

## EXPLORATORY MINI-WORKSHOP

# ***USE OF UNMANNED AIRCRAFT SYSTEMS FOR ENVIRONMENTAL MONITORING***

### **BACKGROUND:**

Unmanned Aircraft Systems (UASs) entered the national consciousness with military operations in Southwest Asia following the attacks on September 11, 2001 and, in the decade that followed, UASs have become an important capability for both military and homeland security operations. UASs have also seen limited testing and research activity for environmental monitoring and have the potential to revolutionize our nation's ability to monitor and understand the environment from a localized area up to a global scale. A key information gap exists today between data from instruments on Earth's surface and data from satellites — UASs can bridge that gap. Operated autonomously or by remote pilots and ranging in wingspan from less than 6 feet to more than 115 feet, UASs can also collect data from dangerous or remote areas such as the arctic, the open oceans, in and around tropical cyclones, near erupting volcanoes, and over wildland fires. Better data and observations can improve scientific understanding and lead to better forecasts to save lives, property, and resources and aid several U.S. Government agencies in achieving their mission goals.

The Department of Defense operates a wide variety of UASs for operational intelligence, surveillance and reconnaissance missions but their use for environmental applications appears to be limited or not openly available. Similarly, the Department of Homeland Security's Customs and Border Protection and U.S. Coast Guard have been operating UASs for various missions but environmental data collection appears limited or not openly available.

In civil environmental applications, the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the Department of Energy (DOE) have been actively operating or preparing to operate UASs. NOAA collaborated with NASA to conduct a number of demonstration projects applying UASs for tropical cyclone reconnaissance, maritime monitoring for law enforcement in protected areas, and arctic monitoring, and NASA used the Ikhana UAS to monitor a wildland fire during an emergency situation in California earlier in the decade. The DOE is in the final stages of approval to operate a UAS overwater along the North Slope of Alaska for climate data collection. DOE is also currently working with NOAA to renew a Memorandum of Understanding (MOU) on UASs and is seeking other agencies to make use of their Alaska capability (via a proposal process) or to partner in other ways. Other Federal agencies with interests in UAS environmental monitoring capabilities include the U.S. Forest Service (USFS) and the U.S. Geological Survey (USGS).

Each year, the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) organizes and hosts the Interdepartmental Hurricane Conference (IHC) to review the nation's end-to-end tropical cyclone research, observing, forecasting, and warning program. The results of the 59<sup>th</sup> IHC in 2005 included an action item to develop a strategic plan for improved tropical cyclone reconnaissance systems, including manned, unmanned, and space-based systems, and this action item was subsequently incorporated as a task in the *Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead* in February 2007. UAS

applications in tropical cyclone observing have been expanding with NASA and NOAA tests and field programs and has demonstrated the potential to address the needs identified in the 59th IHC.

Although the preceding discussion has been meteorologically-focused, UAS and Autonomous Underwater Vehicle (AUV) operations with an ocean focus are also underway. Under the White House's National Science and Technology Council, the Committee for Environment, Natural Resources, and Sustainability has established the Subcommittee for Ocean Science and Technology (SOST, formerly the separate Joint Subcommittee on Ocean Science and Technology). Under the Subcommittee, the Interagency Working Group on Facilities and Infrastructure has established the Task Force on Unmanned Systems (TFUS). Chartered in January 2010, the TFUS advises, assists, and makes recommendations to the working group on policies, procedures, and plans related to unmanned system uses, upgrades, and investments. The OFCM joined the TFUS in 2010 to provide the interagency meteorological focus for the group. In 2011, the TFUS plans to develop a strategic plan for unmanned systems development and utilization for environmental monitoring and the OFCM, with information from its participating agencies and from this mini-workshop, will provide the meteorological input.

## **DISCUSSION**

Building on a history of interagency leadership in developing aerial weather reconnaissance capability and recognizing the emerging UAS capability for civil environmental monitoring, the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) has organized an exploratory mini-workshop. Now is the time to open an interagency dialogue to share information, identify opportunities to collaborate, and assess potential to improve the nation's return on investment in this area. The OFCM has successfully used the mini-workshop approach in the recent past to address hydrometeorology needs and priorities, potential science and technology skill shortfalls, and the integration of social sciences into meteorological operations and services. These mini-workshops serve as models for this effort.

The Exploratory Mini-Workshop on the Use of Unmanned Aircraft Systems will be held on February 4, 2011, at the OFCM conference room in Silver Spring, MD. The workshop will consist of three primary sessions addressing the following environmental monitoring topics: UAS applications for environmental research and monitoring; challenges to the development and use of UASs; and interagency coordination and strategic planning for the use of UASs. The complete agenda will be provided separately.

## **OBJECTIVES:**

The objectives of the mini-workshop are to:

- Share information among active and interested agencies
- Identify opportunities to collaborate and leverage activities
- Identify roadblocks to success and identify potential courses of action to eliminate or mitigate them
- Identify community direction and support for next steps