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Enhancing UAS-based Earth Science Through Coordinated Facility Support

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Uncrewed Aircraft Systems (UAS) represent an evolving and important set of tools for earth science and engineering. While low-cost uncrewed aircraft systems (UAS) can be acquired and operated by individual researchers for simple surveying or photography, very high-resolution observations using advanced sensors are often out of reach for most researchers. Over the past 5 years, U.S. National Science Foundation (NSF)-supported facilities have developed specialized UAS and UAS sensor capacity; however, this has largely been done independently and at very modest levels of support. Nevertheless, there has been growing success in supporting NSF and other federal researchers' needs in the areas of topographic mapping, geothermal imaging, wildlife inventories, post-disaster monitoring and critical zone observations.

To help make UAS resources more widely available, five NSF-supported Earth science facilities (NCALM, the GAGE Facility operated by the EarthScope Consortium, NHERI-RAPID, OpenTopography, and CTEMPs) have joined together to create the UAS Federation (UASFederation.org). Each of these facilities have supported UAS activities in the past, but they were generally small components of each facility, and often not well advertised or subscribed. Through formal coordination and a common portal, this new federation effort will enable Earth science researchers to access a much broader suite of sensors, aircraft, FAIR data archiving resources, and expertise.

The UAS Federation currently manages over 35 aircraft (6 heavy lift airframes, 7 medium lift, and at least 23 light duty airframes) along with remote-sensing systems that collect a broad range of data, including lidar; airborne magnetics; hyperspectral, multispectral, and thermal images, and albedo. Numerous cameras with RGB capacity are also available. In addition, we can provide access to software and over 140 archived UAS data sets. In the future, the UAS Federation will be developing and distributing training and instruction support.