

# SWING ARCUS RS



Currently at Swing everything revolves around the RAST partition system. The Arcus RS is the second series glider using this technology. This has made our in-depth individual test even more exciting...

Test pilot: Norbert Aprissnig  
Photos: Franz Allmann

The different design on the bottom surface indicates the RAST system, which in effect divides the wing into front and back wing areas.

**Translation of the Arcus RS test report from the Thermik Magazine 9\_17. This text was translated by SWING Flugsportgeräte GmbH!**



There aren't many paragliders that become synonymous for an entire glider category, but the Arcus range is a prime example of this. The original Arcus saw the light of day in 1999. There was ongoing development of this concept until 2012 and the Arcus 7. Swing fans have had to wait a further five years till this year for another new version. However, this new Arcus is not called "8" but symbolizes a new beginning with the discreet suffix "RS".

There may be various reasons for this new beginning and the lengthy hiatus. It's certain though that the change in the design team to Michael Nesler and use of the new RAST partition system play a major part in this. Back to the original Arcus: Franz Huber wrote in the summary of his test report in THERMIK magazine (4/2000): "We have here an extremely safe and also high-performing glider with sensitive handling. Accordingly it also has a large target market: from aspiring beginners and those who fly infrequently, to pilots who enjoy thermal flying and right through to cross-country pilots - they are all well served by the Arcus." Thus was laid the foundation for a new category, the basic intermediate. Other manufacturers in succession were also to jump on this bandwagon. The various models in the Arcus range enjoyed great popularity and, with its new Arcus RS, Swing is wanting to repeat the achievements of its legendary predecessor.

## CONSTRUCTION, MATERIALS & DESIGN

The Arcus RS is currently available in four sizes (S to XL), covering a take-off weight range from 70-130 kg. The XS size (take-off weight 55-75 kg) is intended to make the Arcus RS available for lightweight pilots as well. The type-test certification was still being processed when we went to print. The Arcus RS family is currently also being tested with lightweight fabrics and will be available shortly in a special lightweight version.

The glider we tested was size M (as in the Testival, see THERMIK 7/2017), which will probably cover most pilots in the medium weight range.

Apart from the RAST partition system, the Arcus RS features many modern design details: smooth, kink-resistant plastic rods in the leading edge, set-back A-level suspension points, mini-ribs in the trailing edge, 3D-shaping for the top and bottom surfaces and a reefing system for the brake-line attachment. A shark-nose system is not used.

The German manufacturer Swing uses a fabric produced exclusively for it, namely Techtext WT3020 (38 g/m<sup>2</sup>) and WT2020 (32 g/m<sup>2</sup>). Sheathed aramid (Kevlar) is used for the main lines (TSL from Liros). The intermediate and gallery lines are also aramid, but unsheathed (Edelrid 8000).

The workmanship of the entire glider is exceptional. Usually we no longer particularly emphasise this in our tests since the quality of workmanship by the various manufacturers has evened out considerably. In the case of the Arcus RS, there is justification for mentioning the extremely positive impression created by stitched diagonal ribs, additional reinforcement and the overall standard of workmanship. In terms of the line set-up, the Arcus RS is a hybrid three-liner: there are three line levels: main lines, intermediate lines and top lines. The D-level is supported at the canopy by top lines from the C-level.

However, the centerpiece of the design is the RAST partition system. Previously, this new innovation by Swing was incorporated into various miniwings, the Trinity acro glider and the Mito beginner wing. The development team led by Michael Nesler has in the meantime continued intensive research into the RAST system, and now the further developed RAST 2.0 is being used in the Arcus RS. The main refinements were the position of the partition in the glider and the size and operation of the airflow openings.

