WINSPACE

SLC 5

WHITE PAPER

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WINSPACE SLC5 WHITE PAPER

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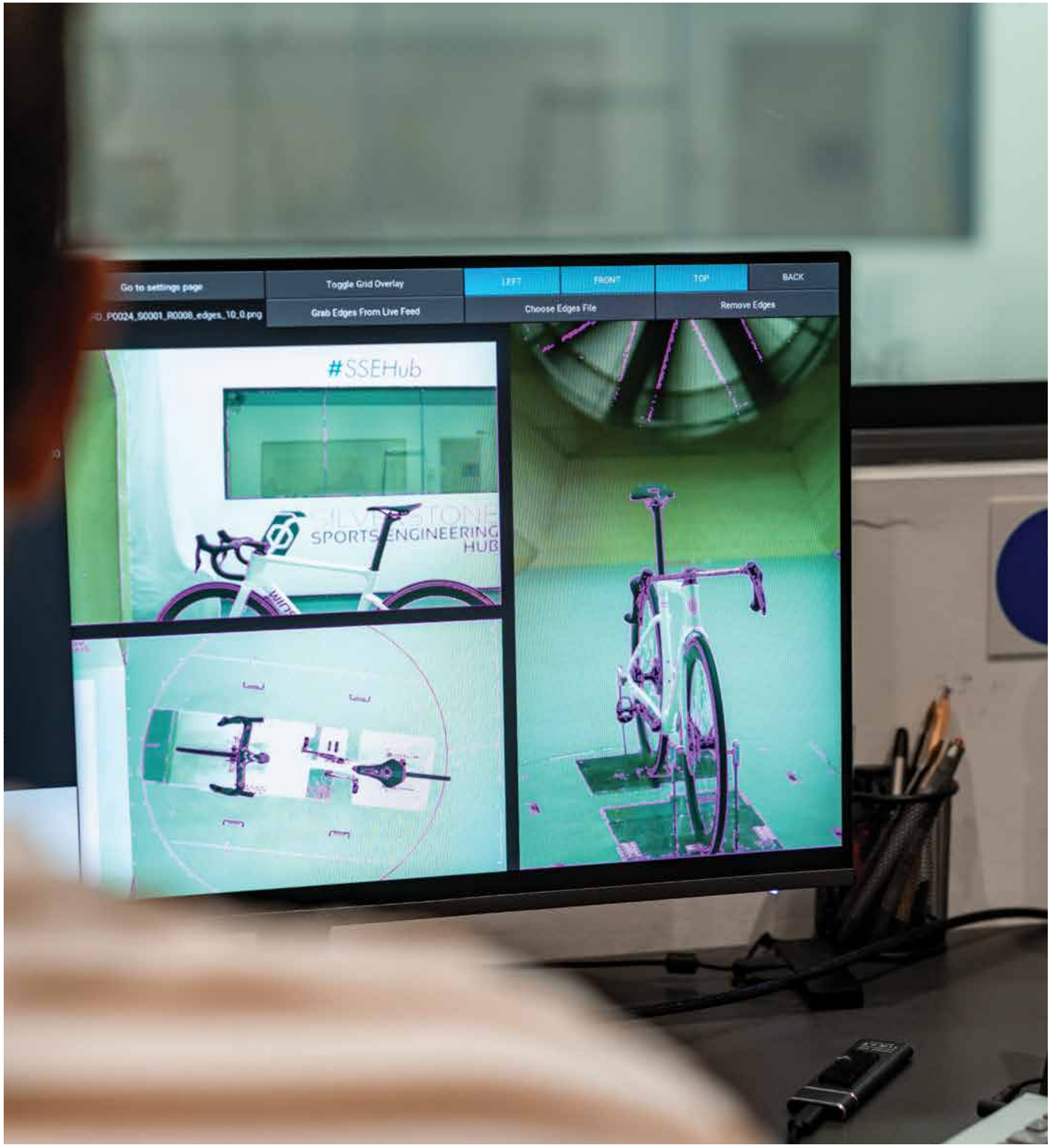


INTRODUCTION

17 YEARS. 1 OBSESSION : Carbon Bike Mastery.
Aero. Climbers. Do-it-all machines.
Each one built with purpose

Then came the question:
What if we built the Ultimate ride?

The SLC5 is our answer.
Everything we've learned — taken further.

Not just speed.
The future, in motion.

DESIGN PHILOSOPHY

Speed isn’t just about slicing through air.
It’s about control in a crosswind. Confidence on a descent.
And getting there without wasting a single watt.

