into several development programs and is already targeted for an entire family of emerging programs involving the development of next-generation network-centric UAV systems including persistent Intelligence, Surveillance and Reconnaissance Systems, Hunter-Killer systems, and loitering munitions.

SBIR Topic:

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AFRL Air Vehicles Directorate

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