Photo: In thermals, the strength of the new Arcus RS is in flat turns

| TECHNICAL DATA (MANUFACTURER'S SPECIFICATIONS) |  |         |         |         |         |
|--|--|---------|---------|---------|---------|
| Manufacturer                                   | SWING Flugsportgeräte GmbH,<br>An der Leiten 4, D-82290 Landberied<br>Tel.: +49 (0) 8141/3277888, Fax: +49 (0) 8141/3277870<br>info@swing.de, www.swing.de |         |         |         |         |
| Production                                     | Aeroman China  |         |         |         |         |
| Designer                                       | Michael Nesler   |         |         |         |         |
| Test pilots                                    | Michael Nesler, Gudrun Öchsl, Alessio Casolla and team   |         |         |         |         |
| Sizes  | XS   | S       | M       | L       | XL      |
| Cells  | -  | 42      | 42      | 42      | 42      |
| Take-off weight (kg)                           | 55-75  | 70-95   | 85-105  | 95-115  | 105-130 |
| Wing area (m <sup>2</sup> )                    | -  | 24      | 27      | 30      | 32      |
| Wing area projected (m <sup>2</sup> )          | -  | 20.7    | 23.3    | 25.9    | 27.7    |
| Wing span (m)                                  | -  | 11.2    | 11.9    | 12.3    | 13      |
| Projected wing span (m)                        | -  | 9.1     | 9.7     | 10.0    | 10.5    |
| Aspect ratio                                   | -  | 5.25    | 5.25    | 5.25    | 5.25    |
| Projected aspect ratio                         | -  | 4.0     | 4.0     | 4.0     | 4.0     |
| Glider weight (kg)                             | -  | 4.6     | 5.0     | 5.4     | 5.7     |
| Total line length (m)                          | -  | -       | -       | -       | -       |
| V trim (km/h)                                  | -  | 38±1    | 38±1    | 38±1    | 38±1    |
| V max (km/h)                                   | -  | 50±1    | 50±1    | 50±1    | 50±1    |
| Price incl. VAT (€)                            | -  | 3,590.- | 3,590.- | 3,590.- | 3,590.- |
| Certification LTF/EN                           | pending  | B       | B       | B       | B       |
| Included with delivery                         | Back pack, inner bag, riser bag, compression strap, Free Speed bar   |         |         |         |         |



In der Thermik liegen die Qualitäten des neuen Arcus RS im Flachdrehen.

The valves in RAST 2.0 in fact prevent the air from flowing out of the rear section back into the front section. In general terms, RAST in any case affects the whole structure of the paraglider, so it isn't possible to just simply put a partition in the glider. Michael Nesler originally developed RAST to minimize performance-reducing oscillation in the rear wing section. This happens in particular when there is turbulence and it deforms the profile, which has an adverse effect especially when penetrating the wind in turbulent thermals. RAST greatly dampens this oscillation, and the more turbulent the conditions, the greater its effect and the more significant the performance advantage. In addition to this fundamental idea, however, it was quickly discovered that dividing the paraglider into a front and a rear air chamber offers the advantage that the rear section of the wing stays inflated longer in the event of frontal and asymmetric collapse, and thus the wing has increased stability in extreme manoeuvres and, in an extreme case, there is much less loss of altitude. In general, the wing also has better stability in relation to asymmetric and frontal collapses - and we were able to verify this during our test flights. In addition, RAST gives rise to various other positive effects, which we will discuss in the practical section.

## LAUNCH

Launch preparations are simple even though the Arcus RS is made from a combination of sheathed main lines and unsheathed race lines in the top gallery. The lines separate well and, after they have been laid out, with a focus on the centre, you're all set to launch.

On launch, RAST means that initially only the front section of the wing is filled, before (after a slight delay), the whole canopy is fully inflated. There is no downside to this uneven inflation, because the Arcus RS has superb directional stability in the inflation phase. For a forwards launch, it proved useful to hold only the riser with the inner A-lines. In light conditions, be careful not to be tempted into using too much power by the way that the Arcus RS rises slowly in the first third of the inflation arc. If the canopy is actually completely inflated, rising accelerates towards the zenith, which means unnecessary brake is needed to halt the glider again above the pilot. Pulling up lightly and evenly will give a solid forwards launch! The Arcus RS exploits the full strength of RAST in strong winds. We had a number of windy days during our Festival in Meduno in the north of Italy. The new Swing intermediate behaved perfectly on launch during this time.

Photo left: Easy to see: mini-ribs markedly reduce ballooning in the trailing edge  
Photo right: A very elegant and graceful glider. This is how a modern basic intermediate looks!



Foto links: Gut zu sehen: Miniribs reduzieren das Ballooning im Achterliek markant.

Foto rechts: Keine Spur von „Panzer“! So sieht die Outline eines modernen Basisintermediates aus!

| DESIGN/MATERIALS |   |
|------------------|---|
| Canopy           | elaborate craftsmanship: plastic rods, 3D-shaping on top and bottom surface, mini-ribs, RAST 2.0; top surface: <a href="#">Tectex</a> WT 3020/WT 2020, bottom surface: <a href="#">Tectex</a> WT 2020 |
| Lines            | main lines: LIROS TSL 190/220<br>intermediate lines: <a href="#">Edelrid</a> 8000U-090/190<br>gallery lines: <a href="#">Edelrid</a> 8000U-090/130<br>brakes: LIROS HMA 8000U                         |
| Riser            | clear, slim, nicely finished riser with wide attachment loop  |