At the heart of the SLC5 is a belief :
Aerodynamics should never come at the cost of ride feel. So we reimagined every surface, not just for drag reduction, but for harmony.
Stiff where it matters. Smooth where it counts.

And then we cut the weight.
Not to chase a number, but to keep the bike alive under pressure.
Fast uphill. Stable downhill. Reactive when it counts.

The result?
A bike that disappears beneath you, until the next attack.

THE SCIENCE BENEATH THE SLC5

1. Engineered from the Ground Up
No Recycled. Every tube and carbon layer was custom-designed for real-world strength using advanced simulations.

2. Perfectly Balanced
We optimized for stiffness, durability, and light weight — tuning each part to work in harmony.

3. Tested to the Limit
Prototypes were lab-tested for stress, fatigue, and impact using sensors and precision tools.

4. Refined Through Iteration
Eight rounds of R&D led to a 12% boost in stiffness and 6% less weight — without compromising comfort.

5. Validated by the Road
After lab success, pro riders pushed it on real terrain. The result? A frame that's ready for anything.

SLC5 Functional Zones Key Highlights:

Head Tube
Designed to resist lateral flex during steering, ensuring precise handling at high speeds.

Down Tube
Transfers pedaling power efficiently to the bottom bracket, maintaining stiffness under heavy load.

Bottom Bracket
Built for maximum torsional rigidity and resistance to crushing forces under sprinting efforts.

Seat Tube
Supports rider weight while providing vertical compliance for added comfort during long rides.

Top Tube
Helps manage frame vibrations and harmonic feedback for a smoother ride feel.

Chain Stays
Engineered to deliver optimal power transfer and keep drivetrain alignment stable under pressure.

Seat Stays
Tuned to filter out road buzz and enhance comfort, especially on rough
surfaces.

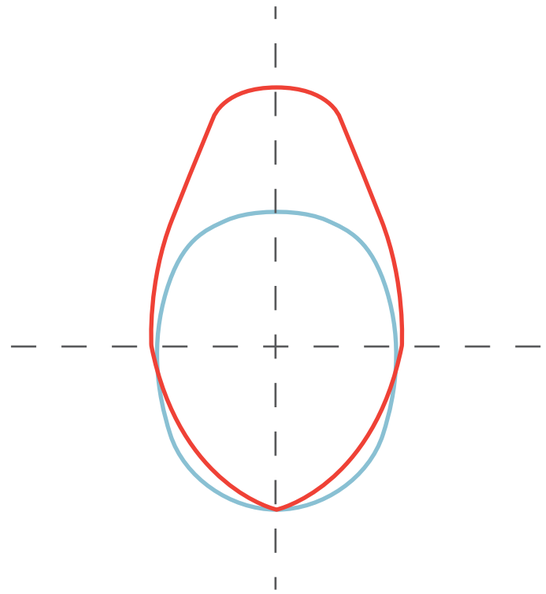
To build a better frame, we had to understand what “better” really means. This section breaks down the structural improvements that make the SLC5 faster, stiffer, and more responsive than its predecessor and many of its peers.

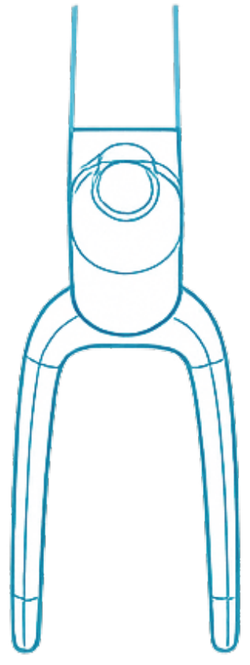
Because marginal gains aren’t optional.
They’re engineered.

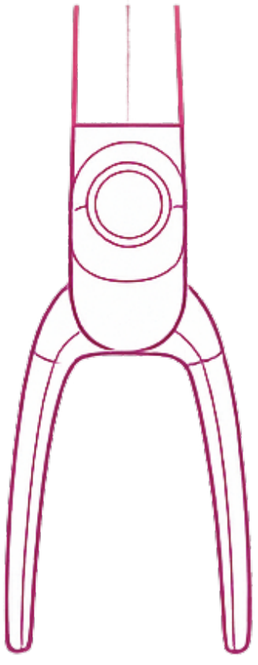
HEAD TUBE

The head tube employs a deep, narrow profile to reduce frontal drag while efficiently guiding airflow toward the top and down tube junction.

Its cross-sectional geometry is aerodynamically optimized to mitigate lateral flow separation, delivering enhanced stability in variable wind conditions.



