

The neatly designed performance wing is a visual treat, with the bulkhead partition system clearly visible here.



# SWING AGERA RS

The AGERA RS is Swing's first EN-C glider to feature the RAST system. The 3-liner with the popular characteristics of a 2-liner created plenty to talk about even before it was released, and even more after the first test gliders were withdrawn ...

*Test pilot: Franz Sailer  
Photos: Norbert Aprissnig*





Swing designer Michael Nesler doesn't imitate the conventional. The revolutionary RAST system is his creation, with the bulkhead partition system now incorporated as standard in all new Swing gliders and having proved itself in everyday flying. Needless to say, this lateral thinker likewise took an innovative approach and set new standards in developing Swing's new high-end sport class glider, the Agera RS, rather than taking the well-trodden route. Development focused on "maximum canopy stability, forgiving collapse behaviour thanks to RAST 2.0, best possible glide performance, high top speed". Furthermore, the ambitious goal was to develop a sport class glider with the characteristics of a 2-liner. No wonder that the Agera RS thus sparked curiosity and generated keen interest among paraglider pilots even in its preliminary stages. So it was even more of a surprise for all concerned when Swing temporarily withdrew the Agera AS shortly after it was released. The reason for this was that there had been some isolated criticism regarding its handling, although about 90% of pilots apparently had no complaints. An investigation showed that with some of the Agera RS gliders inspected, the A1 and A2 lines had stretched after even the first few flights more than would have been expected, and in some cases the C3 had also shrunk. The changes in length were in fact within the tolerances specified by the manufacturer and, taken in isolation, did not affect safety. However, they resulted in a noticeable deterioration in handling if combined with other factors, e.g. the harness used, too

much distance between the carabiners etc. Swing responded to this immediately, released an official statement informing all pilots and other interested parties and offered a free upgrade. The German manufacturer advised "We have allowed for the stretch in the A-lines in all Agera RS gliders delivered in 2019, i.e. the lines are shortened by the stretch anticipated. A slight increase in trim speed will have to be expected during the very first flights, until the lines have "settled". In addition, we have optimised braking, which has allowed a significant improvement to be made to climb performance in weak conditions, with a simultaneous reduction in control pressure."

In short: here at THERMIK, just in time for the start of spring, we have received from Swing its new flagship, the Agera RS with RAST 2.0 and the final upgrade...unpacked it...with amazement...and tested it extensively on the southern slopes of the Emberger Alm, in Carinthia, Austria.

### CONSTRUCTION, MATERIALS & DESIGN

We noticed immediately looking at the technical data that the five different sizes for the Agera RS have considerably smaller weight ranges than comparable gliders. In this regard, the manufacturer says "The weight ranges are very precise and narrow, allowing the AGERA RS to develop its full performance, and at the same time they cover the range of optimal wing-loading."

With the Agera RS, Swing has in fact devised a completely new overall design that has many differences from traditional wings in the sport class. The high-end C glider was designed for all intents and purposes as a 2-line glider, as there is virtually no load on the C-level during flight. Its weight distribution is 45% on A, 43% on B, the rest on C and brakes. The C lines have a supportive function, operating only when the brakes are used or if there are canopy disturbances.

Michael Nesler says in this regard that "The rear section creates neither damping nor lift because of the fact that almost the entire load, i.e. lift as well, is between A and B: everything is transferred directly and immediately – that's what creates the 2-liner feeling! With the Agera, A and B can be combined which would immediately be a 2-liner, however without the possibility of certifying it as EN-C, as collapses cannot be provoked without folding lines." Swing (based in Landsberied, Germany) is convinced that the Agera RS offers all the advantages of a 2-liner, such as glide at high speeds and in turbulent conditions, but without demanding extreme flight behaviour. Accordingly, regarding the target group, it says that the Agera RS "is intended for ambitious C-class XC pilots and competition pilots wanting to fly with the usual performance and precision but with less stress and risk."