  

| SUITABILITY |                      |
|-------------|----------------------|
|             | [X X X X]            |
|             | Experienced pilot    |
|             | Cross-country pilots |
|             | Competition pilot    |

| PILOT REQUIREMENTS   |                         |
|--|-------------------------|
| (DEMANDS ON THE PILOT)   |                         |
| E1   | E2 i1 i2 S1 S2 H1 H2 CC |
| Basic intermediate: High safety and sufficient performance for thermals and first cross-country flights. No hidden quirks, good and honest safety margins. Wings for a lifetime! Skills/experience required: leisure pilots, social pilots and pilots who fly infrequently; with some restrictions a first glider after training; basic understanding of the material, safe launching, <a href="#">thermalling</a> , soaring and landing without endangering oneself or others. Airtime required: from min. 30 hours/year* |                         |
| PILOT COMMENTS   |                         |
| Exciting! The new “Ram Air Section Technology” design principle seems tailor-made for the basic intermediate category. I liked the Arcus RS very much and I am already excited to see how RAST will behave in other Swing gliders in the future.   |                         |
| What we liked: safety, stability and handling  |                         |
| What's different: Ram Air Section Technology RAST 2.0  |                         |
| What we don't have: an Arcus RS without RAST for the test, to identify the benefits of the “wall” even more clearly!   |                         |

| TEST REPORT   |                                   |
|---|-----------------------------------|
| Test pilot take-off weight (kg)   | 100                               |
| Wing-loading (kg/m²)  | 3.8                               |
| Harness   | <a href="#">Supair Skypper</a>    |
| Flight instruments  | <a href="#">Flymaster</a> live SD |
| Acceleration distance (cm)  | 42                                |
| Glider weight (kg)  | 51                                |
| V trim (km/h)   | 38                                |
| V max (km/h)  | 50                                |
| CONTROL PRESSURE DIAGRAM  |                                   |
| Control pressure [daN (-kg)]  |                                   |
| [graph not transcribed]   |                                   |
| Control travel [cm]   |                                   |
| 0   | 10 20 30 40 50                    |
| Comment: Linear control pressure increase in the readings, in practice control pressure increase is more progressive because of crisp feedback and corresponding canopy reaction. |                                   |

# SWING ARCUS RS

## FLIGHT BEHAVIOUR

After a launch that can be described as “rock solid”, the impressions from the first moments of flying are similar to launch behavior: high directional stability and high stability! With the first turns, the range expands: control pressures are crisp and notably increasing, but not unpleasant, agility and handling are excellent for a basic intermediate. Above all there is solid and accurate feedback through the control lines – something that inspires confidence! The Arcus RS has minimal canopy movement in turbulent conditions. Pitch and roll damping is high, as specific to the class. In general, the new Swing wing is very resistant to turbulence and collapse, probably a benefit of RAST.

### Thermal flight

In thermals the Arcus RS is from its basic characteristics basically a flat turner. The control pressures remain in a comfortable range and only increase when the pilot tries to put the intermediate glider into a greater bank angle and tighter circles. This is in principle possible, but sometimes the wing requires a “turn reset” i.e. it assumes greater bank angle better from horizontal flight by decisively pulling the control lines (and weight-shifting) than from steadily increasing control inputs from flat turns. The wing also has the previously described accuracy when turning in thermals.

Feedback is consistent, the canopy does not appear imprecise. Nor does the Arcus RS have any tendency to other “sins” that spoil thermal flight. By that I mean in particular unpleasant leveraging, a tendency to be pushed out of the thermal, pitching with increased sink. In a cross-country attempt as part of some test flights, after an early launch my colleagues and I were able to gain height only hesitantly. The Arcus RS was on a par with several high-B intermediates in the weak climbing, I couldn't establish any significant difference. Climbing passes!

### Fun factor (dynamics and agility)

A basic intermediate naturally offers only a fairly restricted fun factor. The Arcus RS is no exception to this. However, it achieves the perfect balance for this category, namely combining relatively high agility with low dynamics. In short: safe and heavily damped, and at the same time nicely agile. Anyone nevertheless wanting to try dynamic manoeuvres, e.g. wingovers, can by all means do this with the Arcus RS. With good timing and momentum, medium wingovers are certainly possible and in particular very stable, as is appropriate for the target group

### Accelerated flight

Some force in the legs is certainly needed to accelerate the canopy, which is tensioned significantly by the RAST system, but in return we have a canopy that is very stable even at high speed, with which one can travel through smaller areas of turbulence without making an impression on the canopy.





