Thermik

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7_2022

REPORTAGE

Leinenriss

TEST

Ozone BV1
Dudek Nemo 5
Swing Sphera RS

TECHNIK

Thermikkurbeln

KÖSSEN

SUPER PARAGLIDING TESTIVAL

Einzelausgabe € 9,70

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The inner workings of the new racer are clearly visible: RAST (blue strip in the middle) and various bands …

SWING SPHERA RS

The comeback! After many years of abstinence, Swing has once again launched a pure EN-D two-liner to the market, with the Sphera RS. We have tested this exciting new glider from Upper Bavaria and, of course, compared it against CCC gliders as well …

Testpilot: Franz Sailer
Fotos: Norbert Aprissnig
Pilot for Fotos: Markus Smeykal

It's been a long time since Swing launched a two-liner glider. In 2012, the last two-liner concept, the Core 3, went into series production. 10 years later, the Landsberg-based paragliding company has surprised the paragliding scene with a brand-new two-liner design. The basic idea for the Sphera RS came from Maurizio Bottegal, the long-time Swing Italian importer. The former competition pilot approached Swing with the wish to create an XC two-liner glider, that was easy to handle and combined the advantages of a two-liner glider with the advantages of RAST. Together with some experienced XC and competition pilots from his area, he offered to help with the development and the complex test and comparison flights.

Maurizio tells us: „At the end of August 2020, in the middle of the first pandemic, I called Alessio and asked him if he could draw a two-liner glider on the computer. The day after, we were at Monte Avena testing three different two-liners to get more understanding of the design."

As a result, Swing designer and test pilot Alessio Casolla and a team of passionate pilots worked together with dedication and enthusiasm to bring the Sphera RS to the market.

In total, only four prototypes were needed until homologation at the end of 2021, amazing! Thus, after a decade, the German manufacturer once again has a high-performance wing with a two-liner construction - and equipped with the patented RAST system - in its product range. Swing comments on the concept and target group of the Sphera RS as follows: „Never before has it been so comfortable to fly a two-liner glider and so easy to access its full performance potential. Therefore, the Sphera RS is the first choice for ambitious XC pilots and aspiring competition pilots who want to enter the two-liner class to raise their personal performance to a new level."

And Swing team pilot Tim Huber, took this to heart right away on May 15th with the Sphera RS: From Unternberg near Ruhpolding, he achieved a great FAI triangle of 254 km and thus made a tremendous start to the season. Likewise, the German Matthias Wehrle also created a sensation with the Sphera RS: he flew a new German flatland record with a closed 219-km FAI triangle from Kandel on May 30th. At Swing, it will be interesting to see what development potential the combination of two-liner technology and RAST has in store for the C-Class. Apparently, they are already thinking more than just a bit in this direction …

CONSTRUCTION, MATERIALS AND DESIGN

It was clear that Swing would eventually use the patented RAST system in the high-performance class as well. Particularly in a two-liner, the RAST wall should offer great advantages in the event of canopy failure, as two liner constructions - when they do fail - can sometimes break away over a large area. The Sphera RS is now the first two-liner with RAST on the market. With an aspect ratio of 6.9, the Sphera RS fits snuggly into the current two-liner class, which is where numerous other manufacturers with similar key data for their models are to be found.

In contrast to other swing models in the lower glider classes, the Sphera RS comes with a distinctive shark nose. The young design team is convinced that this design feature is responsible for high stability in fast flight.

Although, Alessio tells us, the first prototype at the end of October 2020 did not have a shark nose. It already flew very well, but could not quite reach the performance of the top models on the market. The second prototype followed in February 2021, this time with a shark nose. The air intake openings at the leading edge are narrow, as is typical for the class, but not excessively small. When it is laid out in the editorial office, the Sphera RS confidently turns up its nose to show: I am properly „shaped and wired"! Long Nitinol wires extending into the wingtips support both the upper and lower surfaces, and are made of the well-known shape memory alloy that is resistant to buckling, temperature and moisture. The name Nitinol is an acronym for Nickel Titanium Naval Ordnance Laboratory. Swing has long been one of the few paraglider manufacturers to use this (expensive) material, known from medical technology, as a nose reinforcement in paraglider construction. According to the manufacturer, the nitinol reinforcements ensure

TECHNISCHE DATEN (HERSTELLERANGABEN)

