

**air création**

Innovation

# **THE CORSET**®



**BioniX<sup>2</sup>**  
Wing with variable configuration

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## ■ THE CORSET

### *The current state of technology*

1/ Responsiveness in roll of flexwings depends on flight speed, sluggish at slow speeds and jittery at high speeds. For modern machines with a wide speed range this leads to very poor maneuverability at low speeds that prohibits practical operation, or hypersensitivity to roll at high speeds making control difficult, even dangerous. The low speeds are theoretical, in practice the fast wings are unable to make slow approaches and to land at a short distance in turbulent conditions (or in case of engine failure).

2/ The increase in performance has almost universally led to systems of trim pitch in order to vary the speed cruising flight. The various systems only effect speed with the bar dropped. Pitch cannot be optimized for all settings, and wings are hard to push when going fast and hard to pull when going slow. Moreover, because of the fixed geometry of the wing (twisting, lobe, and profile), the performance and handling can only be optimized for one phase of flight, and control is limited at the ends of the speed range.



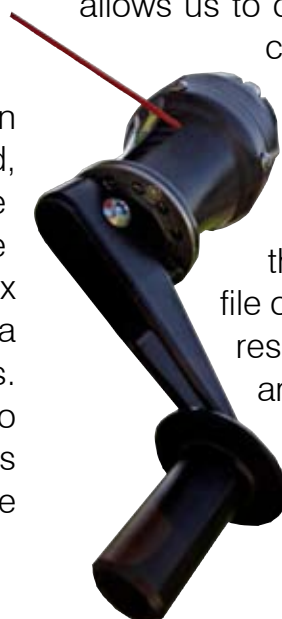
## ■ THE CORSET *The control*

The CORSET is a configuration control easier to use than a quarter pitch (trim). It simultaneously adjusts to speed with the bar dropped and changes the form and design of the wing to better adapt to this speed. This system is patented by Air Création. A true regulator of the «backbone» of the wing, the CORSET acts directly on the tension of the wing to control its form. It allows you to modify in flight the central tension of the rear part of the sail by means of an action by the pilot. A hoist exerts lateral traction on the rear half of each half of the wing through two rigid battens attached to the sail, which close as a result of the tension. Strips of fabric sewn to the sail in Carbon (Carbon Sport fabric) in the direction of the wingspan transmit this additional tension to the tip of each half of the wing. The apparatus is complemented by straps (and/or a keel pocket) forming a wide V, secured to the battens and the keel, maintaining the shape of the profile behind the mast. When the central tension of the fabric is increased, the V is tightened, allowing the central edge of the sail to rise, reducing the prominence of the profile and increasing its central reflex (figure below). The hoist is controlled via a stick shift for tapered roller linearize efforts. The «soft» part of the wing between the two points of traction in «tense» configuration is held by a system of flexible joints for more aesthetic and aerodynamic efficiency.



## ■ THE CORSET *Advantages*

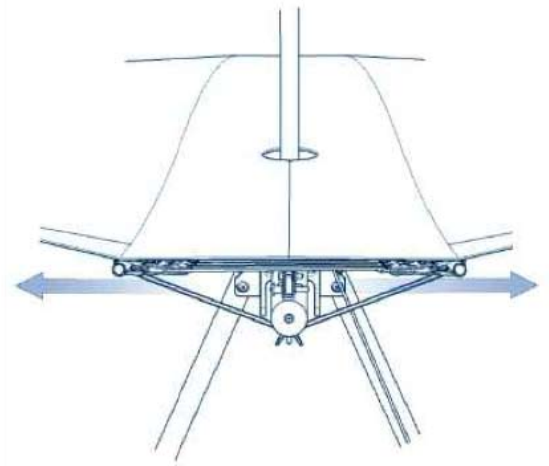
The CORSET system marries exceptional ease of use to remarkable effectiveness. It allows us to combine in a single control the cruising speed and the adjustment of the geometry of the wing to this speed by acting on the lobe («soft» part of the wing that ensures handling), the twisting and the central profile of the wing. The wing reconfigures itself like those of a bird, which are always perfectly fit to each phase of its movement.