Visually, the Agera RS is an elegant sport class glider, which appeals quite clearly to high-

### TECHNICAL DATA (MANUFACTURER'S SPECIFICATIONS)

Manufacturer	SWING Flugsportgeräte GmbH An der Leiten 4, D-82290 Landsberied, +49 (0) 81 41 / 32 77 888 info@swing.de , www.swing.de				
Production	Aeroman China				
Designer	Michael Nesler				
Test pilots	Michael Nesler, Alessio Casolla, Gudrun Öchsl, Maurizio Bottegat				
Sizes	XS	S	SM	ML	L
Cells	69	69	69	69	69
Take-off weight (kg)	65-82	78-90	88-100	98-112	110-125
Recomm. weight range (kg)	65-80	78-89	90-100	100-110	110-125
Wing area (m²)	20.4	22	24.3	26.7	29
Wing area projected (m²)	17.7	19.1	21.2	23.2	25.2
Wing span (m)	11.3	11.8	12.4	13.0	13.6
Wing span projected (m)	9.0	9.6	10.1	10.6	11.0
Aspect ratio	6.3	6.3	6.3	6.3	6.3
Aspect ratio projected	4.8	4.8	4.8	4.8	4.8
Glider weight (kg)	4.6	4.8	5.0	5.3	5.7
Price incl. VAT (€)	4,500	4,500	4,500	4,500	4,500
Certification LTF/EN	C	C	C	C	C
Included with delivery	Sherpa back pack, protection bag 2, compression strap, instruction manual				

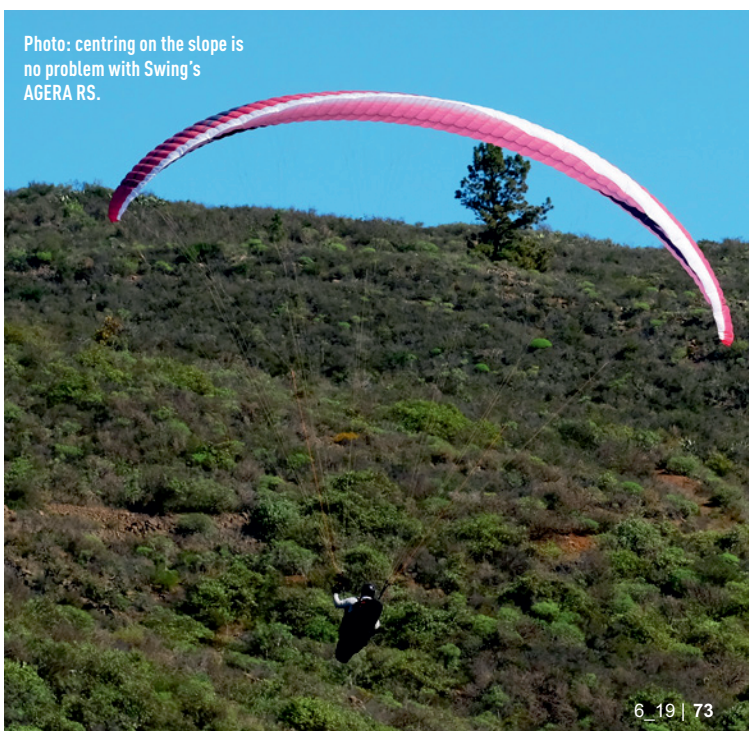


Photo: centring on the slope is no problem with Swing's AGERA RS.



Photo: On launch in Il Fonche, Tenerife. The Agera RS launches safely even in minimal wind.

## SWING AGERA RS

performance pilots because of its racy profile alone.

With a flat aspect ratio of 6.3, it is positioned in the middle of the C class, but the total of 69 cells puts it in the upper part of this class. The Agera RS of course has the obligatory RAST 2.0 system, and also features additional innovative design details such as a completely new profile, which ensures high speeds, best glide and best properties in thermal flying (as per the manufacturer). Thin Nitinol rods were used instead of thick plastic rods to achieve these results. The nickel-titanium SMA (shape memory alloy) is expensive but extremely stable, ensuring a precise razor-sharp leading edge. The leading edge rods are relatively short, but longer for C-wires. Together they thus form a clean profile with maximum aerodynamic quality. Other features of the Agera RS are the double 3D cut, diagonal ribs, various cross-bands and mini-ribs on the trailing edge. As you would expect, it doesn't have a shark nose.

Swing uses the specially developed polyamide fabric Techtex (32g on the top surface and 32/38g on the bottom surface) with a high-quality coating for improved UV resistance, colour fastness and impermeability to air. By using durable but nevertheless lightweight materials, the glider weight could be kept relatively low at 5.0kg for size SM, despite the many cells.

