Multi-UAV Supervisory Control Interface Technology (MUSCIT). ***Patzek, M., Draper, M., Feitshans, G., Liggett, K., & Calhoun, G.; Air Force Research Laboratory.***

System concepts that include the simultaneous employment of multiple unmanned air vehicles (UAVs) from a single control station or platform are under consideration for tactical missions. In many of these concepts there is an emphasis on managing the UAVs and conducting these missions with minimal crew. One potential cost of doing this, however, is how flexible and responsive an individual UAV, and ultimately the team, can be to dynamic mission needs. Thus, in a multi-vehicle context, progress is needed to increase mission effectiveness on a per vehicle basis. To accomplish this, technology development and advanced designs are required to facilitate more timely and effective operator situation assessment and decision making. With the goal of developing controls, displays, and decision support aids for single-operator, multi-UAV systems, the Air Force Research Laboratory has started the Multi-UAV Supervisory Control Interface Technology (MUSCIT) Program. This presentation will provide an overview of this new five-year effort. Managed by members of the Human Effectiveness System Control Interfaces Branch, MUSCIT focuses on dynamic tactical intelligence, surveillance, reconnaissance (ISR) missions envisioned for multi-UAV operations. Technologies to be evaluated include graphical user interfaces, information fusion, multi-modal presentation, direct controls, attention allocation aids, and integrated communication approaches. To evaluate and mature these and other candidate technologies, a customizable development architecture will be employed for the multi-UAV test-bed. MUSCIT will utilize a spiral approach in developing the supervisory control interface and assessing crew and mission-level performance. Spirals 1 and 2 of the program will evaluate interface concepts with single or multiple UAVs using ISR mission scenarios that require less adaptive mission planning and execution. Spirals 3 and 4 will mirror the first two spirals except that the mission scenarios and tasking will be much more dynamic and complex (e.g., more time sensitive missions). This spiral approach will aid in the capabilities assessment and refinement of promising supervisory control interface technology for a wide range of mission situations and complexity. Tests will most frequently occur via high-fidelity operator-in-the loop simulation, reserving a subset of the capabilities to be flight demonstrated. Flight tests are planned with surrogate UAVs to exercise the mission functionality and tasks. Candidate interface concepts will be prioritized in terms of demonstrated value in the evaluations. The anticipated benefits of the MUSCIT Program for multi-UAV operations include improved operator response to time-critical situations, simultaneous supervision of multiple areas of interest, and increased span of control with a single control station.