

Design

Wings work!

Talented young Argentinean designer Nicolas Goldenberg has enjoyed great success with his RG 650 Mini 6.50. He is also not afraid to take on the perhaps more challenging subject of the 'production' wing sail and its application



Nicolas Goldenberg's K8 Sports is almost certainly the first modern monohull purpose-designed for a quasi wing rig. The increase in efficiency over a single-skin sail allows the K8 to rely primarily on form stability – meaning a smaller bulb and lighter displacement

Well know the benefits of wings over conventional sails. This now proven technology is commonplace in speed record designs and C-Class catamarans and has become an unchallenged feature of the modern America's Cup. At the same time we have also learnt how impractical and expensive these systems are for the everyday sailor. However, during the past two years Advanced Wing Systems have quietly been going about an extensive R&D process to bring the advantages of wing sails into a soft or semi-rigid format that can be used on any boat and by any sailor.

Wing sail vs standard rig

Having experienced the 34th America's Cup in San Francisco, we should now need little convincing that wing sails are more

efficient than standard sails in terms of performance. This is because they are able to produce more lift with less accompanying drag, the forces being oriented in such a way that they produce more drive force and less heeling force.

The SRW – the first fully functioning semi-rigid wing

Most wing sail attempts have been based on fitting a standard wing onto an existing boat or mimicking what we conventionally think of as a wing.

These attempts have not been particularly successful; mostly they are far from user-friendly, expensive and not suited for everyday boating. The SRW has reinvented the wing concept in a more pragmatic way – light, user-friendly, affordable and applicable to almost any boat.

The key factors of the SRW

- Familiar set-up – no need to learn how to sail again
- Simple – few controls and the sail can be stored and reefed as a conventional sail
- Light – no complex structures are involved and weight is comparable to a conventional arrangement
- Increased performance – due to the wing sail configuration
- Allows the use of headsails, jibs, code zeros and spinnakers

How does it actually work

Simplicity is the key; our patented system is based around a specially designed and aerodynamically developed mast section. This section is allowed to rotate and is fitted with twin tracks that support two standard sail membranes. A further custom-designed spreader system, together with tapered battens with custom batten ends, plus a few basic but necessary control lines complete the package.

The two mainsail membranes are hoisted in the normal way, using one halyard that splits into two within the mast and attaches to the head of the 'sails'. This also allows reefing in the traditional way and at the end of the day the sail can be dropped down and either flaked manually or, if you prefer, into a pair of lazy jacks.

The rotation of the mast section is the key to achieving the correct aerofoil sections. When counter-rotating the mast (forward face pointing off wind), the windward membrane becomes tensioned (hence flattening the surface) while the leeward battens and membrane are compressed (causing the membrane to bulge). See illustration B (*below right*).

Additionally, the outhaul control is used to induce camber as required (illustration C, *right*). Slip movement between the two membranes delivers twist by controlling thickness and camber, as you can see comparing illustrations D and E (*right*).

In short, the SRW provides a wide range of section shapes while only necessitating a relatively simple set of controls.

Next step

Soon after starting this project we increased the size of our development group, G Yacht Design (ARG) joining forces with Advanced Wing Systems (AUS) and Katabatic Sailing (AUS/ESP), to pursue further development of the prototype semi-rigid wing using an RG650 Mini 650 as our original test platform.

Concept

This enlarged team then put their heads together to develop the design concept in terms of creating a purpose-built boat to both exploit the AWS concept and also get something AWS-based into the marketplace. After conducting a careful examination of current offerings, the K8 Sports was the result: a very modern 8m sportboat suitable for a broad range of sailors, simple yet thrilling to sail and easy to transport. In time the K8 Sports may evolve as a one-design class, but in the meantime it is readily suitable for IRC fleet racing.