The line concept seems relatively traditional: three A, three B and three C lines, plus a stabilo line on C. The 3-liner was fitted entirely with a

competition line system, i.e. unsheathed aramid lines from Edelrid (although sheathed brake lines). The Agera RS is fitted with specially developed risers of 12mm wide webbing with Kevlar reinforcement. Colour is used to identify the riser system, with split A-risers, split C-risers including red C-bridge, smooth ball-bearing Ronstan speed system pulleys, swivel, brake pulley, magnetic fasteners and practical Swing multi-grip brake handles with options to add in or remove the various handle reinforcements. The Agera RS is available in four Swing colour designs: Darknight, Energy, Lime and Rebel. Custom colours and special designs are possible for a surcharge and with a longer delivery time.

### LAUNCH

The unsheathed aramid main lines get caught but, once separated, they are quickly sorted. The brake handles occasionally come undone from their magnetic fasteners, as a result of which they may dangle down and get "lost" in the main lines. Closer inspection before launch is recommended. Launching is of course even easier if the leading edge is arranged in a half-moon shape.

#### Forward launch

There is no need to launch the Agera RS by using vigorous momentum and/or by sprinting into the slack lines, and nor is it necessary to use overly forceful pulling in nil wind. Preferably inflate the canopy with the lines down and behind you. Simply grasp the two inner A-risers (not the baby

A-risers) without shortening them, so as to guide it upwards in an even curved movement. The canopy thus rises with slight acceleration to its zenith, stopping there. Now and again, e.g. in a cross wind, the wing may escape sideways but it can nevertheless be well controlled and corrected during this phase using the brakes – it is reliable in a forward launch!

#### Reverse launch

The Agera RS can be safely reverse-launched in nil wind even on a slippery ski slope. A firm pull on the inner A-risers...two or three steps backwards...the canopy inflates evenly across its entire wingspan...rises reliably and without hesitation...stops at its zenith...turn you turn around and take off! The canopy rises well even if the wind is unfavourable or the ground is slippery. Even in a headwind, the wing has no tendency to act as a lever or overshoot – completely stress-free and a clear strength of RAST 2.0, 5 star standard!

#### Launch in strong wind

In winds higher than 15kph, the wing should not be fully laid out, but just loosely unfolded. If it is entirely in the wind, the canopy will rise up of its own accord as if it were a lightweight wing...its entire trailing edge will fold over its nose...its wingtips will thrash through the lines and then be reluctant to open...or the entire wing will flap around the vertical axis. If the wing is controlled on the ground first, it inflates as usual: the canopy rises with moderate speed and has little tendency



DESIGN/MATERIALS	
Canopy	Short thin Nitinol rods on the nose, long thin Nitinol C-wires Double 3D-cut, mini-ribs, top surface: Techtex WT 2020 32g, bottom surface: Techtex 32/38g
Lines	Lines: unsheathed Aramid lines 8000U from Edelrid main lines: 1.3-1.1mm, middle gallery 1.0-0.8mm; top gallery: 0.8-0.5mm
Riser	Split A-riser, split C-riser with red C/B bridge (C-bridge), mallions with rubber rings for line fixing, smooth-running, ball-bearing Ronstan acceleration rollers, swivels, brake pulleys, magnetic fasteners, SWING multi-grip brake handle

SUITABILITY					
Schooling	Beginner	Leisure pilot	Experienced pilot	Cross country pilot	Competition pilot

PILOT REQUIREMENTS (DEMANDS ON THE PILOT)									
E1	E2	i1	i2	S1	S2	H1	H2	CC	
									High performer for XC and competition Skills/experience required: for pilots who take every opportunity to get into the air Required airtime: from min. 120 hours / year
PILOT COMMENTS									
I found the handling of the Agera RS “typical of a high performance glider” especially in difficult narrow thermals. On the other hand, the high-end sport class glider impressed me at top speed and in its reactions to provoked collapses through its performance and passive safety.									
What we liked: glides well accelerated									
What's different: RAST 2.0 system, 2-liner nature									
What we missed: defined stall point									

TEST REPORT	
Test pilot take-off weight (kg)	95-100
Wing-loading (kg/m <sup>2</sup> )	3.79-4.07
Harness	Woody Valley X-Rated 6, Advance Lightness 2
Flight instruments	Flymaster Live SD, Skytraxx 2+
Acceleration travel (cm)	45
Glider weight (kg)	5.0
V trim (km/h)	41 (at 100 kg loading)
V max (km/h)	56 (at 100 kg loading)

**BRAKE PRESSURE DIAGRAMM**

Comment: low control pressure in operating range, short control travel similar to high performer, diffuse, soft stall point.

to overshoot even in strong wind. In a cross-wind, it tends to escape to one side (yaw) and thus behaves as is typical for a high-performance wing.