Hersteller/Vertrieb	Swing Flugsportgeräte GmbH, An der Leiten 4, D-82290 Landsberied, +49 (0) 8141 /32 77 888, info@swing.de, www.swing.de			
Produktion	Aeroman China			
Konstrukteure	Alessio Casolla, Maurizio Bottegal			
Testpiloten	Alessio Casolla, Maurizio Bottegal			
Größen	S	**SM**	ML	L*
Zellenanzahl	75	**75**	75	75
Startgewicht (kg)	75–90	**85–100**	95–110	105–120
Fläche ausgelegt (m²)	21	**22,5**	24,2	26
Fläche projiziert (m²)	18	**19,3**	20,8	22,3
Spannweite ausgelegt (m)	12	**12,4**	12,9	13,3
Spannweite projiziert (m)	9,7	**10**	10,4	10,8
Streckung ausgelegt	6,9	**6,9**	6,9	6,9
Streckung projiziert	5,2	**5,2**	5,2	5,2
Kappengewicht (kg)	5,3	**5,6**	5,9	6,2
Gesamtleinenlänge (m)	–	**–**	–	–
Preis inkl. Mwst. (€)	5.690,–	**5.690,–**	5.690,–	5.690,–
Gütesiegel LTF/EN	D	**D**	D	D
Lieferumfang	Sherpa Packrucksack, Protection Bag 2, Kompressionsband, Reparaturset, Betriebsanleitung			

*Noch nicht homologiert

In the hands of an experienced pilot the Sphera RS shows its handling and its dynamics …

Swing Sphera RS:
Two-liner technology at
its best

a permanently razor-sharp leading edge and maximum profile stability in the Sphera RS. There is no question that the resulting high profile stability can be seen in the wing when it is spread out on the ground.

Our impression will be confirmed later during the many test flights. The performance profile developed especially for the Sphera RS was designed step by step. „We started from a profile we used in some prototypes of earlier models, adapted it to a two-liner design and then modified it for our needs after aerodynamic simulations. Finally, we optimized the rear part of the profile to balance the behaviour in accelerated flight," Alessio and Maurizio explain.

As a further performance booster, „Airflow Alignment" ensures optimized aerodynamics. In the area of the leading edge of the profile, double 3D shaping is used to reduce wrinkling. What's more, the individual ribs are aligned with the airflow direction from the centre of the wing outwards to maximize the aerodynamic quality of the profile, which is further enhanced by the additional use of mini-ribs all the way to the trailing edge. In addition to the supporting RAST wall, there are low-stretch transverse tension bands in the area of the A and B attachments.

As for the fabric, a mix of Skytec 38 (38 g) and Techtex Sakai STA15 (32 g) at the front and STA10 (28 g) at the back is used for the topsail and STA10 for the entire bottom sail. The Sphera RS is equipped with the Pro-Dry Aramid lining. These are the latest generation of unsheathed aramid lines - for maximum performance and trim stability. The special Pro-Dry coating reduces the line's moisture absorption by up to 60% and also increases UV resistance and dirt resistance. The lines are differently coloured in magenta, blue and orange.

The Sphera RS riser consists of two main risers, the outer A-lines are separately attached, so that the split A-riser ensures an even angle of attack of the canopy over the entire speed range and allows for „ears". The specially designed, ergonomic „T-bar" is mounted on the B-riser and can be removed. Maillons with rubber rings for line fixation, smooth-running Ronstan ball-bearing accelerator pulleys, swivel, brake pulley, magnetic brackets and the Swing Multigrip brake handle complete the set-up. The Sphera RS comes in four sizes, three colour designs and covers a take-off weight range from 75 to 120 kg.

START

In the last five years I have been able to test all the two-liner gliders available on the market and thus get a truly complete picture of this high-performance glider class. Therefore, my excitement was even greater and the tension was palpable when I laid out the Sphera RS at the launch site for the first time. The aramid lines are quickly separated and sorted, as the high stiffness of the line material reduces knot formation.

