

Leading the way



Jochen Ewald tries the new Antares 18S – and concludes that it sets a new standard for 18-metre ships

AT THE end of June 2006, Axel Lange of Lange Flugzeugbau revealed his latest product, the Antares 18S flapped 18-metre glider. It's a development of his Antares 20E electric self-launching motorglider into a top 18-Metre Class glider, which can be fitted with a conventional sustainer engine. Two prototypes are flying.

The 18S wing, with its characteristic, continuously rounded leading edge, is being manufactured from the 20E moulds, shortened by a rectangular one-metre section at the inner end. With nine spanwise distributed aerofoils and a straight trailing edge that points backwards towards the tip (see photo at the top of page 39), it delivers a so-called superelliptic lift distribution.

This produces only 0.1% more lift-induced drag than the theoretically optimal elliptic shape, without any washout.

A further reduction of up to 5% of lift-induced drag is achieved by the winglets (including their downwards-pointing fairing, which contains the small wingtip wheels). Laminar airflow under the wing covers up to 95% of the airfoil depth; laminar separation bubbles are prevented by zig-zag tape underneath the flaperons. This is easy to install and more reliable in operation than 'blowing holes', which often stop working when blocked by pollution. On the top surface, laminar airflow can be found for up to 75% of the wing's depth, which is the highest value yet reached for a glider wing.

The Antares wings have single-piece flaperons, with six flap positions from +2 to -3 (18°, 15°, 10°, 5°, 0° and -3°) and three-bladed Schempp-Hirth airbrakes. They contain three waterballast tanks (from tip to root: 20, 30 and 54 litre), of which the outer two have interconnected outlet valves. They are filled through lids on the upper surface, which include automatic valves to prevent water loss when one wing is on the ground. So the wing-loading range of the 18S is between 32 and 54.7kg/m².

The fuselage comes with a monocoque safety cockpit structure as used in F1 racing

'The adjustment of the seat, including the seatpan, and of the pedals, is almost what you'd expect from a modern car'

cars, including a nosecone designed as a crumple zone. The cockpit ergonomics set a new standard in gliding with a wide range of seating positions. As well as a backrest that is adjustable bottom and top, the lower seatpan can also be moved diagonally forwards and upwards, and the distance between the rudder pedals increases when they are moved towards the pilot.

The undercarriage with its large five-inch Beringer wheel and hydraulic disc brake is retracted electro-hydraulically and lowered spring-loaded mechanically by unlocking. It is suspended by special gas struts, which

"lock" under sudden heavy loads, activating another crumple zone that is integral to the undercarriage structure – to absorb energy and protect the pilot in the event of a crash landing. The canopy has a Röger hook so that it will fly clear of the pilot if jettisoned. A belly hook serves for aerotow as well as for winching. The tail has a high aspect ratio, and the fin contains a six-litre waterballast tank to compensate for the nose-heavy moment of the wing tanks. This fin tank has two outlet valves, connected to those of the wings, to achieve 'proportional' ballast dumping without changing the sailplane's centre of gravity.

The tailwheel is steerable, integral to the rudder, and all serial-built Antares 18S come with an engine box for the optional sustainer engine, which is under development.

With its detachable wingtips, the Antares 18S fits into a standard-sized 15-metre trailer. The wings with their tongue-fork spar connection are fixed by two main bolts secured behind spring-loaded locks. Using Lange's rigging aid, one-person rigging is fast and easy. Flaperons and airbrakes connect automatically via Hänle-links, and the waterballast valves do via torsional links. The 1.35m wingtips, with winglets, are inserted by their spar tongues and fixed by one snap-in locking vertical pin (one of very loose parts associated with this aircraft).

The tailplane is inserted from above, front to rear, and secures automatically when