## ■ THE CORSET *In flight*

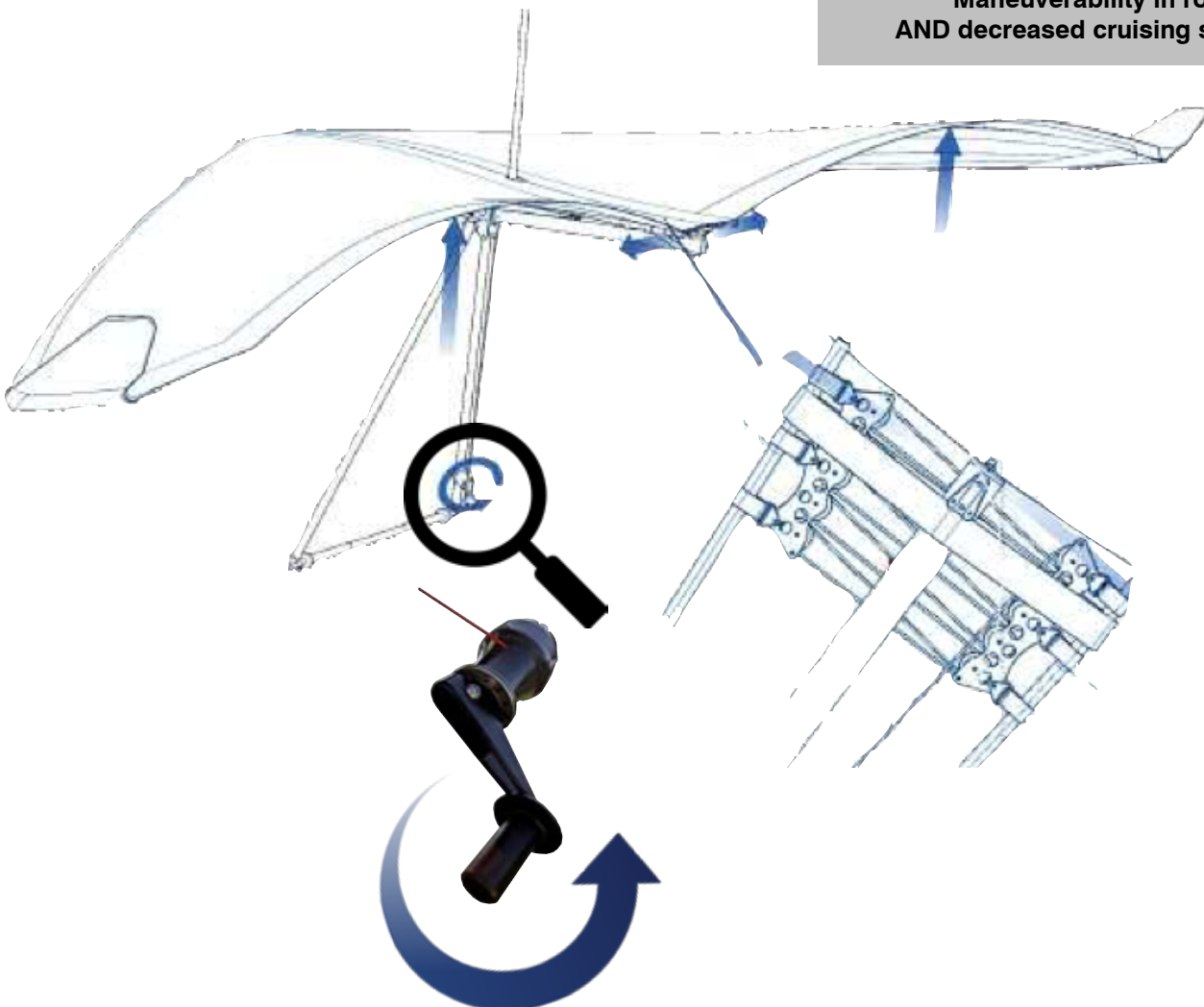
### Slow speeds : *Approach and landing*

The lobe of the wing is very high, allowing for significant differential movements and providing the best handling roll. Twisting of the wing tips is also at maximum, the central part of the wing stalls first to ensure safe and predictable handling in large angles. The central profile is concave, providing the best ratio of lift and ensuring the lowest possible minimum speed. The increase in the lobe and twisting increases drag, which is favorable under conditions of steep approach..



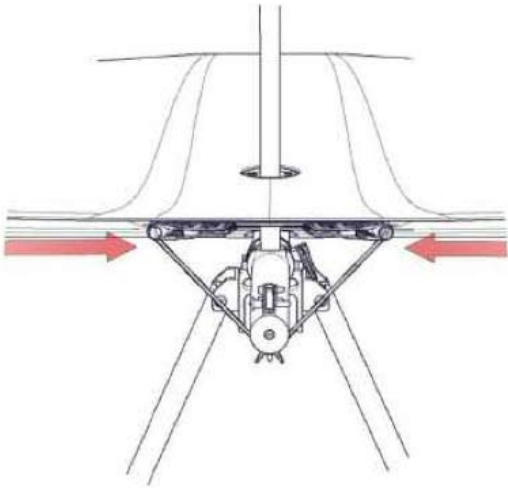
**Tension released :**  
Twisting wing tip increased  
Prominence of central profile  
Decreased central reflex  
Lobe increased  
Center of thrust advanced

**This configuration creates :**  
Safe Maneuvering  
at large incidences  
High coefficient of lift  
Maneuverability in roll  
AND decreased cruising speed.



## High speeds : *Trips, Navigation, strong wind*

The lobe is very low, providing perfect stability without the commitment of roll movement. Twisting of the wing tips is minimal, providing the best aerodynamic performance of low angles. The central profile is relaxed, ensuring the preservation of perfect pitch stability despite the decrease in the twisting of the wing tips. The decrease in the lobe and twisting, coupled with the increase in the central reflex profile causes a reduction in drag and therefore increased performance, allowing for greater speeds for a given power (reduced consumption, maximum speed level higher). The decrease in the prominence of the central profile between low and high flight speeds moderates the amplitude of deflection of the control bar between the two configurations, which improves the ergonomics and handling, increasing the usable speed range and shortening takeoff and landing distance.



**Tension increased :**  
Increased twisting in general  
Decreased prominence of central profile  
Increased central reflex  
Lobe decreased,  
Center of thrust retracted

**This configuration creates :**  
Reduced drag  
Effortlessness in low pitch  
Roll stability  
AND increased speed cruise