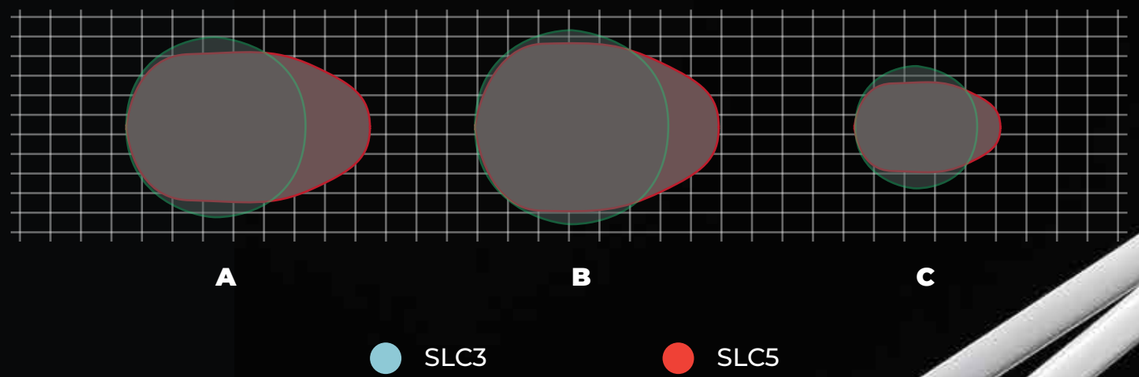


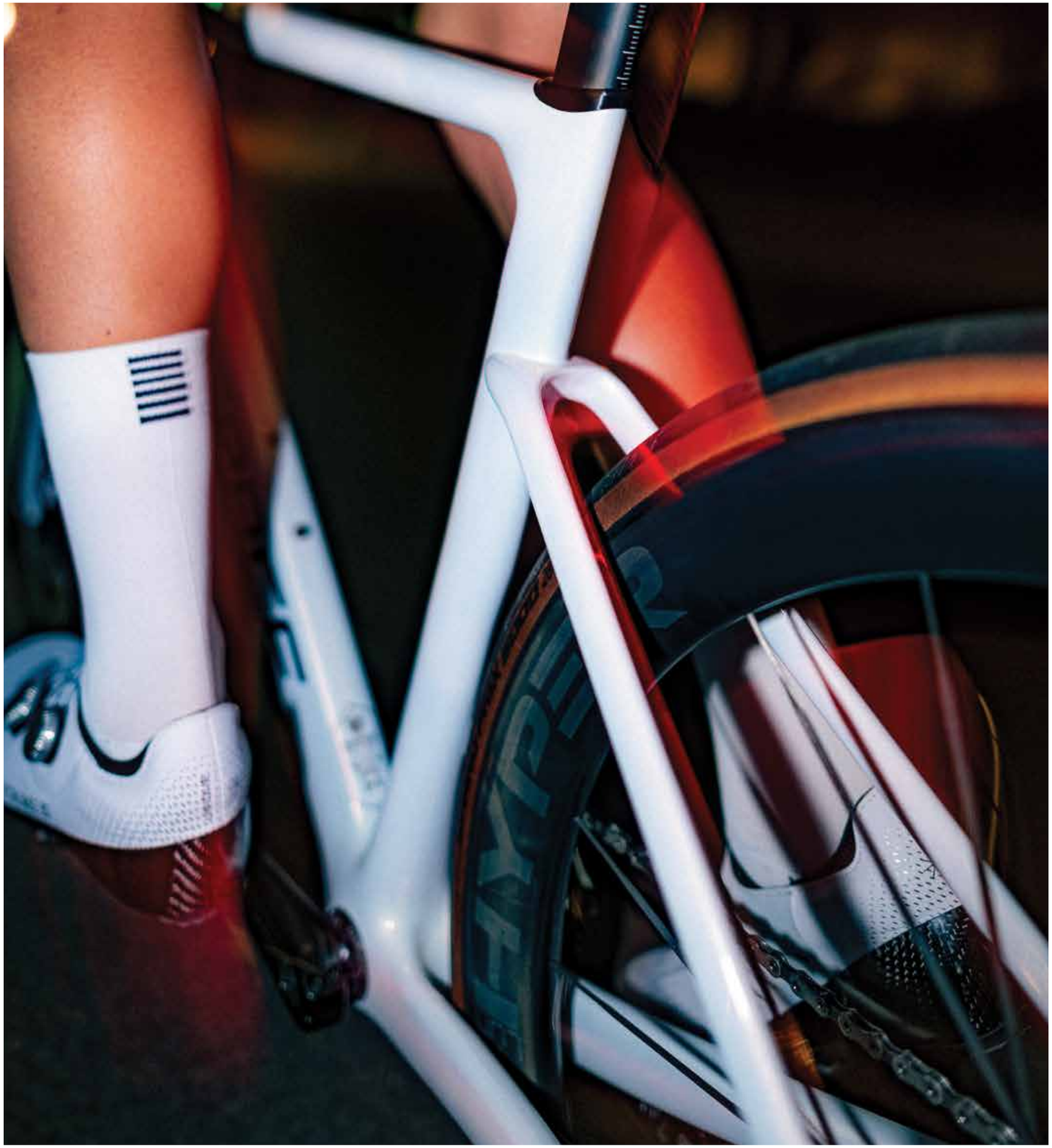


SEAT TUBE

The seat tube features a re-engineered, truncated aerofoil profile that tapers progressively from top to bottom, curving inward to closely follow the rear wheel. This design minimizes wake turbulence, maintains laminar airflow, & preserves aerodynamic efficiency through the rear triangle.

The lower section subtly flares to accommodate bottle cages without disrupting flow, while surface continuity prevents separation under load. Its curvature was refined through iterative shaping and validated in wind tunnel testing, with torsional strength peaking just above the bottom bracket—where it matters most.





REAR TRIANGLE - REDEFINED

The redesigned rear triangle brings improved compliance and control without compromising efficiency.

The dropped seat stays feature a flattened profile, tuned to absorb high-frequency vibrations and deliver a smoother ride across mixed terrain—while preserving lateral stiffness for precise handling.

At the base, the chainstays are broadened near the bottom bracket to counter torsional flex under hard pedaling, then taper elegantly toward the dropouts to maintain a responsive, road-sensitive feel.

Built on What Came Before
