

Inflated Wing Sail on the wind:
This prototype sail installed on a
5.5m class yacht attracts a lot of
attention on Lake Geneva.



An inflatable rig

The Inflated Wing Sail could soon revolutionise sailing.
The prototype has done some tacking on Lake Geneva.

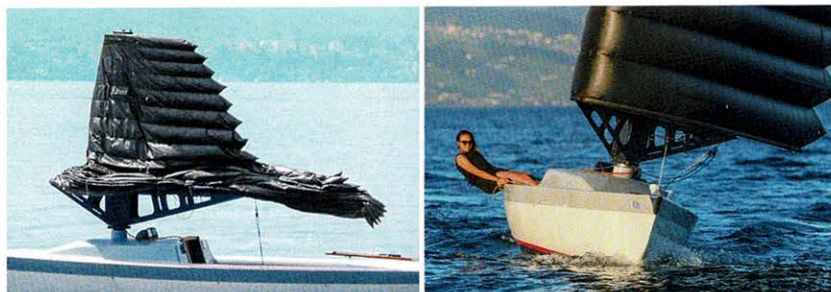
At the touch of a button the air chambers of the Inflated Wing Sail, IWS for short, inflate and the rig extends as if by magic 13 metres upwards from the boom (called the “Nest”) of the 360°-pivoted wing mast.

If all five air chambers on this “aero-rig” are full, then 42 square metres of symmetrical NACA airfoil provide forward propulsion for the IWS prototype yacht, an international 5.5-metre class craft. “If you require less sail area, then you only need to inflate three or four air chambers”, says Swiss entrepreneur and sailmaker, Edouard Kessi, who co-initiated development of this innovative system together with paragliding pioneer, Laurent de Kalbermatten. Reefing has never been so simple!

Both inventors are supported by aerodynamics professional, Stéphane Fauvet, who worked for many years as a sail designer at North and Incidence Sails. “Our concept is based on the way paragliders work, where air chambers form a sturdy airfoil and provide lift. The only

difference on the IWS is that our airfoil is shaped identically on both sides and the air stream is vertical rather than horizontal”, engineer Fauvet explains. The IWS is inflated at the touch of a button using fans placed inside its leading edge. Pressure within the sail needs to be a constant 1.5 grammes per square centimetre (0.0015 bar), to ensure airfoil membrane stability along the entire height of the sail and to generate an airstream that provides lift and thus, ultimately, forward propulsion. Sail twist is controlled by the trimmer using the air pressure in the airfoil and the way the system absorbs pitch is impressive.

According to the IWS design engineers, the symmetrical NACA airfoil structure of the wing has the added benefit of ensuring that the sail’s CP is located right in the aerodynamic centre of the airfoil, which means that the free-standing, 360°-rotatable wing does not have to be actively trimmed. The wing’s angle of incidence to the wind can be modified using a mainsheet. Otherwise the IWS manages without any winches, halyards or complex deck equipment whatsoever. No flapping sails, no dynamic stress. This innovative concept therefore appears tailor-made for use on board supersailers, which have always relied on rig solutions that are as automated and reliable as possible – and have space for the requisite pumps and structure. But will it take off?!



Whopper: the symmetrical wing-like sail is “set” using air pressure and rises up from the free-standing rigging’s boom, which is called the “Nest”. Easy to reef!