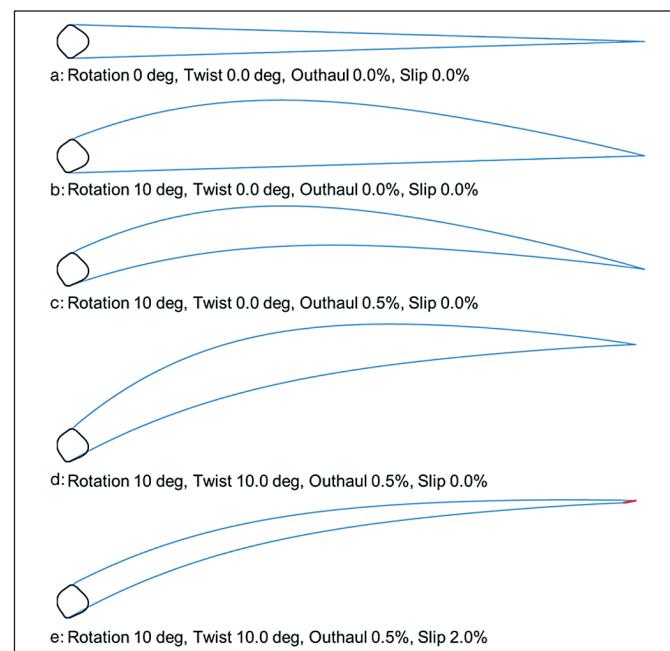
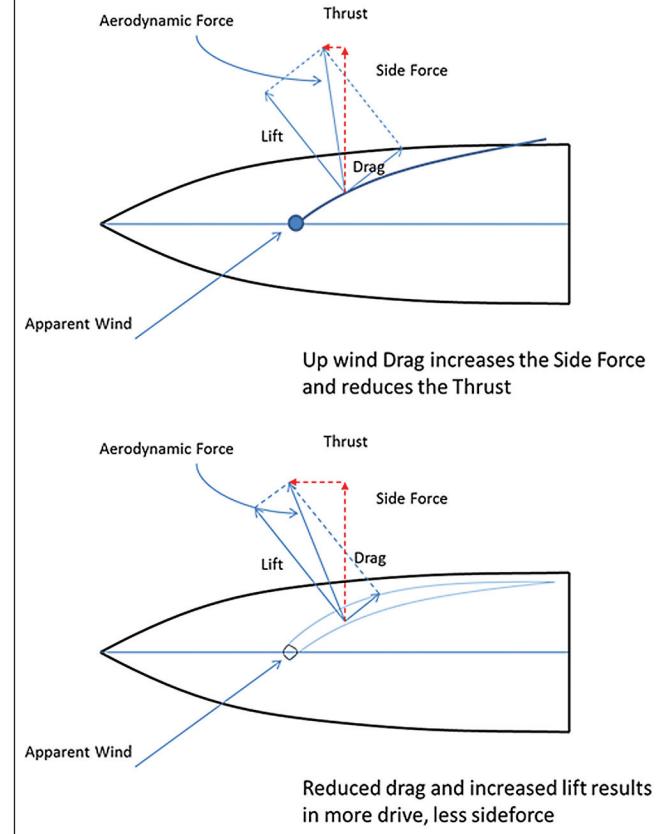
It should also make for a great little club racer, slotting into most local handicap systems and promoting the capabilities of a modern yet pragmatic wing rig system. We believe that this flexibility of concept and application will deliver maximum technical interest and sailing enjoyment... all at an accessible price.

The K8 Sports

In terms of hull design, the K8 Sports was purpose-designed around SRW performance parameters. This approach contrasts with the usual design spiral where too often a rig is designed to suit pre-ordained hull parameters.

Consequently, our final hull lines differ from other existing boats of this size. The SRW rig delivers more power with less heel and, as a result, the hull has been given greater form stability than would be typical at this size, with relatively flat underwater sections – that run right from the bow – to promote early planing.

The K8 Sports has more than met our early expectations during initial testing in Spain in September. Upwind the boat is stable and easy to manage and is continuing to impress all who get hold of



the tiller. Powerful yet extremely manageable, the K8 Sports is achieving speeds comparable with much larger boats, opening the door for a very exciting product launch at the end of this year.

The K8's exaggerated waterline beam – but with narrow heeled waterlines – drove us immediately to employ twin rudders for optimal control in all conditions and at all (normal) heel angles.

Downwind the hull is powerful and planes easily, enabling the helm to catch every little wave. In larger waves and stronger winds the bow lifts quickly, the boat behaving a little like a skiff as it begs to be offered up for the next surf.

The bulb keel lifts for trailing as do the rudders. The bowsprit is also easily removed for transport. The deck design has been created

K8 SPORTS

LOA	7.99m
Beam	2.55m
Draft	2.1m
DSPL	1,200kg
Crew	3-5
Wing area	29m ²
Jib	12m ²



The twin membranes of the SRW 'sail' are clearly identifiable in this K8 rig photo (*above*). By rotating the specially profiled spar the span-wise shape can be varied to make the sail sections deeper or flatter, as required; adjusting the outhaul and the slip between the membranes adds control of twist and camber. *Top left:* wing sail forces vs standard single-skin configuration. *Left:* a seamless transition of section shapes is made possible by combining adjustment of mast rotation, outhaul and slip

according to the needs of the SRW rig plan, the standout features being the mid-cockpit (carbon) traveller beam and tidy modern control pod. The correct traveller location is vital to getting the most out of SRW, as the sheet must work at the correct angles to operate the wing efficiently.

The raised pod on the cockpit floor includes all the fine-tuning controls for the twin membrane rig, allowing the K8 to be operated by a small crew yet still achieve maximum potential. The jib is set up with wider sheeting angles than you would see on a soft rig, to facilitate the correct interaction with the deeper chord of the wing compared with a traditional sail. A self-tacking jib set-up allows the crew to focus on wing trimming.

In terms of aesthetics, the K8 Sports displays a clean and modern look, featuring a large open cockpit and low streamlined coachroof. All of the sailing systems are kept simple and neat, with most control lines running through the inside of the boat to preserve a clean deck.

K8 – principal features

- Semi Rigid Wing technology (SRW)
- Built in E-glass with carbon reinforcement
- Trailable (lifting keel and kick-up rudders)
- For one-design and IRC racing
- Crew weight limit allows for three to five sailors
- Price including SRW and all sails – €95,000

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www.gyachtdesign.com www.advancedwingsystems.com