Forward launch

Lay out the leading edge so that it's straight in the middle or only slightly bent, but pull the outer wings down more distinctively. This way the stretched two-liner glider will reliably catch air in the middle first, without any tendency to create a primary horseshoe in the pull-up phase (ears are pushing forward). It is not necessary to launch the Sphera RS with an impulse and/or run into the loose lines. Instead, pull up the glider with the lines of the A1 riser when they are just taking tension. When pulling up the glider, RAST decelerates the incoming air. The front part of the profile fills much faster, during the further inflation process the rear part of the canopy is only slowly filled with air. In the inflation phase, the canopy therefore prefers constant pull in order to reliably rise to the zenith. If the wing was pre-inflated on the ground - which is generally not the case with zero wind launches - the canopy rises faster at the beginning and has to be braked at the apex. If there is a crosswind, the wing can easily break out sideways, so the pilot must under-run the canopy as a result and, if necessary, be brought back on course by means of a stronger brake input.

Reverse take-off

From a wind speed of 5 km/h the Sphera RS can be launched backwards without any problems. Grasp the inner A-risers and pull up with constant momentum. In light winds, a strong impulse may be given to quickly fill the canopy behind the RAST with air. If, on the other hand, the canopy is pre-inflated, a controlled pull is sufficient to avoid a significant overshoot. In the set-up phase, the canopy can sometimes veer off course and yaw around the vertical axis under the influence of crosswinds, but this is not uncommon in this glider class.

SWING SPHERA RS

Strong wind launch

The canopy usually stays nicely on the ground in a strong wind or can be held there with the brakes. However, the wind likes to blow the trailing edge over the entry openings and closes them in no time, so that the pulling-up process is hindered or made more difficult. The best thing to do is to lay the canopy out so just a small middle section is presented to the wind and tighten the sensitive outer wings considerably. The wind-up impulse again depends on whether the canopy has been pre-filled or is lying empty on the ground. When pre-inflated, the Sphera RS can overshoot as is typical for its class if it is inflated too quickly. It then requires a quick brake reaction. When deflated, the filling process is delayed by the bulkhead (RAST) and the wing climbs much more gradually to the zenith. The high aspect canopy is clearly more susceptible to side winds, it can be turned abruptly off course by a gust of wind and needs „short reins" applied quickly to be brought back to its original line.

FLIGHT BEHAVIOUR

After take-off, I immediately have to fight the Danube wind to reach the house thermal in Marsbach. This is where the initial thermal is located in easterly winds, and it is important to catch it. At half bar, the Sphera RS pulls extremely efficiently through the bubbling masses of air that boil up from the seething ridge every few meters. The high canopy tension instils confidence. The Sphera RS only jerks slightly with the outer wing tips now and then when a thermal rushes into the lower sail. I reach the thermal … and enter effortlesslyx … within a few minutes I am above the ridge by about 1,000 meters in altitude and am amazed: Wow, that was fast! The Sphera RS turns very nicely in the thermals. The roll movement is relatively benign - the wing is not overly eager to roll, but neither is it a bulky flat-turner. In other words: The wing is happy at all banking angles. The brake works precisely and directly, first on the wingtips, later further in. In moderate thermals, the first 15 cm of braking distance can be used to gently lift the wing into any banked position or to effortlessly vary the radius. Only in stronger or more turbulent thermals does the two-line glider need more frequent control inputs and a stronger pull on the brake. As a result, the steering forces increase more noticeably, a fact that is later confirmed by the steering force measurement. Today, a flatland triangle is in the books, and according to the forecast, the wind should drop during the day. I put the spurs to the Sphera RS and glide 5 km north. With my take-off weight of 99 kg, I am in the upper range of the SM test size (85-100 kg). That's good, because the Sphera RS should definitely be flown above 96 kg take-off weight in tricky conditions. No wonder that the highly loaded wing pulls forward brilliantly and penetrates the air masses very effectively. The overall control travel is typically short, and the stall point itself is not as pointy and clearly defined as in some other two-liners. Nevertheless, the outer wing tips are a very reliable indicator of a stall. If you continue to pull abruptly in tight, flat turns, the stall is clearly visible at the end of the wing. At this point there is still enough time to release the brake. The one shortcoming with the brakes: It is relatively silent in feedback terms. The Sphera RS seems to indicate air movement via the risers. The canopy, which is well tensioned, moves as a whole block in turbulent air masses rather than working against itself. The outer wings are also super stable in turbulent air. The disadvantage: For my taste, the tensioned wing provides slightly too little information in light thermals. In other words, you have to learn to interpret the sparse movements of the ears correctly or look at the on-board computer (thermal centring aid) from time to time in order to make centring corrections in good time.

