

Final Report for Project FA288: Unmanned Aerial Systems (UAS) Technologies

Project scope:

“Coordinate a community of interest related to disseminating technical information about unmanned aerial systems with Reclamation to reduce costs, add technical capacity, and enhance safety.”

Project Background

This project was adopted from Doug Clark (86-68260) upon his retirement from Reclamation. Doug proposed this three-year project as a way to help facilitate introducing UAS technical information and capabilities throughout Reclamation. FY 2017, the third and final year of the funding agreement, served as a transition year for migrating from a community of interest focus, to a focus on practical implementation of the technology in order to expand the technical capacity of Reclamation as a whole.

FY 2017 Activities Supported by FA288

Information dissemination:

- In order to share news related to developing UAS technologies, status of authorization for use of UAS, and facilitate UAS-related discussions amongst interested parties, periodic email bulletins were sent out to the Reclamation UAS Community of Interest email listserv. The listserv consisted of 124 individuals dispersed throughout all levels and areas of Reclamation.
- Creation and maintenance of online repository for members of the Technical Service Center (TSC) UAS team to house and share information related to UAS meetings, platforms and equipment, regulations and guidance, projects, safety, and training.
- Meetings with key people related to implementation of UAS capability within the Bureau. Internal meetings including senior Reclamation management (TSC, SSLE, and the S&T Office), the national and regional aviation managers, and pilots and subject matter experts within Reclamation’s PN Region. Outside coordination included the USGS National UAS Systems Project Office, the BLM National Operations Center, and the DOI Office of Aviation Services.

Training and Certification:

- Practical training for, and acquisition of, Federal Aviation Administration required Remote Pilot Certification.
- DOI instructor-led training for *Small UAS Remote Pilot / Operator* qualification course and certification.
- BLM instructor-led course in use of PhotoScan software for creating photogrammetric products from UAS acquired remote sensing data.

Conference attendance:

- The ASCE Congress on Technical Advancement is a consortium of civil engineers tasked with identifying and addressing technical needs within the civil engineering discipline. Matthew Klein (Concrete, Geotechnical, & Structural Laboratory, 86-68530) traveled to the forum location and

shared an overview of Reclamation's applications and needs with respect to UAS and how ASCE can collaborate and help solve some of the issues faced with using UAS for data collection. He talked generally about Reclamation's usage of UAS and specific projects where UAS technologies were implemented. He also spoke about the challenges that Reclamation faces including close-range, high-resolution navigation, complex geometrical flight planning, and vertical surface surveying. This outreach helps to activate a larger base of experts who have similar challenges and can help to provide Reclamation with solutions to adapting UAS to Reclamation's specific needs.

- Jakeb Prickett attended the Federal UAS Users Workshop, joining several other Reclamation colleagues at the NASA Ames Research Center based event. UAS users from across the spectrum of Federal Government were in attendance. The agenda included scientific presentations, networking, practical UAS and software demonstrations, and discussions on policy, best practices, and safety.

Equipment review and acquisition:

- Research related to sensor capabilities and applications. Based on this research, several sensors were chosen from the DOI Office of Aviation Services approved list of payload equipment, including: GoPro Hero 4 Black camera, Ricoh GR II camera, MicaSense Sequoia multispectral sensor, and FLIR Vue Pro thermal sensor.
- Research of approved UAS platforms, resulting in decision support for acquisition of four 3DR Solo quad-copter vertical takeoff systems.



Reclamation and DOI personnel attending the DOI instructor-led Small UAS Remote Pilot / Operator qualification course in Denver, CO.



Inaugural flight of TSC's first UAS airframe (3DR Solo with GoPro camera and 3-axis gimbal), Denver, CO.

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