### FLIGHT BEHAVIOUR

For my various test flights I used two totally different harnesses with a carabiner distance of 48-51cm (recommended by the manufacturer) to allow me to make comparisons: the relatively well-damped X-Rated 6 race harness from Woody Valley, and the rather sensitive Lightness 2 without seatboard from Advance. All up, this gave a take-off weight range of 95-100kg.

The extremely varying weather or test conditions (crisp spring thermals marked by strong winds, as well as dull thermal inversions or large-scale evening thermals) subsequently show that the appropriate loading, i.e. the “sweet spot”, for the SM test size was about 95-97kg. The Agera RS flies at its best with the resulting wing-loading, rises formidably in mild thermals and glides excellently into the (turbulent) wind as well.

It is immediately apparent after launch that the Agera RS has the characteristics of a high-performance wing. In trimmed flight, the elegant wing mills through air masses at high speed, later readings were over 41kph (with the new trim upgrade). The basically somewhat harder wing always presents itself in moving air as “absolutely full” but nevertheless not hard as rock. With pleasantly low control pressure in the

operating area, immediate tight turns can be flown, with the “super soft” brake handles sitting perfectly in your hands. If made even tighter, control pressure increases only slightly, so you don't need sturdy biceps to do an eight-hour flight. Stall point comes sooner as is typical for a high-performance glider and soft and somewhat diluted: first the wing tips bend away, only then does the airflow brake away in the centre.

### THERMAL FLIGHT

Pleasant handling and the best climb performance are achieved if the Agera RS is flown in thermals with adequate turn speed and weight-shifting in turns. Outside brake off, moderate inside brake, deliberate use of weight.

Sustained use of the brakes simply increases sink rate and leads to unpleasant handling. Pitch or radius corrections to the wing-tip should therefore be quick and succinct, too much braking makes the Agera RS unwieldy, in strong thermals the wing tends as a result both to lever and to swing. So release the “reins”, use full weight and allow a brisk turn...the canopy, with high internal pressure, appears relatively undamped in thermals, but not restless.

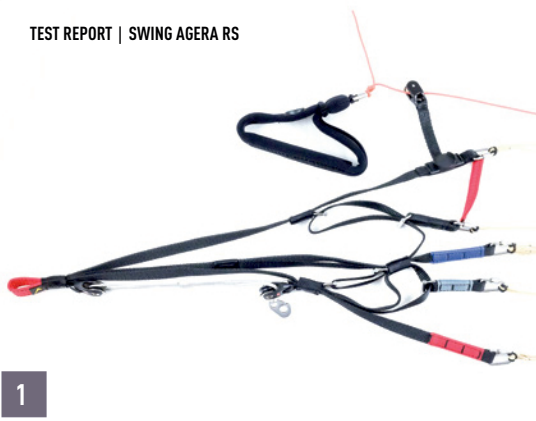
The wing communicates primarily and unmistakably through the risers, less through the brakes. This means the dimensionally stable taut canopy transmits airflow zones to the pilot fairly directly through the risers, whereby it acts as a lever now and again, rolls sideways, or pitches as

one entire block. The wing always remains super-stable and the absolutely full wing tips almost never ease off. There is therefore little need to support the ears constantly. On the other hand, the stable wing tip does not always transmit sufficiently clear signals especially in weak thermals. In this regard pilots could complain that the canopy gives inadequate feedback and that in warm air they have to ‘listen in’ to the wing.

Flying into thermals, the canopy stops briefly (or tips back gently in strong thermals) to then move into the core. In strong uniform thermals, the essentially flat turner fully plays out its advantages with increased roll moment. The compact wing settles into the core of the thermal, and turns nicely. While other high-performance wings experience shaking ‘ears’, or they ease off or twist, the Agera RS stays stable and efficiently spirals up towards cloud base.

