AIRBORNE REVOLUTION

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WHEN AIRBORNE DECIDED TO WORK ON A NEW TOPLESS GLIDER WE WERE AIMING TO INCREASE HIGH-SPEED PERFORMANCE, REDUCE WEIGHT AND RETAIN THE GREAT HANDLING, WHICH HAS BEEN A CHARACTERISTIC OF AIRBORNE GLIDERS. WE HAD THE LUXURY OF STARTING FROM THE GROUND UP, WITH ONLY THE BASIC CONTROL FRAME HARDWARE TO REMAIN UNCHANGED. THIS ARTICLE WILL FILL YOU IN ON THE NEW REV, AND HIGHLIGHT SOME OF THE FEATURES THAT MAKE IT OUR BEST HIGH PERFORMANCE WING TO DATE.

Let's jump forward to the first real test for the wing at the Canungra Classic 2009.

We took the new Rev 13.5 to Canungra for final testing prior to certification. I'd called Rohan Holtkamp and asked if he wanted to come up and fly the Canungra meet on the new glider. I was very satisfied with the final prototype Rev and indicated to Rohan that I felt that the glider was going really well. We would find out how good it was during the comp.

Day one of the Classic and my National ranking was stated on the pilot list as 1044, which meant I was 4th last on the launch order. I elected to go the alternate launch route and was moved to 4th on the start. With a 10:30am launch and the first start gate at 11:45am I figured that at least I can get some airtime before the race begins. Although I am flying frequently prototyping and production test flying my hours are much lower than in the past so I was quite rusty from a competition point of view.

The first round was a race to goal with Rohan winning the day and me placing second, 10 seconds behind. Our impressions of the glider were all positive and we couldn't wait until the next day to prove that it wasn't just a 'lucky day'. The following round saw the Rev in second and third with high placings continuing for the rest of the meet. The overall placing at the end of the Classic saw the Rev taking first and third. Johnny Durand, who had won the Classic the previous seven or eight years, was just in front of Rohan in second place.

The competion has proven that the glider has world-class performance and is a significant improvement over the C4.

SO WHAT MAKES THE REV SO SPECIAL?

The first time you see a Rev, you'll notice some obvious changes from the C4. The planform has a slightly deeper mid-span chord, the tip wands exit the leading edge with a more tangential sweep and the percentage of double surface is greater.

When you look at the sail you'll see it's cleaner than ever. With the VG on it is twang tight and wrinkle free. The top surface layout is the now the common 'rim & fill' style with load bearing heavier cloths used where needed. Lighter, more flexible laminates 'fill' in the remainder allowing minor stretching to make the skin slick and tight. The under surface carries much more tension than previous wings, but still allows for blow-down outboard to optimise the airfoil for higher speeds. The sail also includes as standard, a fairing for the pullback hardware. After you tension the crossbars you can just pull the zip and the rear keel hardware is enclosed as an extension to the keel pocket.

Looking inside the sail you'll see the engine room of the wing. The Camber Control System (CCS) is the most obvious change with a tensioning system used to control the airfoil from distorting upwards at high speeds. The CCS is activated when the VG approaches the full on setting and maintains a precise airfoil shape. The control of the airfoil results in a reduction in profile drag. The distortion of the upper surface at high speeds has been well documented on other gliders and the drag penalty is obvious.

In combination with the new airfoil section, with increased double surface and improved pitch characteristics, the Rev gives the pilot smooth positive pitch feedback throughout an extremely wide speed range.

THE FRAME

The standard control frame has new airfoil uprights (55mm by 26mm) with the Microdrag Downtubes (76mm by 21mm) available as an option.

The round basebar is the standard configuration with a faired alloy speed bar or carbon speedbar as options. All basebars are interchangeable for both down tube configurations.

All sprog junctions are now alloy and have a two way joint to allow adequate movement with simple adjustment available.

Tip angle adjustment is easily achieved by rotating a bolt and is an excellent tuning mechanism if required. The main sail tension strap is located at the rear of the leading edge and allows adjustment.

