## PREPARATIONS FOR A NEW "GEOSPATIAL UNMANNED AIRCRAFT SYSTEMS (UAS)" COURSE

Unmanned aircraft system (UAS) technology is changing society, and innovation in the remote sensing and geospatial educational environment is critical to facilitate development of and training in UAS applications that benefit Arkansans. With encouragement from within AmericaView, and in collaboration with Drs. Fred Limp and Jack Cothren (and with University-wide support from Drs. Jim Rankin and Rich Ham), Dr. Jason Tullis prepared equipment and materials and initiated the purchasing process necessary to lead the first UAS-based course at University of Arkansas beginning in Fall 2016.

Dr. Tullis worked to implement the vision for a UAS course proposed by Dr. Fred Limp (captured at https://goo.gl/Klt0Dx). Using a University of Arkansas teaching investment (approximately $30K), he coordinated acquisition/inventory of seven small UAS from 3D Robotics (Solo and IRIS+), gimbals, and sensors (GoPro, Parrot Sequoia multispectral, and FLIR Tau 2 thermal). He further initiated the process to order and assemble a quad-processor (32-core) rack-mounted geoprocessing server, and to configure Pix4DMapper Pro software to complement a prior installation of Agisoft PhotoScan Pro.

Scoping out potential flight locations in January 2016 for students in Geospatial Unmanned Aircraft Systems (UAS) class to be launched in Fall 2016 at University of Arkansas.
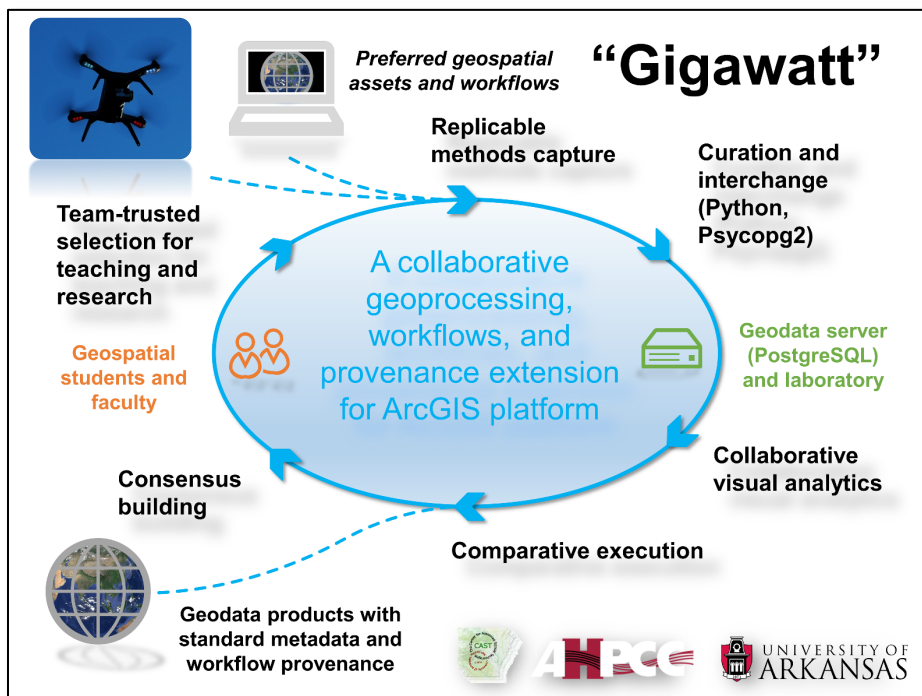
The concept of Gigawatt (moniker for geoprocessing and workflows or GW), prototyped in early 2016 at CAST, is that UAS and other remote sensing-based workflows should be immediately replicable between collaborators in order to accelerate learning and discovery.

Finally, Dr. Tullis developed procedures for leveraging Gigawatt, a recently prototyped collaborative geoprocessing tool developed at the Center for Advanced Spatial Technologies (CAST), for the UAS classroom environment (including multi-user mission planning and collaboration).

The end product was a cache of UAS equipment, computer hardware and software materials underway, and innovative geospatial laboratory design sufficient to allow "Geospatial Unmanned Aircraft Systems (UAS)" to go forward for approximately 16 students in Fall 2016. This effort generated significant interest (with many students hearing about the upcoming course by word of mouth only and requesting registration in advance).

The tremendous amount of excitement about these preparations was clearly evident, and reflected an immediate positive impact of AmericaView-sponsored remote sensing and geospatial work underway within Arkansas.

ArkansasView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state.

BENEFITS TO ARKANSAS

While universities in Arkansas have been involved in various UAS activities over the last few years (e.g., CAST has utilized these platforms internationally in archaeological site surveys), training-program development has lagged behind progress in some other states. FAA restrictions on higher educational UAS activities were only one factor, with the sheer logistics involved in course development a significant component. The timing was therefore very good for ArkansasView to provide leadership in this area. The following are key benefits from the 2015-2016 efforts:

- Developed a cache of University of Arkansas sponsored UAS-specific hardware and software available for graduate and undergraduate students in multiple University of Arkansas classes.
- Increased awareness of practical, logistical, and legal details needed for students to participate in UAS field and laboratory activities.
- Significantly contributed to a preliminary network of UAS-interested parties at University of Arkansas, including the Vice Provost for Research and Economic Development, the Vice Chancellor for Government Relations, a commercial pilot with experience in government regulation, and both academic and technical leadership from CAST.
- Leveraged innovative geospatial laboratory techniques to enable efficiently replicable UAS-based workflows in both educational and research environments

Potential public (U.S. Forest Service) land for educational UAS activities (top), a nearby gate inviting non-motorized access (lower left, Jan 2016), and 3D Robotics (3DR) Solo and IRIS+ platforms readied for deployment (lower middle and right). ArkansasView funds enabled preparations for the first higher education UAS class in Arkansas.

ARKANSASVIEW CONSORTIUM MEMBERSHIP


ArkansasView activities are led by Dr. Jason Tullis and Dr. Mohamed Aly from the Center for Advanced Spatial Technologies (CAST) at University of Arkansas. The Center is under the direction of Dr. Jack Cothren. Dr. Lu Liang from University of Arkansas at Monticello also contributes vital remote sensing leadership and expertise to ArkansasView. Since 2002, a number of organizations and individuals have contributed directly to realizing ArkansasView goals and initiatives. For example, the Arkansas GIS Office provides access to statewide remotely sensed data, the EAST Initiative trains high school students in remote sensing techniques, and Communities Unlimited trains remote sensing students in applications that benefit underbuilt communities in Arkansas and six other states.

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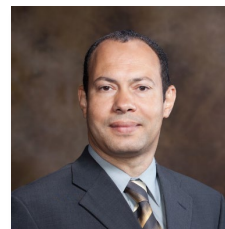
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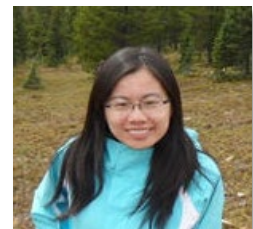
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