UAV Remote Sensing Service Center

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Partners/Collaborators:  
Various end-users in Utah

Project Description

- Need and Purpose:
  
  Many current sources of remote sensing data (e.g. manned aircraft and satellite platforms) are too expensive, have low spatial resolution, or don’t update frequently enough to be practical for many applications. A low-cost, small unmanned aerial vehicle (UAV) called AggieAir™ can fill this need by providing inexpensive, multispectral aerial imagery quickly and frequently. In addition, AggieAir’s independence from a runway for takeoff and landing enables it to be launched from almost anywhere. AggieAir can benefit applications such as agriculture, riparian habitat mapping, road and highway surface monitoring, wetland mapping, fish and wildlife tracking, and many others.

  Developed over the last several years, AggieAir has become stable and robust. Therefore, using AggieAir on a regular basis to provide aerial images and remote sensing data could benefit many of these applications. The money generated from these applications could help fund continued AggieAir development and research. A service center has been established to handle the operational and maintenance needs so the research can continue to progress undeterred. The service center is also a good source of feedback to help steer AggieAir research and development in the right direction.

- Benefits to the State:

  The data provided from the service center has the potential to help Utah save water and manage environmental resources more efficiently. The service center can help save water by offering farmers a low-cost solution for mapping the soil moisture of their crops in order to irrigate more efficiently. Furthermore, this data can also help canal operators and individual irrigators manage water diversions more effectively. The service center can also map roads and highways to monitor the quality of the asphalt and to update the road inventory (e.g. number of lanes, signs, culvert crossings, etc.). Roads can also be surveyed before, during, and after construction by the service center UAVs. Currently this is only done before construction. Wetlands managers can now obtain current data on the distribution of plant species and monitor the success of management practices to control invasive plants. Resources managers who are worried about monitoring and managing water quality can now obtain accurate, high resolution thermal images showing temperature distributions all along a stream or river.

  The service center will indirectly provide new jobs and economic growth to the state of Utah. Long term, the service center will be the first step toward a new business that will be based around the AggieAir UAV platform. The service center will allow us to test the waters, as well as gain experience to learn what would be required to make this happen.

- Geographic Areas:

  Study Area:  State-wide.

  Areas Benefited:  State-wide.
Accomplishments:

Findings/Results: The funds from this project have developed and fully equipped a service center at the Utah Water Research Laboratory called AggieAir Flying Circus (AAFC) (see http://AggieAir.usu.edu). As planned, the AAFC uses AggieAir UAV platforms and sensors on a regular basis to provide aerial images for applications that benefit from remote sensing data. The images below display some of the maps generated by the AAFC and the analysis of the imagery to address water management problems in a variety of applications.

The AggieAir service center completed manuals to train customers who have purchased the UAVs from USU. Aircraft have been sold to organizations that wish to use AggieAir for their own remote sensing purposes, and licensing agreements are in place with private companies in Utah to manufacture AggieAir aircraft and avionics. AggieAir technology sales were made this year to research groups at UC Merced, Texas State University, and Oklahoma State University. Additional field crews have been trained to fly the UAVs and process the imagery they collect.

In the past year, the AggieAir Flying Circus has provided support to research contracts in several states, with a very large number of flights conducted on a wide array of resources management problems in Utah. The AAFC is currently engaged in research projects to improve irrigation and nutrient management for center pivot irrigators in Scipio and to quantify salt that flows into the Green River from the Price River Basin, as well as a large number of other similar projects. The AAFC is also been engaged in projects in water and natural resources management in Cache Valley for the City of Logan and in numerous other applications around the State.

The AAFC obtained two Certificates of Authorization (COA) from the US Federal Aviation Authority (FAA) in the past year that certify the AggieAir platform is airworthy and authorize its use subject to FAA rules. A license was signed between USU and a private company in Utah to manufacture the aircraft, and negotiations are now underway to create a spinoff company that will market AggieAir equipment and services. New payloads are in development that will include a wider array of sensors, and a new airframe is being designed that will provide much better capability in the field.

Work Plan FY14/FY15

Expand the AAFC business base through acquisition of more research contracts, develop and license a spinoff company to market AggieAir technology (both aircraft and downstream services), and complete the development and deployment of new aircraft and payloads.

Informational Resources

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