

The miniature V-22 of UASs from Australia

Philip Smart | Adelaide

Australian commercial pilot and inventor Rowan Watkins isn't the first to envisage an aircraft with a wing that rotates like a helicopter rotor for vertical landing and take-off, and locks to become a fixed wing for faster forward flight.

But he may just be the first to have cracked the issue's greatest single conundrum – the transition between the two modes.



Watkins is the inventor of the **Stoprotor Unmanned Aerial System**, which seeks to combine the best of helicopter and fixed wing aircraft performance.

The issue has always been the rotor disc. In forward flight, the helicopter has always been held back, quite literally, by the speed-limiting aerodynamics of lift-generating rotating blades, where high forward speed creates issues between the lift generated by the advancing and retreating blades.

This has effectively put a practical cap

on how fast a helicopter could fly.

The same aerodynamic issues have complicated the process of starting and stopping the blades when transitioning to and from fixed wing flight.

But Watkins believes he has found the answer.

On the Stoprotor UAV, transition between rotating and fixed wing is given a helping hand by momentarily flying the aircraft in a steep nose-up or "high alpha" attitude, which changes the airflow from one travelling along the aircraft to essentially one moving from below to above.

This puts the airflow at more useful angle to the rotor blades, allowing transition from fixed to rotating and vice versa before the aircraft then assumes normal fixed or rotary winged flight.

Watkins conducted the first such transition with a scale model UAV in 2013 and has been refining the procedure and flight management systems ever since.

With this innovation, a Stoprotor UAV could operate as easily from a runway or a ship deck without needing UAV recovery infrastructure.

It could launch vertically, transit to its surveillance area at higher speed as a fixed wing aircraft, then revert to rotary wing flight for data gathering if needed.

Stoprotor sees opportunities in a myriad of applications from target acquisition to decoy work, law enforcement and disaster management and mining surveys. It has a patent pending on the technology.

Others see the value too.

In July 2014 Stoprotor was awarded an **Australian Government Department of Industry development grant** which provides both funding and access to business advisers providing objective and expert guidance, and was invited to present as part of the **Innovation Showcase** at the **2015 Australian International Airshow**.

The company is now working with the **Defence Science Institute** based in Melbourne to determine how the technology may be commercialised.