

Manufacturing Safe Drones

Drones, RPAS, UAVs... Whatever you call them, they are a growing technology that many Kiwi companies are embracing for myriad tasks. *Vector* chatted with two of the manufacturers in New Zealand to find out how they aim for the highest safety standards.

Queenstown-based company, Shotover, had been producing fittings for helicopter filming, when it identified a market for specialist filming drones.

"We have pilots and engineers in our team as well as filmmakers," says Brad Hurdell, Shotover's General Manager, and a former aircraft technician in the Royal New Zealand Air Force.

"We therefore know what customers want from a filming point of view, but also what will work from an aviation point of view.

"As aviators, we understand the importance of safety and it's at the forefront of what we plan with our products."

Some of the safety features included in the U1, Shotover's first drone, are a parachute, dual battery systems, and an innovative motor system.

"We have eight motors, but they are in pairs, so look like four, and have counter-rotating coaxial shafts," says Brad. "Having multiple motors allows the craft to continue to operate if a couple of engines fail."

Linda Bulk from Raglan-based Aeronavics echoes Shotover's commitment to safety.

"It starts with the airframe," says Linda. "Everything has to be the best quality – we use aircraft-grade aluminium, industrial composites, and high-quality carbon fibre.

"The propulsion systems need to be high-quality and smooth. We check that the parts manufacturers we work with have excellent ratings and that every part we use is reliable and well-tested."

Aeronavics' co-founder, Rob Brouwer, is a former commercial pilot, and Linda says that this helps bring aviation safety to the forefront of the business.

"I think it's very much in the blood of aircraft pilots to be aware of safety.

"And we're looking at this technology in the same way – manufacturing procedures need to be highly conscious of safety."

For Aeronavics, this safety culture isn't limited to just the manufacturing side. When they're testing their craft, they also ensure the highest safety standards are met.

"If we're testing an aircraft, which we do on one side of the building, a flashing light indicates to others not to approach the area where it's flying and the controllers are in a protective cage. Only well-tested aircraft are

demonstrated to clients, and pre- and post-flight checks are always carried out."

The fully stabilised mode means that if the controller gets confused or lost, the drone will just hover while it isn't receiving any inputs, until the problem is solved.

"If something goes wrong, or your batteries are low, you get an alert. If you ignore the alert, it will eventually come back and land.

"If there's a loss of signal with the controls, it will also automatically come back to where it was launched and land," says Linda.





Aeronavics' SkyJibX4 flying beside a wind turbine.

Both Aeronavics and Shotover drones have multiple motors, and will still fly if they lose a motor or two.

Parachutes are also fitted to slow them down if they should ever plummet.

Both companies have worked closely with the CAA. Shotover has been authorised to manufacture and alter aircraft under 25 kilograms, and Aeronavics is in the process to do the same. Previously, only Model Flying New Zealand was allowed to do that.

"We want to set high standards that are fit for purpose," says Linda, "and that's why working with the CAA has been so beneficial. We think we are fortunate to have a regulator so willing to be involved in this field."



Mark Houston, CAA's Senior Technical Specialist, Unmanned Aircraft and Recreational Aviation, says it's great to see manufacturers taking such an interest in aviation safety.

"Shotover and Aeronavics are two great examples of Kiwi companies leading the world. They, along with other Kiwi designers and manufacturers, are highly innovative and able to carry out many different tasks and applications.

"It shows the positive strength of a rapidly expanding industry moving beyond recreational drones;

Shotover's U1 model. Photo courtesy of Shotover.



The coaxial propulsion arrangement on the SkyJibX4.

demonstrating just what benefits are available through pasture management, food production, ecological management, and resource development."

Brad Hurdell adds, "One of the hardest things for people in this industry, is that it is all so new, and rules and regulations are still catching up to this fast-changing industry.

"Our thoughts are that if we take a proper aircraft engineering approach to this, and do full analysis and reliability testing, then we will exceed any new regulations when they're in place."

Safety is at the forefront for these manufacturers – not only because a safer drone is more reliable for their customers – but because they understand the risks of operating above people and property.

"Having a background in aviation, we know the risks," says Brad. "You can't just pull over to the side of the road and wait for help if something goes wrong. It's potentially a life and death situation."

And that's probably the lesson here. Shotover and Aeronavics take safety seriously – all aviation participants need to.

"You need to be constantly thinking about the environment your drone is flying in and what you're going to do if something goes wrong," says Mark Houston. "Where can it land? Is it still in your line of vision?"

"It all comes back to good airmanship. A drone is an aircraft and the same skills apply – knowledge of the aircraft, environment, and the risk."

For more information on drones, see the CAA web site. ■

www.caa.govt.nz/rpas