

Aero 2011 A Glimpse into the Future of Powered Flight

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This year at Friederichtshaven, there was an unmistakable trend towards electric power plants. Sure, the two stroke motor still reigns supreme for self-launch climb rates and duration, for now. Development seems to be reaching a plateau though, and basically installations and systems are now just being refined. The most important change is the exchange of the toothed belt for multiple V belts. Toothed belts result in a very tight coupling between the piston engine and the whirling propeller a meter above and torsional oscillation is hard to control. The multiple V belts exhibit up to 3% slip and this helps a lot with vibration reduction, without significant wear.



Early-type 40KW electric power plant



New V-belt drive

Antares led the way with electric self-launching about a decade ago, but the concept caught on very slowly. The glider was heavy and expensive. Then in 2005, a Slovenian converted an Apis to electric self-launch, with excellent performance. Since then Slovenians have been leading the pack in large brushless motor and controller development. Those flying electric RC models will recognize the similarity.



Simple new pylon design

At Aero 2011, main line glider manufacturers had more or less bought off-the-shelf electric motors, controllers and battery packs. They presented some very elegant, simple self-launch or sustainer installations, all from the same Slovenian supplier. No more belt drives – just 12kg direct drive motors about the size of a 200mm cake tin on the top of a light-weight pylon. Batteries are now in the fuselage, around the C of G, just three of them, each about the size of a small shoe box.

The DC to 3-phase AC controller is mounted next to them.

Compared to electric flight, two stroke power plants are horribly inefficient (less than 50%), complicated, smelly, noisy and rough running. New brushless motors rated up 60kW for takeoff have an efficiency of over 90%, and the controllers up to 99%. As the power outputs

increase, water cooling is appearing. The only limitation is battery capacity and recharging time. Huge strides have been made in the last few years. The wing is no longer super heavy due to all the batteries, and we have the automotive industry providing the driving force in battery development. Any electric powered gliders today will probably have massive battery upgrades during their lifetime.

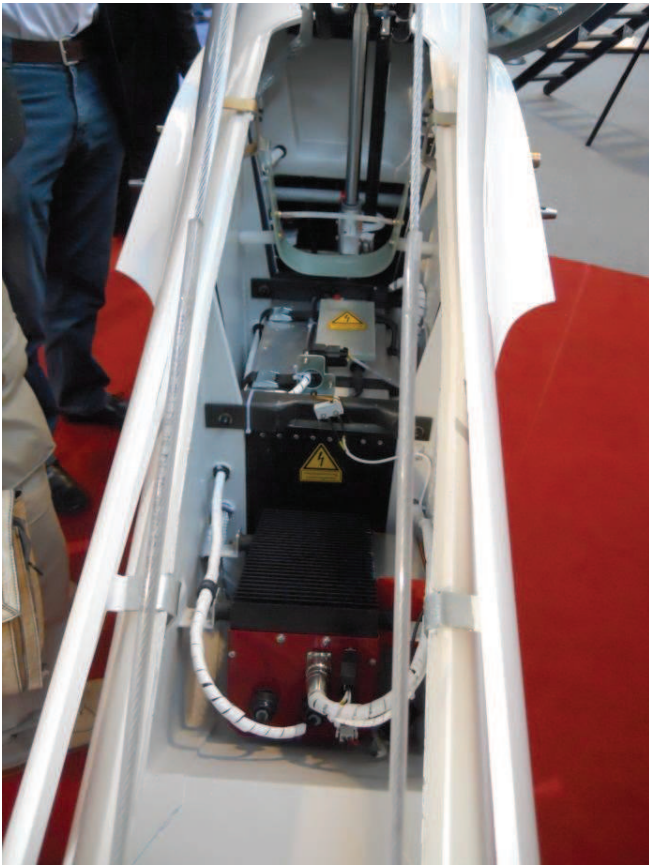


LAK 17B FES



LAK battery pack

So, what electric flight was on show at Aero 2011? The venerable Antares now has a new 23m wing. The electric motor must have been one of the first to receive EASA type certification. This must be the reason why Schempp-Hirth teamed up with Lange Aviation for their Arcus E electric self-launcher. Then there was Pipistrel's Taurus E with a very elegant 40kW motor and standard battery/controller pack as described above. DG had their DG-1000TE, with similar off-the-shelf Slovenian power plant components, despite not being of German origin.



DG1000T power pack

In flight demonstrations the big gliders were outperformed by the little guys, which is where all the development is coming from. Luka Znidarsic of Slovenia, with his 25kW nose mounted front sustainer in a LAK 17, performed a most amazing self-launch. It was an elegant and simple installation, and fitted to another glider, but being an ultra-light, was even more amazing. Whilst the pylon-mounted electric power plants still exhibit propeller/pylon interference noise, the front electric sustainer, or FES installations were very quiet and probably much more efficient. Being nose mounted, their main limitation is propeller ground clearance.



Electra One

Low noise emission must be a great driving force in Europe for all types of flight. One electric powered trike using two large model aircraft motors and controllers, coupled to a belt driven prop, was so quiet that the crowd could not spot it during the climb out. He had just used off-the-shelf parts from an RC model shop.

In its infancy, electric flight utilises low wing loading and clean airframes to extract every ounce of performance. The Electra One is one of these and looks like a small RF-4, claiming three hours of flight on 16kW. TMG or LSA? Who knows in South Africa? The German advert even states “no medical required”. Unfortunately, this innovative flight development seen at Aero is probably almost impossible in South Africa today.

2011 SA National Gliding Championship 11-22 December

A year or more ago, a survey was sent out to establish the dates that pilots wanted to have this event. Most wished to celebrate the Christmas and New Year holidays with their families, and so the dates were changed to allow pilots time to travel back to their homes in time for Christmas.

This annual SA National Championship is scheduled to be held once again at Welkom Airfield from 11-22 December 2011, with 10 December as a practice day. Arrangements are under way and application has been made to the Local Council for permission to use the airfield.

Having accommodated the pilots' wishes, we hope and trust that there will be a bigger number of local pilots heading to Welkom in December than was the case last December.

More details, entry form and further information should be on the SSSA website before too long.
www.sssa.org.za