Care is needed in weak narrow thermals: if the turn is extremely flat, and there is little weight-shifting, but a lot of inner brake and frequent use of the outer brake, then the airflow may slowly separate from the outside cells at the inside of the turn. The Agera RS signals this very clearly and also unspectacularly: rotation slows, pressure on the control lines eases, and the ‘ear’ bends backwards noticeably. It doesn't stall initially, so the pilot has enough time to quickly release the control lines a few centimetres and save the situation. In weak thermals, launch weight should not be at the maximum amount,





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1. Riser with C-bridge (red connection band between B and C levels) to control the canopy at accelerated speeds
2. High-quality Ronstan pulleys on the speed system
3. The 3-liner has unsheathed competition lines
4. Nitinol rod forms the leading edge and also the top surface by C-wires
5. Designer Michael Nesler hasn't used a shark nose for the Agera RS



5

otherwise the wing has trouble with delicate bubbles. With 96kg in the test size, the Agera climbs very well even in weak thermals. At 100kg, a pilot will be rewarded in crisp thermals with

### Accelerated flight

Pilots will notice from the outset that the Agera RS has excellent glide. The canopy penetrates efficiently through turbulence with full throttle at around 56kph and average pedal force and speed bar travel, and its leading edge is bomb-proof. The wing does actually impart a certain ‘2-line character’ in accelerated flight. I normally fly a 2-liner myself, so I can make a comparison and I am definitely not imagining this. The taut canopy can indeed lever roughly in moving air if flying at throttle and thereby roll sideways more. Obviously with the 3-liner the C-steering doesn't operate at all as it does with a true 2-liner. The canopy bends visibly behind the B level when pulling the beautifully soft C-risers (see weight distribution) and deforms the profile. Nonetheless, pitch corrections can be managed well enough. Comparing glide with current C gliders showed that Swing's new high-end C sport class glider is positioned at the top of its class in accelerated flight and can absolutely hold its own against many D class gliders in regards to the top

speed measured of 56kph with simultaneously flat polar curves. With one difference: with the Agera RS, the maximum speed can be flown in a suitably relaxed way because of the high pitch and collapse stability, and if it should ever collapse, asymmetric and frontal collapses are nowhere near as aggressive thanks to RAST 2.0.

### Extreme flying manoeuvres

In about 30 hours of airtime, I experienced ‘true’ asymmetric collapses only in accelerated flight, and not one single frontal collapse, even though flying conditions were at times fairly tough. The asymmetric collapses were completely unspectacular, inflation was usually ‘snappy’. RAST 2.0 may have countered major collapses here, ultimately the positive effect of the partition was likewise seen with provoked asymmetric collapses: for numerous non-accelerated asymmetric collapses, the RAST 2.0 system evidently favours a flat folding angle and lower wing chords. Major collapses with steep folding angles could be achieved only if the pilot pulls down the A risers long and far in order consciously to force the collapse beyond the partition. The problem with this is that there is high load on the A lines and huge force is required to initiate the manoeuvre and overcome RAST

2.0. These asymmetric collapses brought a large variance in the extent of collapse and the line of collapse and were thereby hard to reproduce and assess. With these large-scale asymmetric collapses that were clearly initiated beyond RAST, the Agera RS behaves completely typically for its class. There were no line-overs, although the deformed section of wing opens rather harshly and ‘snappily’. With a normal front stall from trim flight, the Agera RS generally folds symmetrically at the partition. There is then a slight delay before it opens, but it does so automatically. Re-inflation can be expedited by measured symmetrical braking. The wingtips can migrate forwards only with extreme front stalls beyond RAST 2.0, i.e. over the entire surface, so that the glider forms a U-shape. Here too, symmetrical braking on both sides assists the wing to open and stabilises it promptly.

### Fun factor (dynamics & agility)

The Agera RS offers a high level of agility and sufficient dynamics to perform impressive wing-overs. Anyone wanting to swing high over the canopy should always properly support the wingtips using the brakes at the dead point. Likewise, asymmetric spirals, tight turns etc. can be neatly flown.





Almost 90% of the load is on the A and B levels, with the C level having more of a supporting function.

