NTHU Students Won ASME’s Unmanned Aerial Vehicle (UAV) Competition

Congratulations go to National Tsing Hua University power mechanical engineering students Shao Wei Yeh, Xian Ting Zhang, Zhen Kai Wu, and Chia Hao Wu, who formed team “DIT Robotics” to enter and win the American Society of Mechanical Engineers’ (ASME) student design competition. The NTHU team’s “Four Winged Aerial Robot” entry beat out Feng Chia University’s “White Dolphin” entry to gain the championship for the Taiwan region, winning fifty thousand NTD in prize money. DIT Robotics will be travelling to Canada in November to participate in the finals.

The Taiwan region ASME student design competition finals commenced on March 9th at the National Applied Research Laboratories Instrument Technology Research Center. The winners of the Taiwan region would advance directly to the finals of the ASME global competition. In this year’s competition, entries were challenged to do the following: design a small UAV to carry a cargo through two gates, drop a payload and safely return to the starting point. Additional points were awarded the longer it flew and the heavier the UAV was.

Although Team DIT Robotics “Four Winged Aerial Robot” initial flight wasn’t as adequate as the “White Dolphin’s,” the 2kg weight of the “Four Winged Aerial Robot,” a weight roughly four times the “White Dolphin”, became the deciding factor for the win. According to Shao Wei Yeh, development of the “Four Winged Aerial Robot,” the fourth generation of its kind, started in June of 2013. The four wings of the UAV reach balance by counteracting its clockwise and counter-clockwise engines. The control of the UAV is made possible by controlling the specific lift power of the many smaller engines inside the robot. The team applied many high level control theories to the robot, including robust control theory and the PID controller mechanism. The team sacrificed optimal control for the UAV’s weight, a decision that led to their win.

Multi-rotor UAVs may be a significant real life application in the future, with Amazon leading the way by proposing multi-rotor UAVs as a tool for delivery. Others have proposed the
application of multi-rotor UAVs for search and rescue operations, theorizing that the stability and payload weight of the multi-rotor UAV could potentially carry people out of hazardous conditions. However, due to high power consumption, the flight time of the multi-rotor UAV has always been limited, which is one of the main reasons why there haven’t been any ground-breaking real life applications as of yet. Team DIT Robotics plan on pushing multi-rotor UAVs to be a document delivery robot within Tsing Hau campus, continuously researching and improving the stability of the UAV.

DIT Robotics encourages their members to propose their own projects: Shao Wei Yeh points out that four members of DIT Robotic’s sixteen members joined together to develop the “Four Winged Aerial Robot.” The idea to develop a multi-rotor UAV sprouted from the four’s common passion and goal, in an effort to challenge themselves and to create something unique and applicable to the real world.

At its root, DIT Robotics embodies the yearning to realize the many abstract engineering designs their members have. In an effort to dispel Taiwan’s global image of “Made In Taiwan,” the “DIT” in DIT Robotics stands for “Design In Taiwan.” Simultaneously, DIT also stands for “Do Improve Try”, which is the group’s motto: to constantly challenge, improve, and develop. DIT Robotics is currently preparing for the fully-automatic EUROBOT competition in Dresden, Germany, hoping to win and to use the event as a platform to hone their ability to solve, develop, implement, and build.
DIT Robotics wins ASME Taiwan Region Championship

Ready for the Competition

The fourth generation “Four-Wing Aerial Robot”