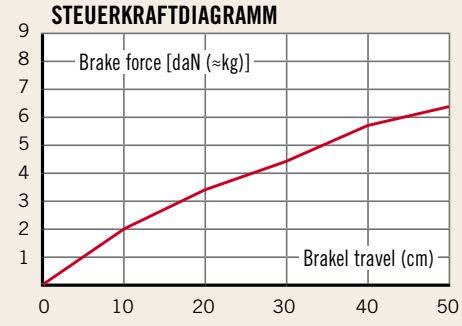
Thermal flight

When entering a thermal, the canopy pulls actively into the centre - it does not pitch unwillingly, but also does not rush forward wildly with an overshooting tendency. Pitching tendencies are more likely to occur when the Sphera RS impulsively nods forward on exit from the updraft; at this point a determined, quick hand is called for. And: In turbulent upwinds, the two-liner can sometimes lift more powerfully and has a tendency to want to go off course. In no way is the Sphera RS a tiring „outer-wing pitcher" or „outer-wing reliever". With some high performance gliders you have to keep a close eye on the outer wing in turbulent air, often applying the brakes when the fast outer wing „closes" the radius and wants to drill its way down. Not with the Sphera RS! Even in disruptive thermals, the wing is super-stable and does not stress you with annoying ear deflations. An ingenious design - a big plus in boisterous thermals!

The two-liner not only makes a solid impression, it is solid! I observed this on several occasions: The sturdy canopy dives a meter rather than folds in at the front. Only three times did I have to catch a (harmless) collapse. Otherwise, nothing happened in about 25 hours of airtime. Of course, the Sphera RS needs an experienced high-performance pilot who knows how to tame the wing's decent horsepower, but

TEST PROTOCOL

Take-off weight test pilot (kg)	97-101
Area load. (kg/m²)	4.31-4.44
Harness	Genie Lite 3, WV GTO 2
Measuring instruments	Flymaster Live SD, Skytraxx 2.1
Speed bar travel (cm)	47 (measured to kick-down ball)
Weight glider (kg)	5,65 (weighted)
Vtrim (km/h)	41 (100 kg load. at 1,800 MSL)
Vmax (km/h)	60-61 (100 kg load. at 1,800 MSL)



Comments: increased brake pressure, short brake travel, precise and direct response to inputs, short brake travel to stall, stall point diffuse, but with reliable visual indication

CONSTRUCTION/MATERIALS

Canopy: long Nitinol wires on top and bottom sail, Shark Nose, Airflow Alignment, double 3D-Cut, RAST, Miniribs; Topsail: Skytec 38, Techtex Sakai STA15 (32 g) front, STA10 (28 g) back; Bottom sail: Sakai STA10

Lines: line material: unsheathed Pro-Dry Aramid; main lines: Edelrid 8001 230/190; middle gallery: Edelrid 8001 130/190; top gallery: Liros Dyneema DC100/60

Riser: 12 mm cousin aramid/polyester webbing, Techtex maillons with rubber rings for line fixation, smooth-running Ronstan ball-bearing accelerator pulleys, swivels, brake pulley, magnetic holders

PILOT EXPERTISE
(DEMAND ON THE PILOT)

E1	E2	i1	i2	S1	S2	H1	**H2**	CC

H2: Demanding high performance glider for XC and competition. Required Skills/Experience: for highly experienced pilots who demonstrate outstanding talent and exceptional flight experience. Required airtime: min. 150 hrs./year

PILOT COMMENT

There are test gliders where it hurts when you have to return them. I was reluctant to send the Sphera back...

What we liked: very strong on glide, super stable, strong in thermals

What's different: RAST 2.0 system on a two-liner

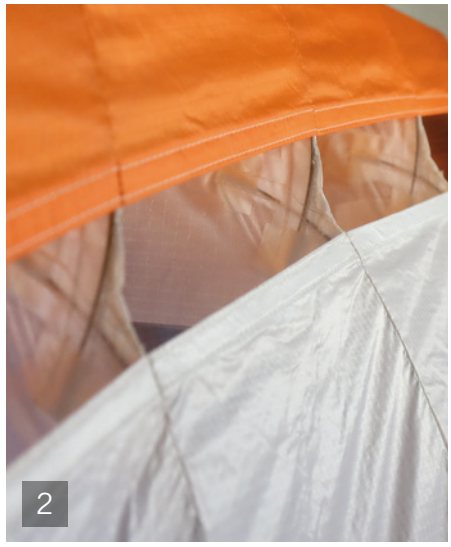
What we miss: less sharp B-handles (to grip for mittens)

