

## NASA Activity Update for the 2013 UVSI Yearbook

This year's report offers a high level perspective on some of the UAS related activities in which NASA is involved, both internal and external to the agency. Internally, NASA issued UAS operational policy on certification of NASA UAS and aircrew. A team of NASA UAS experts and operators analyzed all current procedures and best practices to design the policy. An update to the agencies Aircraft Operations Management Manual incorporated a new chapter to address UAS planning, preflight operations, flight operations, flight crew requirements, airworthiness and flight safety reviews. NASA UAS are classified into three categories based on weight and airspeed. Aircrews, including observers, are classified by how they interface with the UAS, and the policy defines qualifications, training, and currency. The NASA flight readiness approval process identifies risks and mitigations in order to reduce the likelihood and/or consequence of the risk to an acceptable level. The UAS operations process incorporates all aspects of airworthiness, flight standards and range safety – exactly the same processes used for NASA manned aircraft operations.

NASA has two internal organizations that routinely operate UAS. The Science Mission Directorate utilizes UAS as part of its Airborne Science Program and is the most frequent operator of NASA UAS in both national and international airspace. The Aeronautics Research Mission Directorate conducts UAS flight operations in addition to conducting research important to the UAS community. This past year the Science Mission Directorate supported the Hurricane and Severe Storm Sentinel (HS3) Mission with two NASA Global Hawk platforms. HS3 is a five-year mission specifically targeted to investigate the processes that underlie hurricane formation. During the 2012 portion of this mission the Global Hawk overflew hurricanes Leslie and Nadine in the Atlantic Ocean completing 6 flights and accumulating more than 148 flight hours.

Another multi-year mission was initiated last year when the Sensor Integrated Environmental Remote Research Aircraft (SIERRA) UAS began surveying faults in California's Surprise Valley. A team of scientists and engineers from the United States Geological Survey (USGS), NASA Ames Research Center, Central Washington University, and Carnegie Mellon University will measure magnetic fields using ground surveys and the SIERRA to map the geophysics below the surface of Surprise Valley. The data collected will be used to generate 3D maps of the geophysical data of the area.

The Aeronautics Mission Directorate continues its collaboration with Boeing to conduct UAS flight operations of the X-48C, a modified version of the X-48B originally built by Cranfield Aerospace, United Kingdom. The Aeronautics Mission Directorate utilizes vehicles of this size for a wide variety of research studies. Most of these operations are conducted within restricted airspace. The Aeronautics Research Mission Directorate also sponsors the UAS in the National Airspace System (NAS) Project, which is working in close cooperation with the Federal Aviation Administration (FAA) to address critical challenges associated with routine UAS operations in civil airspace. The project is focused on separation assurance and collision avoidance systems and algorithms, command and control for non-military operations including spectrum allocation requirements, human system interaction issues, and safety and certification topics. A more detailed discussion of the project and its objectives is contained in a separate article.

NASA also collaborates with the community at large on UAS issues through a variety of forums. NASA currently chairs the UAS Subcommittee of the Interagency Committee for Aviation Policy (ICAP). The ICAP was established to promote sound policy and foster the highest aviation standards across the various agencies of the U.S. government that own and operate aircraft.

As has been reported in the past, NASA continues to support the UAS Executive Committee. The UAS Executive committee was established by the U. S. Congress to enable increased and ultimately routine access of Federal UAS engaged in public operations.

In 2011 the FAA established an Advisory Rulemaking Committee (ARC) for Unmanned Aircraft Systems (UAS)

([http://www.faa.gov/regulations\\_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/121](http://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/121)). One of the more significant activities the UAS ARC has undertaken is the development of an implementation plan for the FAA's UAS Roadmap. The implementation plan will describe in more detail the activities necessary to achieve the intent of the FAA's Roadmap for safely integrating UAS into the NAS. NASA is participating as a member of the ARC and has provided subject matter expertise to the various working groups established by the ARC. In fact, there has been a close working relationship between the UAS ARC and the NASA UAS NAS Access project.

NASA has established an even closer working relationship with the RTCA Special Committee 203 (<http://www.rtca.org/comm/Committee.cfm?id=45>) whereby several of the deliverables from the UAS NAS Access project will feed directly into the SC-203's activities. RTCA SC-203 of course is working very closely with the ICAO UAS Study Group and similar efforts in Europe.

Finally, NASA is supporting UAS related activities undertaken by the Joint Planning and Development Office (JPDO). The JPDO was established as a multi-agency office to coordinate the various federal and private activities necessary to enable the Next Generation Air Transportation System in the United States. More recently, the JPDO has been charged with developing national goals for UAS integration, as well as a research and development plan for UAS.

NASA remains committed to continuing the development of UAS capability in support of its science missions, and the civil community for ultimately achieving routine access to airspace in a safe and efficient manner.