# SWING AGERA RS

BRIEF ASSESSMENT	
LAUNCH FEATURES	Forward launch **** Risers easy to hold, rises reliably, may brake out sideways, does not shoot forward much at ist zenith
	Reverse launch ***** Doesn't hang back, may now and again yaw around the main axis, minimal shooting forward, reliable in nil wind too
	Handling in strong wind *** Ears twitchy and get tangled, fickle on the ground, canopy tends to yaw and break out sideways, however shoots forwards only averagely
FLIGHT BEHAVIOUR	Agility **** Flat turner with good roll moment and passage, prefers brakes "off" in circling flight
	Control behaviour **** Immediate, low control pressure, somewhat "silent" brakes, unclear stall point/stall range
	Collapse behaviour ***** Unspectacular non-accelerated, RAST 2.0 system ensures flat folding angles and low chord length
	Accelerated flight ***** Can roll more, leading edge extremely stable, average pedal force (higher after kick-down), excellent glide
	Damping *** Can pitch more, low roll damping in turbulence, can lever, air blasts
	Stability ***** Constant internal canopy pressure, front extremely stable, wing tips
DESCENT METHODS	Big Ears **** Hard to find the correct point, 'ears' uneasy if pulled too much, canopy rolls
	B-Stall **** Works perfectly!
	Spiral dive ***** Manoeuvre starts without hesitation, turns markedly from 12 m/s, active
SUITABILITY	Experienced, ambitious XC pilots, competition beginners
RATING	* mangelhaft    ** durchschnittlich    *** gut    **** sehr gut    ***** ausgezeichnet

## DESCENT METHODS

### Big Ears

Both practice and feel are needed for the 'big ears' manoeuvre. If the baby As are pulled down too forcefully, the 'ears' will flap around and there will be considerable disruption in the "glider/pilot" combination. If too much surface area collapses ('ears' flapping, high holding forces) the best thing to do is to reopen the ears then start the manoeuvre again with less force and holding down less area. Ideally, experiment to work out what is the right amount and remember that. It is then relatively easy to fly with sink rates of 3 m/s, and even higher using the speed system. The canopy can roll more in moving air if the speed bar is used. To exit the manoeuvre, quickly release the A-risers. Usually the ears then open automatically. Use pumping to assist any cells that don't.

### B-Stall

The Agera RS is one of the few canopies with higher aspect ratio in which the B-stall operates perfectly and that in our view can be recommended. Grasp both B-risers at the coloured mark from the outside on the mallions and pull with average force beyond the stall point. The B-risers should then not be pulled any further but should be held in that position. The canopy

sinks gently with high sink rates and pleasant holding forces. To exit, quickly return the B-risers to position, the wing continues reliably and does not shoot forward much...a perfect manoeuvre with the Agera RS!

### Spiral dive

The spiral dive begins almost instantly, the canopy turns away markedly and descends. Up to 15m/s the Agera RS automatically recovers from the spiral dive. Depending on weight, braking the outside half of the wing and/or weight-shifting to the outside to recover from the spiral is advisable. At even higher sink rates, the canopy turns away clearly, however the tendency to straighten up remains moderate and manageable after exiting the dive.

## SUMMARY

There is no doubt that the Agera RS enriches the sport class. An obvious point is its indisputably formidable glide performance. The sport class wing is impressive above all in accelerated flight up to its top speed at about 56kph with its flat polar curves and above average stability. If there should nevertheless be a collapse, then the pilot can rely on the benefits of the RAST 2.0 system, which without doubt favours a flat folding angle and lower chord length. The Agera RS presents

itself as somewhat 'different' in thermals, and it definitely has to be flown 'differently' in lift. And indeed as a high performance glider: with sufficient speed...hardly any outside brake...and consistent weight-shifting! Then the sleek wing will show that in lift it is happy to turn, agile and always super-stable. Of course the performance-optimised canopy transmits air movements relatively directly to the risers. With a sensitive harness without seat-board, yaw, roll and pitch movements in difficult conditions transfer unfiltered to the pilot. Those moving up from the B class must be aware in particular in strong thermals that, e.g. there is a considerable difference between the intermediate Nyos RS and the Agera RS in regard to flight behaviour, which requires appropriate control behaviour and considerably quicker reactions, as the performance-oriented concept gives the uncompromising XC machine the character of a high-performance glider, particularly in demanding conditions.

The Agera RS is intended for ambitious XC pilots, who will be thinking about the glider's performance capability on long flights. The full XC potential of Swing's new high-end C glider will soon be demonstrated by various XC aces and Swing's team pilots Didi Siglbauer & Co, who are targeting a FAI 300 with high average speeds. ■