SUITABILITY

Beginner		XC	●●●●●
Casual pilot		Acro	
Competition	●●●●	Hike & Fly	●●●●●

• (low suitability) to ●●●●● (high suitability)


1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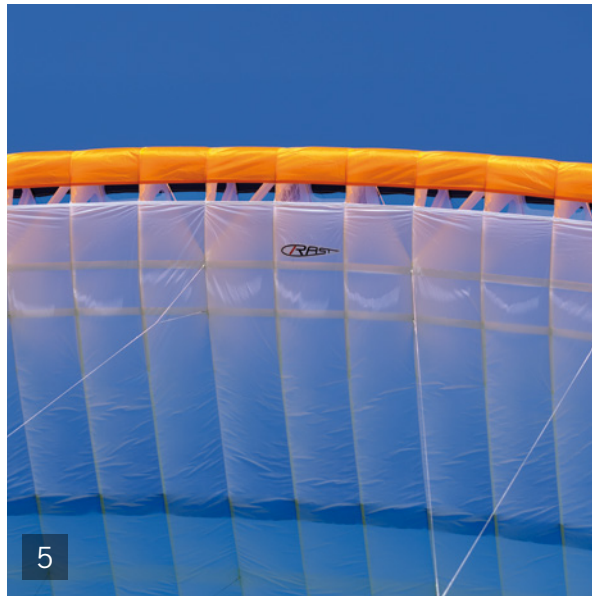
SWING SPHERA RS

1. The riser of the Sphera RS with long speed system and distinct handle for B-steering
2. The crossed nitinol rods form the shark nose
3. Riser details with B-steering handle and separate outer A-risers
4. Profile nose with prominent Shark Nose
5. Double pivot A-risers with cross tension straps and diagonal ribs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it doesn't stress you out with „soft ears". This has another big advantage: with the Sphera RS, the „dynamic thermal entry" can often be used: Apply the speed bar approx. 30-50 % before entering the thermal … pierce into the thermal … release the speed bar successively … and the Sphera RS will catapult you upwards with screaming beeps. Speaking of climb behaviour: One must always be careful with performance comparisons, because too many factors are involved. Nevertheless, numerous extended thermal comparison flights with other test pilots have definitely shown that the two-liner from Landsberied climbs excellently even with a full 100 kg load.

Accelerated flight

I accelerate 50 to 100 % on each glide passage to save time on this great thermal day. The Sphera RS glides excellently, this is reinforced after several comparative flights. The Sphera RS does not need to shy away from any comparison with the current EN-D two-liners. On the contrary: the performance in fast flight is formidable, even in direct comparison with current CCC gliders the two-liner glider performs surprisingly well - and this means a lot! The top speed is about 60 km/h, with a truly flat polar curve. Up to kick-down, the bar pressure remains pleasantly low; only above this point you have to strain your calves and thighs a little. Without the kick-down ball, the accelerator travel is noticeably prolonged again, so that some harnesses will have the bar at the limit. The tensioned wing sends sufficient feedback downwards, it is about in the middle range of the current two-liner gliders when it comes to „passing on information" in fast flight. In other words: some gliders communicate the limit range a little more precisely, others are clearly more „mute" in that they are even more hesitant with informative canopy feedback. The plastic handles are nicely ergonomically shaped and easy to grip from above with finger cuffs. With mittens, however, you have to grip sideways; they are too pointed for this and eventually start to hurt on longer flights. Rounded ends are a better alternative.

In high-speed flight, especially in turbulence, the wing, which is quite happy to roll, does not always follow the track and has to be brought back on course from time to time - thrown off course by air shocks. On the other hand, the pitch axis is less of a concern: at full throttle, the canopy is almost as stable as a „fixed wing" above the pilot. In the evening I glide almost 20 km at speed over the flatland back to the launch site and am thrilled by the high-speed flying characteristics. After almost six hours of airtime, I land back in Marsbach. At the end of the day, I managed a 107-km FAI flatland triangle - a flight area triangle record, which is undoubtedly also due to the great gliding performance of the Sphera RS …