SLC5 vs SLC3

	Whats Changed	Objective
Head Tube	Slightly shortened (e.g. 115mm on size M)	Lowers frontal area for a more aerodynamic rider position
Down Tube	Shape evolved from oval to teardrop-inspired profile	Improves airflow management around the drivetrain
Seat Stays	Dropped (lowered attachment point)	Reduces wake turbulence and enhances vertical comfort
Seat Tube Angle	Increased slightly	Optimizes power transfer, especially during climbs & sprinting efforts

Together, these refinements subtly enhance torsional stiffness, handling feel, and aerodynamic efficiency across a range of real-world riding speeds.

THE AERODYNAMIC PROCESS

Wind tunnel validation for the SLC5 was conducted at Silverstone's SSEH Sports Performance Wind Tunnel and Kozo Keikaku in Japan.

Tests were conducted across multiple speeds and yaw angle (0°, 5°, and 10°), both with and without a rider.

Results helped benchmark aerodynamic progress from the previous SLC3 platform and informed final refinements to tube shaping and rider integration.

WINDTUNNEL RESULT

Aerodynamic Efficiency: SLC5 vs. SLC3

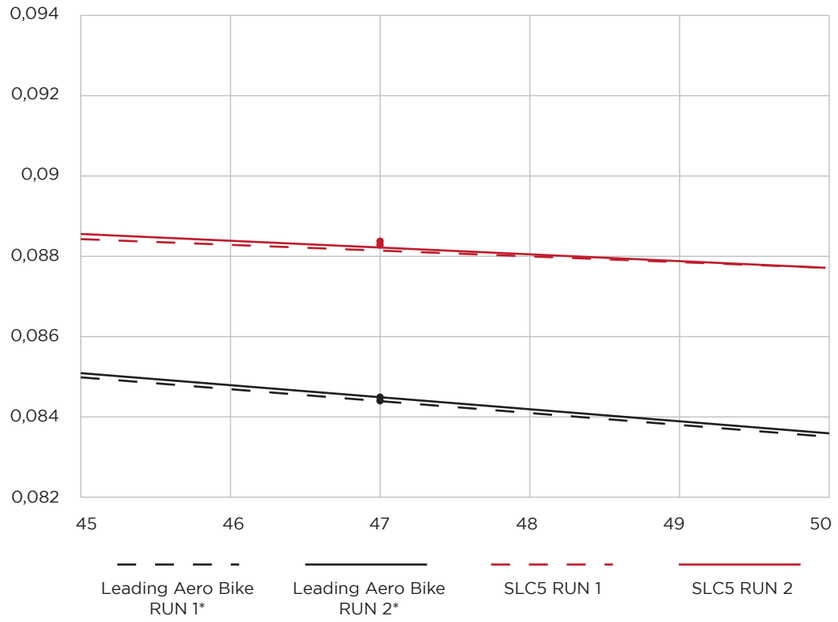
Wind tunnel results show that the SLC5 consistently outperforms the SLC3 in aerodynamic drag at 0° yaw across all tested speeds.