We have developed a new keel stand which is more complex than prior designs but is much more practical than any others available. The keel tube has a 19mm extension, which is inserted into the rear of the keel tube. The result is a much more user friendly system that remains stable as you assemble the wing.

Weight

When you pick the glider up you will notice a reduction in weight. A large portion of the weight has been removed from the outer leading edge area, which results in less tip inertia and therefore a further improvement in handling. The weight reduction has been achieved by using:

Standard Configuration

- *Carbon / glass tip wands.*
- *Carbon rear leading edges.*
- *Carbon transverse battens.*
- *Wills Wing crossbar leading edge junction, which is very light and minimises leading edge torsion thereby allowing lower sprogs.*
- *Al Daniels sail has shed over 10% of its weight compared to the C4.*
- *The VG system has been changed to a traditional moving crossbar system resulting in significant simplification and therefore reduction in parts and weight. The VG pulley system is within the double surface and requires very low activation loads.*

Options

- *Optional light weight battens.*
- *Carbon leading edge inserts.*
- *Carbon fibre sprogs will be available in early 2010.*

Flight Characteristics

(The following is an extract from a review by Adam Parer)

Favourable comparisons and outstanding competition results are one thing, but how does the Rev fly? For those of us who own or have flown a C4 you will be impressed and probably surprised (and maybe even a little dubious) to hear the Rev has even tamer and more obedient handling characteristics than its forerunner.

The transition from minimum sink to stall is longer and the stall is indicated well before arrival. In fact the stall speed feels a knot or two slower than in the C4, which was actually one of the nicer characteristics of the earlier mark. The roll response remains benign but is perhaps even gentler in the Rev and there is less tendency and a later onset to drop a tip if you try to slow it down too much in a turn. The roll/yaw coordination is excellent and notably a little better than the C4.

The pitch pressure transitions smoothly throughout the speed range with any abrupt peaks seemingly dampened or 'dialled down' and I suspect this adds significantly to the very pleasant feel of the Rev. As a result turbulence feels less likely to throw you around. We've all flown gliders that are either scarily light or like a barge in pitch, even if only for a particular VG setting so it was nice to find the Rev exhibits a nicely weighted pitch pressure at all times. Naturally the pitch lightens with higher VG settings but it never fades completely or gets too light. And even with full rope the glider still responds relatively well in roll.

Keel stand

How is it to tow? There is little to say about towing the Rev other than it is 'on rails' and well mannered. It tracks 'in-line' as good as anything perhaps as a function of its predictable and very docile handling. Again, compared to the C4 the Rev is nicer under tow. Even with too much VG it remains manageable without oscillation or 'walking'. No vices at all were experienced behind the tug.

Thermalling is where comparison to the C4 reveals the Rev to be a total departure in design rather than a direct descendant of the Climax family. It has its own distinct feel when thermalling and is very comfortable sitting on a tip with little high siding needed to stabilise it in climb. The Rev resists knifing-in when you ease-out in a surge, the turn radius and bank angle just tighten up slightly and the glider proceeds to soak up the lift. It is easy to thermal and literally requires less physical effort to do so. How does the Rev climb compare to the best pilots flying the best equipment? Many of the competitors attending The Canungra Classic will confirm the Rev possesses a superior climb rate, by any standard.

When on a fast glide or at max speed you can still feel lift. Here the bar pressure maintains a mild but noticeable feedback and the nose will want to rise a little. No more charging through lift during fast glides because you can't see or hear the instruments or more importantly because you can't feel the air. This is an unexpected and very nice characteristic that potentially offers a huge advantage. Combined with the Revs low sink rate this should make for very long glides.

It appears the partnership between chief designer (Airborne) and sailmaker (Wingtech) along with many long hours and hard work in the loft, and some inspired designing have combined to produce a very high quality glider with exceptional performance and superior handling. The Rev has already proven its competitiveness amongst the finest equipment currently available but performance aside, most of us want the best handling glider first and foremost and the Rev is definitely that.

Production

The first production run of the glider will be the end of November 2009 with Certification testing currently under way in Germany.

Final specifications and prices will be available shortly.