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For Immediate Release:

WSRI Team Successfully Flies Multiple Different UAS with a Single Operator

(Dayton, OH) A team from Wright State Research Institute (WSRI) and the Air Force Research Laboratory (AFRL) spent two weeks in September working in the restricted air space at Camp Atterbury, Indiana testing advanced concepts for single operator control of multiple different UAS (Unmanned Aerial Systems).

The Heterogeneous-UAS Integration for a single-operator VSCS Environment (HIVE) Capstone Flight Test was the culmination of a project managed by AFRL and funded by OSD.

"AFRL has been developing and testing advanced UAS interface concepts through the Vigilant Spirit Control Station (VSCS) for a number of years utilizing simulations and flight testing with small UAS. HIVE was a devoted effort to demonstrate the advanced capabilities and maturity of Vigilant Spirit with larger UAS using operationally relevant mission vignettes," stated Greg Feitshans, AFRL's Chief Engineer for Vigilant Spirit.

According to Dr. David Gross, WSRI's chief engineer and the HIVE Principal Investigator, "on the surface this may not seem like a big deal, but it is truly significant for our military and those who fly larger UAS." Dr. Gross likened the current state of UAS operations to the old days of computers before Microsoft, when there was no common language that allowed different brands and types of computers to speak to each other and be networked. Dr. Gross added, "UAS don't have a common operating system or interface. With the larger Group 3 to 5 UAS in current operation by our military, typically the ground station is proprietary and only works with that specific type of vehicle, making it very inefficient. Since the ground stations can't communicate with other UAS types, they have to be individually operated, creating huge challenges and eliminating opportunities to put the best teams of vehicles together to get the job done. HIVE has demonstrated that we can successfully have multiple, different UAS flown simultaneously by one operator from one station, which can significantly improve productivity."

Kate Heilner, Senior Systems Engineer at WSRI, was the primary Air Vehicle Operator during the HIVE Capstone and summarized the experience as, "I am excited to have participated in HIVE and have the opportunity to fly three heterogeneous Group 3 aircraft simultaneously. During the course of the flights

I found I was easily able to maintain situational awareness on the health and status of each aircraft. I did not have to hunt for information or sift through extraneous data to know where the aircraft were flying and important stats like altitude, airspeed, system voltage, and fuel levels. Having been a sensor operator for the RQ-1, MQ-1, and MQ-9 [UAS], and conducted test for other types of UAS, I have experience with different command and control stations. The way in which I maintained situational awareness and provided the aircraft for tasking to support the mission scenario was fluid and straightforward. I am looking forward to flying more unmanned aircraft systems with Vigilant Spirit Control Station!"

"[AFRL] took a human-centered approach to developing the automation, displays, and controls for the control station by determining flight and mission information requirements of the operators. It sounds like a mouthful, but it really means that we have developed a safe and effective method allowing an operator to control different types of UAS from a common interface which is, to our knowledge, the first time this has been done," stated Dr. Guy French, AFRL's HIVE Program Manager.

Chad Marshall, Research Aerospace Engineer, Aerospace Systems Directorate, AFRL added, "In our flight test in September, it was exciting to see that we could operate these three different Group 3 UAS at one time from a single system. With this capability, we can reduce personnel requirements and costs as well as improve consistent decision-making based on pre-programmed rules. All of which provides significant opportunities."

While there are many groups researching autonomy technologies trying to answer the question of how many UAS one operator can control or supervise, they have focused on the same type of UAS with the same operating system. Others have successfully flown-teams of UAS together, but each had a single operator, and all of them were trying to work in concert which requires an enormous amount of planning and continuous communication between operators resulting in tremendous inefficiencies.

According to Dennis Andersh, WSRI's Executive Director. "We are excited and proud to have been chosen to partner with the AFRL team on this effort. It will certainly improve operations for those doing the critical work of protecting our warfighters, but it will also attract the attention of the commercial sector. This is another great solution driven by AFRL, as they reach out to build new innovation pathways. Now we can work together to reach out see who else might be interested in working with us to develop specific capabilities for their platform."

About WSRI

As a non-profit research institute, Wright State Research Institute (WSRI) delivers high impact solutions for government, industry and human performance sponsors through research education and training. WSRI is a proud affiliate entity of Wright State University. Wright State offers an abundance of research opportunities at all academic levels. The University's research covers a broad spectrum of activity, from fundamental investigations into the physical, biological, and neurological sciences to translational research that directly impacts the quality of life in the Dayton region and beyond.