The top graph (CdA) indicates lower drag coefficients for SLC5, especially as speed increases.

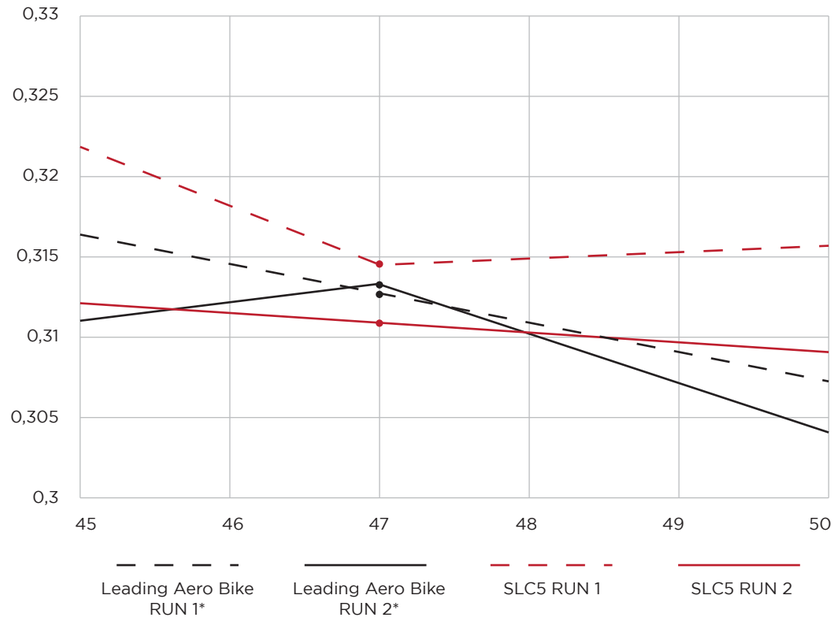
The bottom graph (Crr) confirms reduced rolling resistance, albeit with a smaller margin.

Conclusion:
The SLC5 frame delivers measurable aerodynamic improvements over the SLC3, validating refinements in tube shaping and overall airflow integration.

