

# 'High flier' at unmanned airplane contest

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MR JOSHUA Chao, 25, is plane crazy.

When he was in national service (NS), he applied to join the Republic of Singapore Air Force as a pilot, but failed to make the cut.

So after his NS, he went to study aerospace engineering at the Nanyang Technological University (NTU) to learn about flying machines.

He had always been designing and building pilotless surveillance planes. With a team of NTU students he assembled, he came up with a prototype for an Unmanned Aerial Vehicle (UAV) he named Extractor X.

He entered this in UAVForge Challenge, an international compe-

tition organised by United States defence research outfit Defence Advanced Research Projects Agency and the Space and Naval Warfare Systems Centre.

The plane has been placed sixth, beating a field of 140 unmanned aircraft – including those designed by the Massachusetts Institute of Technology and defence contractors.

Weighing all of 1.5kg and GPS-enabled, the battery-powered craft stays aloft for half an hour and can pick up ground targets.

The plane's edge over the top nine teams was that it was made the most cheaply – with just US\$2,081 (S\$2,590) worth of parts.

It was also the only entry in the competition that could be convert-

ed from a rotary-wing aircraft into a fixed-wing plane.

But Mr Chao is not just a geek who won an international airplane-design competition.

Up until recently, the newly minted NTU graduate owned a company specialising in producing UAVs.

The elder of two sons of an electrical engineering lecturer had already worked on up to 40 UAVs in two years.

"I want my work to have real applications and to sell in the market," he said.

He has since sold his shares in the company to take up a day job with DSO National Laboratories. He starts this month, specialising in unmanned systems.

It is a job that will put him in touch with more experienced



(From left) Mr Jasper Sim, Ms Eunice Lim and Mr Joshua Chao worked together to create the Extractor X that took sixth place in a UAV competition held in the US. The plane weighs 1.5kg and costs just \$2,590. ST PHOTO: DESMOND WEE

people in the field, he said.

Recalling his experience building the Extractor X, Mr Chao said he had built a 3kg UAV as a final-year school project.

But it could be entered in the competition only if it fulfilled size and weight criteria, so, with his team, he reduced its wingspan

and halved its weight.

And while some teams in the competition worked on their "babies" for as long as four years, his team had all of seven months to meet the competition's deadline.

"I wasn't sure if we could get into the finals, but there was nothing to lose," he said.

He and the team missed meals and lost sleep working on it – and he was in the middle of his final-year examinations at that.

His 25-year-old girlfriend Eunice Lim, now a teacher, put her design and media training into use by producing the team's presentation video.

Team member Jasper Sim, 23, a second-year aerospace engineering undergraduate, said: "I learnt a lot more than from textbooks and saw how engineering applies in the real world."

Mr Chao may not be donning a pilot's G-suit for a day at the office, but he said that he is happy to be able to create the next-generation unmanned fighter jet, which could well make pilots obsolete.

He said: "Humans have limitations. Pilots cannot take the kind of pressure or risks that these flying robots can."

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