Extreme flight behaviour

In just under 25 hours of airtime I experienced three harmless side collapses, no frontal collapses or front deflations. Provoked side collapses could only be pulled with brute force and with an undesired pre-acceleration of the canopy. In the same way, pulled front

The Sphera RS shows its strengths in thermals and on glide

SHORT REVIEW

LAUNCH CHARACTERISTICS	**Forward launch** ★★★	Takes more time to fill in zero wind, can get stuck in zero wind, can rotate around vertical axis
	Reverse launch ★★★★	Easy in light headwind, no hang-up, may yaw around vertical axis, if pre-filled (RAST), canopy may advance more significantly and needs quick input at zenith
	Strong wind handling ★★★	Canopy stays on the ground, oscillates on the ground around the vertical axis (yaw), initially rises moderately, but must be stopped consequently at the zenith if pre-filled (RAST).
FLIGHT BEHAVIOUR	**Agility/maneuverability** ★★★★★	Good roll moment, great penetration
	Brake response ★★★★	Slightly increased control pressure, reacts quickly to inputs, stall point/stall area diffuse due to RAST effect, but optically well recognizable
	Collapse behavior	Collapses rarely, three unaccelerated side collapses were manageable, few outer cells can snag
	Accelerated flight ★★★★	Leading edge very stable, initially low bar pressure (significantly higher after kick-down), very pitch stable even in turbulence, not always true to track
	Damping ★★★	Can roll in turbulence, now and then more powerful pitching, occasionally distinct levering
	Stability ★★★★★	Constant canopy internal pressure, front extremely stable, canopy dives rather than collapses at the front, wingtips also stable
DESCENT TECHNIQUES	**Ears** ★★	Difficult to pull and hold, ears like to pop, in combination with foot accelerator unstable and with big tendency to roll
	B-stall	Not possible
	Deep spiral ★★★★★	Initiation quick, canopy turns very stable and hardly moves in itself, high g-forces, exit typical for high performance gliders: turns and rises more strongly.
Suitability		Ambitious XC pilots, competition pilots
Rating		★ poor, ★★ average, ★★★ good, ★★★★ very good, ★★★★★ excellent

collapses cannot be achieved without a folding line and are therefore equally unrepresentative. Therefore, no reliable statement can be made about the exact collapsing behaviour of large deformations (turning, shooting forward), but it can be made regarding the stability of the canopy: very high!

Fun factor (dynamics & maneuverability)

Can you conjure up high wingovers, tight turns or lush spirals in the sky with an upright two-liner? No problem with the Sphera RS! The wing has enough roll moment and great punch to swing high over the canopy. However, the high load of the limited line set-up should not be ignored.

DESCENT TECHNIQUES

Deep spiral

The agile canopy dives quickly if the inside brake is applied. In the spiral the wing rotates surprisingly stably despite the high aspect ratio - the canopy only works a little inside itself. From -10m/s the Sphera RS generates massive g-forces typical for the class, an anti-g system for emergency descent is advisable. The exit of the spiral dive should be done slowly and steadily over several turns to prevent a significant surge of the canopy.

B-stall

The B-stall is not possible due to the design.

Ears

Ears require practice. On the one hand, the outer A-lines must be grasped very high up and pulled deep so that the ears fold away correctly. If the ears are pulled too short, the outer wings will not fold properly and will open again immediately. If the ears fold up cleanly after a deep pull, however, you have to reduce the pull discreetly again, because the outer wings start to flap or snap open if too much surface area is folded in. Without using the accelerator, you soon get the hang of it. In combination with the speed system, however, the point at which the ears finally remain stable is not easy to find. Furthermore, with the speed system activated, the canopy tends to roll more, which in turn promotes the tendency of the outer wings to snap open.

CONCLUSION

It is not easy to build a two-liner which does full justice to the current high level of performance, but which also offers a high level of safety and stability in fast flight, and which also has excellently balanced thermal handling. The Sphera RS hardly allows itself any weaknesses and performs convincingly in almost all aspects - this cannot be said of every two-liner currently on the market. Not least because of its evident stability and its pleasing thermal handling, the new Swing glider is predestined for frequent-flying, ambitious C-pilots to make the step up to the EN-D two-liner class (and thus into a new flying dimension) with confidence. The Swing construction team around the two protagonists Alessio Casolla and Maurizio Bottegal has done a brilliant job, congratulations! ■


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