Without Rider - Speed Sweep @ 0 Deg



With Rider - Speed Sweep @ 0 Deg

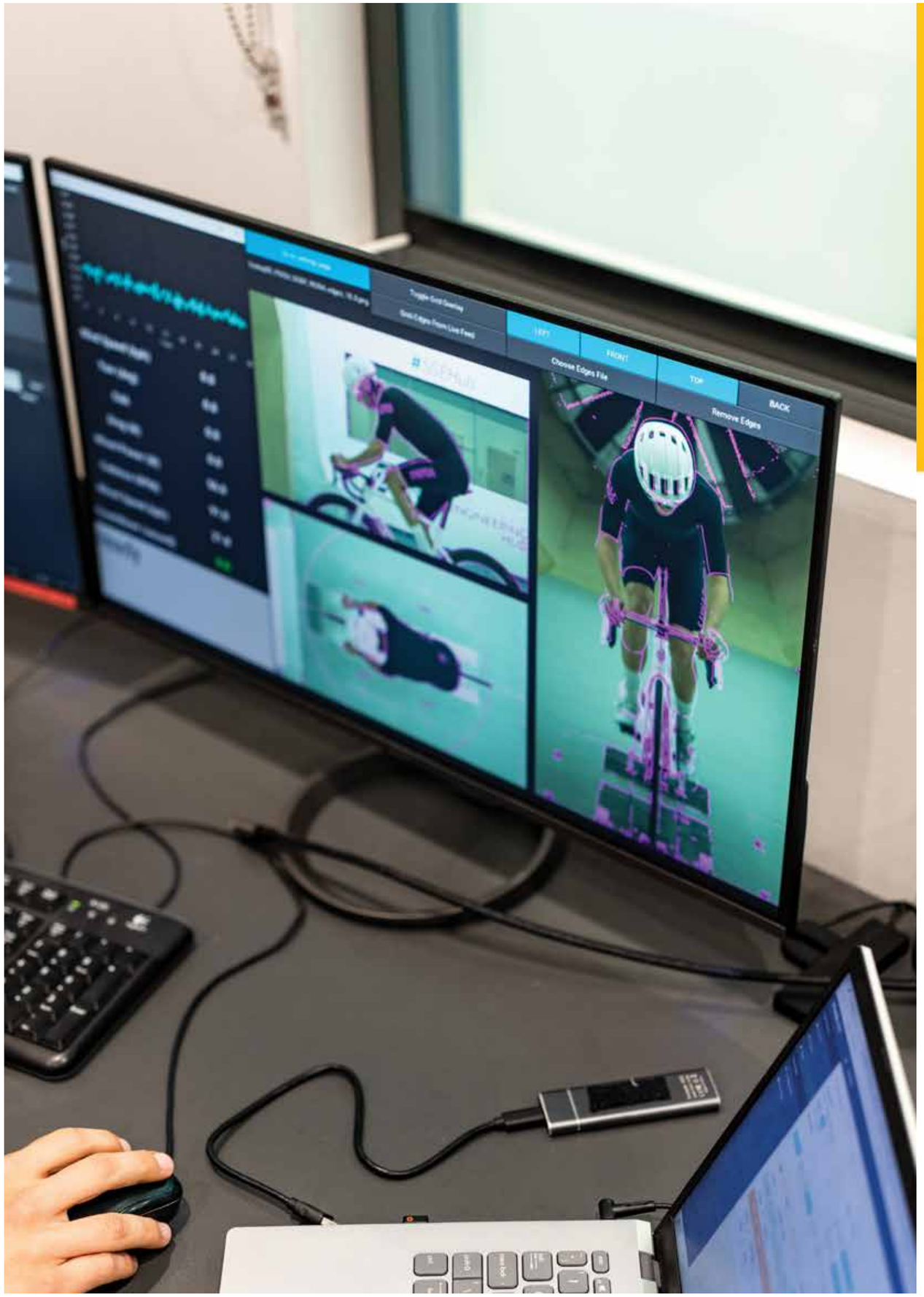


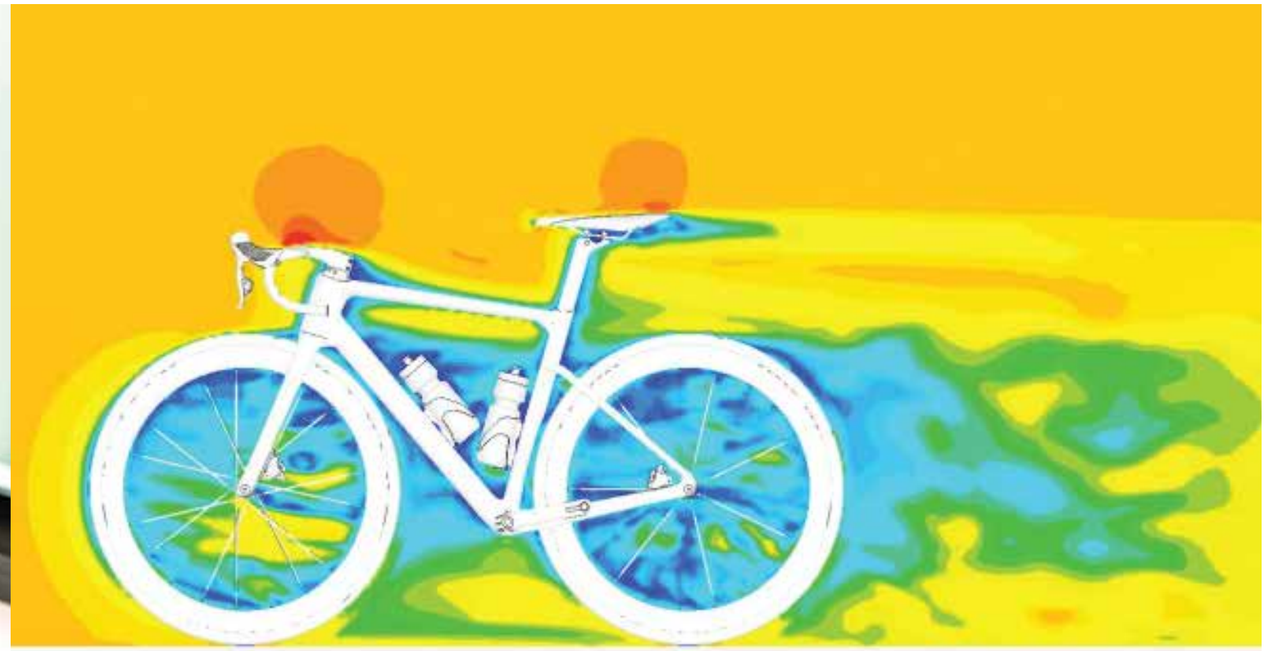
These results confirm the SLC5's standing as a top-tier aero road frame under live load conditions.

Note: CdA values reflect complete system drag (bike + rider + mounts), not frame-only measurements. Relative comparisons are more meaningful than absolute values.

