Unmanned aircraft system

Case Study

Founded in 1826, UCL (University College London) is London's leading multidisciplinary university, made up of 13,000 staff and 38,000 students from 150 different countries. The department of Mechanical Engineering is regarded as one of the best in the country; testing students knowledge and work-based skills with real-life challenges.

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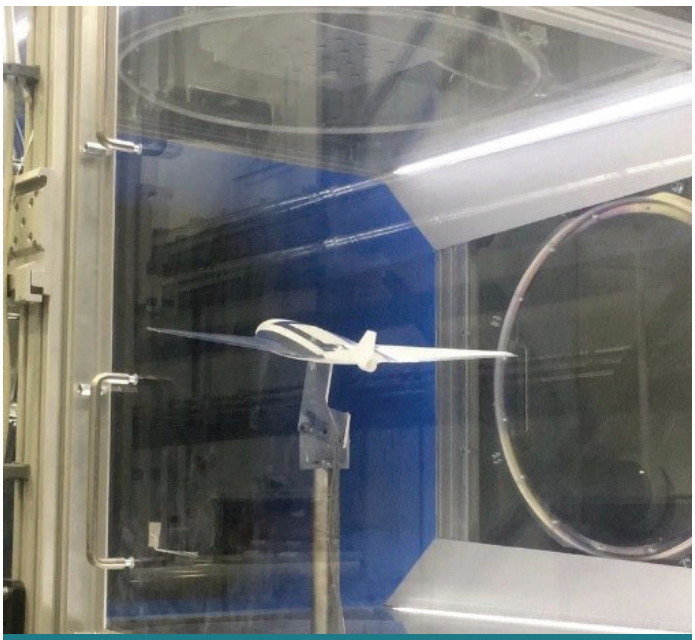
When fourth-year students at UCL entered the Unmanned Aircraft Systems Challenge – an international competition run by the prestigious Institute of Mechanical Engineers – the team reached out to Ogle Models to provide a complex yet cost-effective solution.

The challenge

Students at UCL were tasked to design, manufacture and operate an unmanned aircraft which was set to complete a range of tasks simulating a humanitarian mission. The focus of the competition was innovative design. Students met the brief with a tail-less, blended-wing body aircraft, which was to be made as a monocoque from carbon-fibre reinforced polymer. Creating a model to withstand the required wind tunnel testing is often expensive, especially if the part required pressure taps to sample the distribution of air across the model.



The solution

The team approached Ogle as they had been recommended by the UCL Formula Student team. Following a briefing, Ogle recommended using Stereolithography (SLA), which would allow for the pressure taps to be built within the model; reducing costs and the complexity usually required.

The accuracy of industrial SLA ensured that the complex geometry of the scaled-down aerodynamic surfaces was replicated with precision. For display purposes, the team chose ClearVue resin, which allowed the pressure tapping pathways to be seen on the finished model.

Conclusion

Ogle are passionate about investing in and supporting the next generation of engineering talent. Having supported teams in the Formula Student event previously, they were keen to obtain feedback. Sam Hiscox, team leader for the project, said: "Following the wind tunnel testing, the results converged across a range of angles of attack and yaw positions. Pressure plots taken from the taps validated the aerodynamic properties of the design, which would not have been possible without Ogle's expertise.

"With the CFD simulations validated, the team received their design report, for innovative use of materials and manufacturing techniques in creating a wind tunnel model.

"Ogle's support of university projects is indicative of their forward-thinking outlook and investment in the people of the future."