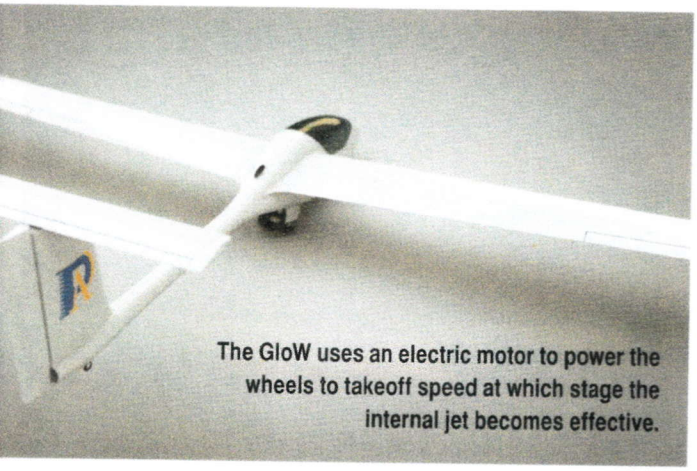
ProAirsport GloW

Small jet engines have unexpectedly found a natural home in powering gliders as a 'get me home' sustainer engine.



The GloW uses an electric motor to power the wheels to takeoff speed at which stage the internal jet becomes effective.

IT would be great if the jet engine could be used to actually launch the glider but so far this has proved impractical as the static thrust of these jet engines is too low to launch a glider from a standing start. This problem of how to get things going has been solved by ProAirsport's innovative jet-powered SSDR self-launcher.

Glider pilot Dave Unwin says, "What I really need is a sailplane that I can rig by myself, and then safely self-launch from a 500-metre grass strip. I've never been a fan of the engine-on-a-stick configuration, while the jet-powered self-sustainers just don't have enough thrust to self-launch and motor gliders are almost universally gutlessly underpowered.

"Consequently, when I heard that ProAirsport was proposing a new type of self-launching SSDR sailplane, powered by a lightweight turbojet my initial reaction was one of scepticism. But then Roger Hurley, ProAirsport's CEO revealed that 'Project GloW' was a hybrid, and that the wheels would be driven by a powerful electric motor. Instantly my initial scepticism turned to enthusiasm."

Designed to meet the requirements of the new UK Single Seat Deregulated (SSDR) class and the US Light Sport category, GloW will have a MAUW of 300 kg and an empty weight of about 180 kg, leaving a payload of 120 kg.

The location of the Titan jet engine is particularly interesting as it is fixed internally behind the cockpit and features an automatic open/close intake scoop. This very neat little turbojet is less 40 cm long and weighs an astonishing 3.7 kg, yet produces a creditable 390 N. This should be enough to produce reasonable climb rates of around 50 kts, while the 34 litre fuel tank should be good for several further climbs. It is expected that a takeoff and climb to 3,000 ft will burn about eight litres of fuel. The cost of a relatively high go-where-you-want launch will still be less than the average winch launch, and a lot less than the average aerotow! In the cruise, fuel flow is predicted to drop as low as half a litre a minute.

GloW's most unconventional aspect is the undercarriage. This consists of four wheels of three different sizes mounted along the fuselage centreline.

There's a small steerable pneumatic nosewheel, a tiny solid urethane wheel (more of a 'tail bumper' really) at the very tip of the tail and dual retractable mainwheels, so the aircraft sits upright wings-level. And this is where GloW gets really interesting, as these wheels are driven by a powerful electric motor.

Modern electric motors put out a lot of torque and this can produce incredible rates of acceleration. Using the powerful electric motor to accelerate GloW up to take-off speed is the design's 'secret sauce'. For take-off, GloW can be wings-level taxied, even reversed into position, with the motor also acting in place of mechanical brakes (further advantages of electrically driven wheels) before starting the jet and setting full power. With a peak output of 7 kW and clever gearing the wheels will easily and quickly accelerate the aircraft to the safe speed above which it will fly, then a smooth rotation will ease it into the air and it will climb away using the thrust of the jet. As the electric energy required for take-off is wanted for only a few seconds (the acceleration really should be outstanding, in fact wheel spin could be an issue if power is applied too quickly) then take-offs from farm strips should be an option.