SILVERSTONE SPORTS ENGINEERING HUB

*Specialized Bike





VELOCITY MAGNITUDE [m/s]

0 2 4 6 8 10

CFD Simulation – Aerodynamic Optimization of the SLC5

This CFD (*Computational Fluid Dynamics*) visualization illustrates airflow behavior around the SLC5 frame, based on simulations conducted by Kozo Keikaku Engineering in Japan. Color gradients indicate velocity magnitude, revealing how air flows over and around the frame.

The SLC5 demonstrates:

- **Minimized turbulence around the head tube and down tube**, thanks to refined tube profiles.

- **Reduced drag zones behind the seat tube and rider position**, indicating improved airflow separation.

- **Aerodynamic gains over the previous SLC3 model** were confirmed through this analysis.

These findings were instrumental in validating aerodynamic gains over the previous SLC3 platform and fine-tuning the final shaping of the frame for real-world performance.

構造計画研究所
KOZO KEIKAKU ENGINEERING Inc.

Crafted in Carbon. Tuned for Feel.

Behind the clean lines of the SLC5 lies a carefully orchestrated carbon layup—where every carbon fiber is chosen not just for strength, but for the sensation it delivers to the rider. This isn't just about stiffness or weight. It's about balance, feedback, and connection.

We blend a range of high-performance carbon types, each placed precisely where it performs best:

T1100 : Used in high-stress areas like the head tube and bottom bracket for maximum stiffness and precise power transfer during sprints and hard cornering.

T800 : Forms the backbone of the down tube and seat tube, offering a strong balance of stiffness and long-term durability.

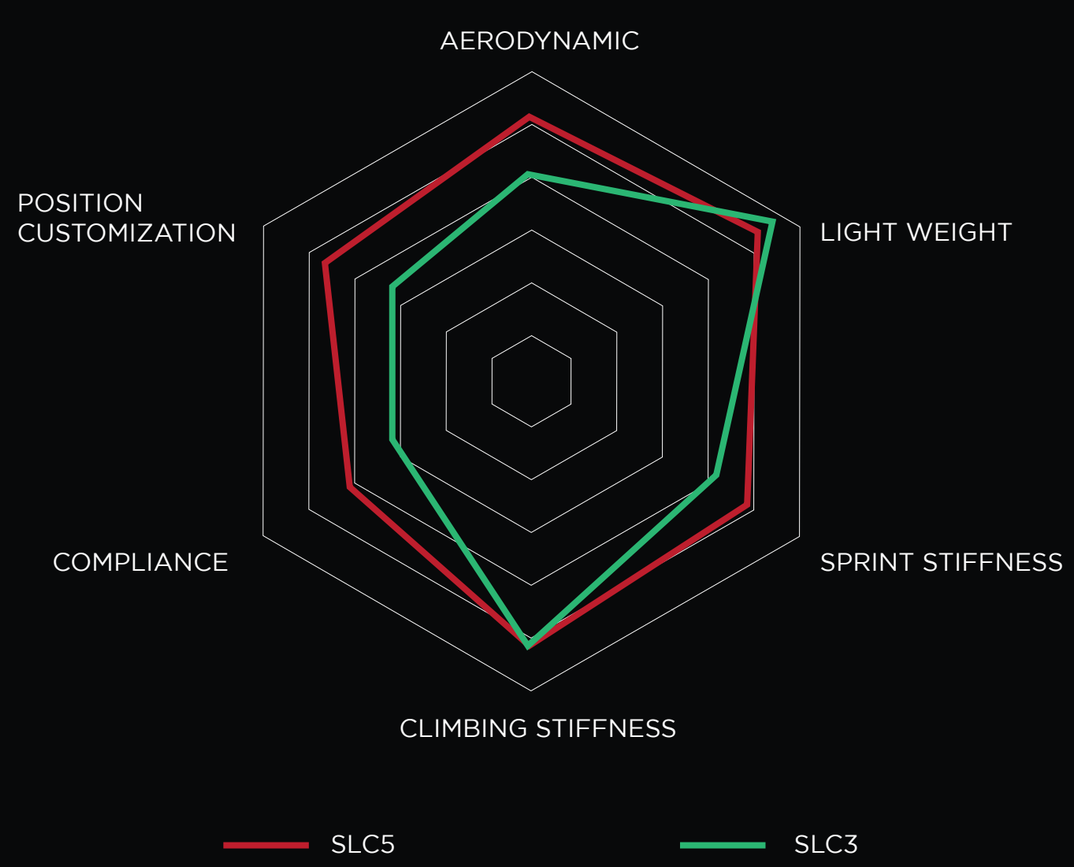
M65J : Placed in key junctions to handle complex forces and maintain structural integrity under real-world loads.

