Educational projects in unmanned aerial systems at the NASA Ames Research Center

Unmanned aerial systems (UAS), autonomy and robotics technology have been fertile ground for developing a wide variety of interdisciplinary student learning opportunities. In this talk several projects will be described that leverage small fixed-wing UAS that have been modified to carry science payloads. These aircraft provide a unique hands-on experience for a wide range of students from college juniors to graduate students pursuing degrees in electrical engineering, aeronautical engineering, mechanical engineering, applied mathematics, physics, structural engineering and other majors. By combining rapid prototyping, design reuse and open-source philosophies, a sustainable educational program has been organized structured as full-time internships during the summer, part-time internships during the school year, short details for military cadets, and paid positions. As part of this program, every summer one or more UAS is developed from concept through design, build and test phases using the tools and facilities at the NASA Ames Research Center, ultimately obtaining statements of airworthiness and flight release from the Agency before test flights are performed. In 2016 and 2017 student projects focused on the theme of 3D printed modular airframes that may be optimized for a given mission and payload. Now in its fifth year this program has served over 35 students, and has provided a rich learning experience as they learn to rapidly develop new aircraft concepts in a highly regulated environment, on systems that will support principal investigators at university, NASA, and other US federal agencies.

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