1. Differenzierte Umlenkung im Beschleuniger
2. Angenehmer Steuergriff, der mittels entfernbarer Verstärkungsstäbchen auf Wunsch verstärkt werden kann
3. Überschaubarer Tragegurt mit drei Tragegurt-ebenen und „Baby-A“
4. Saubere Eintrittskante (ohne Shark Nose)
5. Der dunkelblaue Streifen im Untersegel zeigt die Position des Schottwandsystems



| BRIEF ASSESSMENT |  |  |
|------------------|--|--|
| Launch features  | Forwards launch<br>****  | Good directional stability for a safe launch. Avoid using too much power when inflating otherwise the Arcus RS needs a little braking at the zenith                        |
|                  | Reverse launch<br>*****  | Excellent! Directional stability and forgiving when turning around!  |
|                  | Handling in strong wind<br>*****   | RAST prevents the glider from rising too quickly in strong winds and from launching the pilot unintentionally. Very safe!  |
| Flight behaviour | Agility<br>****  | Good agility with low dynamics   |
|                  | Launch behaviour<br>*****  | Accurate flat turner with good feedback and (for this category) high precision   |
|                  | Collapse behaviour<br>*****  | RAST prevents many collapses and, if there ever is a collapse, has a positive effect on it   |
|                  | Accelerated flight<br>*****  | Requires considerable effort but very fast and stable  |
|                  | Damping/Stability<br>*****   | High damping around all axes with very good stability  |
| Descent methods  | Big ears<br>****   | Wing tips collapse somewhat abruptly, then a safe manoeuvre without any tendency to thrash around.   |
|                  | B-Stall<br>****  | Considerable effort, otherwise perfect!  |
|                  | Spiral dive<br>*****   | Textbook descent with the Arcus RS! Easy to control without any tendency to turn and with RAST safety in the event that any errors should occur when exiting the manoeuvre |
| Suitability      | Fantastic basic intermediate with interesting new partition technology! Safe, accurate, with good performance! |  |
| Rating           | *poor ** average<br>*** good **** very good ***** excellent  |  |

Even visually no indentations are seen at full speed, which increases still further the feeling of high stability. And this with still 50 km/h Vmax, which is considerable for a basic intermediate.

**Extreme flying manoeuvres**  
 In normal flight one can often only guess at the operation of RAST, because of course there is no comparison with an Arcus RS without RAST. Its high stability, noticeable collapse resistance, accuracy even with increasing degree of turbulence are such indications. It is different in extreme flight, which gives very clear signs of how RAST operates. We'll begin with the front collapse or front stall. What is noticeable here is that considerable force must be used on the A-risers to make the leading edge of the canopy cut under. When it finally does, the wing collapses no further than to the partition (with pronounced, straight folding angles). It is very difficult to simulate a true front stall and it is also hard to imagine in practice because of the high collapse resistance. With asymmetric collapses the canopy has a tendency to an extremely flat folding angle, and here too the Arcus RS does not want to collapse beyond the partition. Disturbances are correspondingly harmless. It is only with steeper folding angles that collapses react in the usual manner, but they are nevertheless very manageable with the Arcus RS. I did not have one single unintentional collapse during the test flights despite partly spring-like, partly summery explosive air.

**DESCENT METHODS**

**B-Stall**  
 My first attempts were unsuccessful. Evidently RAST means that a high amount of force is needed to put the wing into a B-stall. The manoeuvre therefore has practical relevance only to a limited extent. Later on I succeeded and the manoeuvre proceeded perfectly: clean folding angles, minimal deformation, no risk of rosette, safe start without aggressively shooting forwards.

**Big ears**  
 With big ears too, the feeling of high internal pressure created by RAST is apparent. The canopy initially resists collapse of the wing tips, which then turn down relatively abruptly, allowing a safe manoeuvre, without unpleasant thrashing around and with medium to high efficiency. Opening is slightly delayed.

**Spiral dive**  
 As mentioned already under "fun factor", the Arcus RS has relatively low dynamics which, in the case of the spiral dive, means that the wing does not aggressively pitch but needs one or two rotations before it transitions into a safe and manageable spiral dive. In the manoeuvre itself, the wing remains easy to control, does not overburden the pilot and independently reduces high descent rates. There was an additional pleasant surprise with the spiral dive (probably thanks to RAST). The Arcus RS simply does not show the typically small collapses and indications of a collapse that happen from exiting the spiral dive too quickly and/or getting into one's own wake. The canopy stays rock solid! Evidently a further positive effect of the partition system.

**SUMMARY**

The Arcus RS is the first Swing series glider with RAST 2.0 and, after the beginner wing Mito, the second series glider using the principle of the partition system. After many test flights, we are of the view that this innovation is particularly suitable for the basic intermediate. However it probably won't be long before the German manufacturer will surprise us with Ram Air Section Technology in other glider concepts. The Arcus RS is in any case a worthy new addition for the tried and tested range. From its suitability profile it is aimed in particular at occasional pilots and pilots wanting to play around in the thermals at their local site without any stress. Then again, its performance potential and its tangible accuracy also guarantee long flights.

Top photo: launching in strong wind with the Arcus RS...a joy!

Photo bottom left: "small ears" in the lower weight range. The "ears" are much bigger at the top weight limit.

Photo bottom right: a well-balanced arc provides a nice silhouette.