M46J : Used in lighter-load zones like the top tube and seat stays to reduce weight while keeping the ride smooth and compliant.

The result? A frame that feels alive beneath you. One that knows when to hold firm and when to breathe. Engineered not just for watts but for rhythm, response, and trusted on every ride.

T1100 T800 M46J

UPDATED PERFORMANCE GEOMETRY



SLC5 SLC3

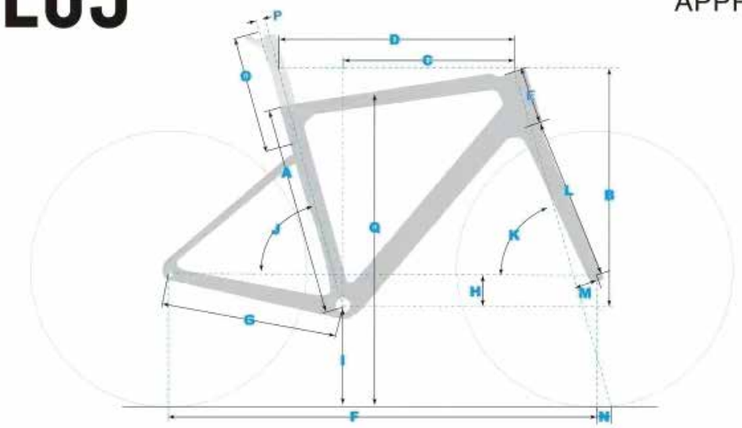
The SLC5 builds on the foundation of the SLC3, refining its geometry to better suit modern, performance-oriented riders.

With a longer reach and lower stack, it encourages a more aerodynamic position, while subtle updates to the head and seat tube angles improve control and power delivery. Two seatpost options (0 mm and 15 mm setback) offer greater fit flexibility, and consistent chainstay and BB dimensions ensure a stable feel across all sizes.

Clearance for 700x32c tires adds comfort without compromising speed—making the SLC5 a thoughtful step forward in the Winspace lineup.

SLC5

UCI APPROVED



		XS	S	M	L	XL
A	Seat Tube Length	440	460	480	510	540
B	Stack	508	520	535	555	575
C	Reach	366	372	382	389	399
D	Top Tube Length	503	517	535	553	575
E	Head Tube Length	108	118	130	150	170
F	Wheelbase	970	975	979	990	1003
G	Chainstay Length	406	406	406	406	406
H	BB Drop	72	72	72	72	72
I	BB Height	271	271	271	271	271
J	Seat Tube Angle	74.9°	74.4°	74°	73.5°	73°
K	Head Tube Angle	70.7°	71.3°	72°	72.3°	72.6°
L	Fork Length	370	370	370	370	370
M	Fork Rake	49	49	45	45	45
N	Trail(32C)	66	62.4	62.3	60.5	58.7
O	Seatpost Length	320	320	360	360	360
P	Seatpost Setback	0	0	15	15	15
Q	Standover Hight	725	741	765	784	805
	Tire	700C*32	700C*32	700C*32	700C*32	700C*32
	STR	1.39	1.40	1.40	1.43	1.44

*The frame size should be selected based on the actual hip height, supplemented by height. Height is for reference only.
It is recommended to collect fitting data to make an accurate choice

#SSEHub

TESTED IN JAPAN. PROVEN IN THE UK.
PERFECTED FOR EVERY RIDE.

Some brands make aero claims.
We back ours with data.

To validate the SLC5's aerodynamic performance, wind tunnel testing was conducted in both Japan and the UK—across different facilities, standards, and conditions. Multiple runs were carried out to ensure consistent, repeatable results. No cherry-picking. No selective numbers.
Just real-world performance, measured scientifically.

Because for us, aero isn't marketing
it's measurement.

THE RESULTS?
The SLC5 recorded a 0.011 reduction in CdA and saved over 13 watts at 48 km/h compared to the previous generation. More importantly, these improvements held steady across varied trials, setups, and rider profiles.

We built it to win on the road.
SLC5 isn't just fast—**IT'S PROVEN**

*The SLC5's carbon layup uses **aerospace-grade fibers**, zone-targeted reinforcement, and FEM-guided structural tuning. This approach ensures maximum stiffness where it matters, compliance where it counts, and durability for top-level racing.*

*All manufacturing meets **EN 14781** and **ISO 4210-6** standards, and the frame is **fully UCI-compliant for race use.***


RAPHA
WINSPACE
SLC 5
FOR RIDERS WHO GO BEYOND SPEED