Pilot Report

Seedwings Sensor 510C

by Dennis Pagen photos courtesy Seedwings

Remember when hang gliding was dangerous and sex was safe? Way back then your choice of gliders was limited to a straight-winged "standard" or a radical curved-winged Seagull unless you wanted to endure the rigors of transporting a Quicksilver or an Icarus II. Today things have changed. A competent pilot has a choice of a variety of nimble ships, all of which exhibit remarkable performance, safety and convenience.

It is this very choice that presents a problem to most pilots. It is difficult for the average aviator to test fly the available gliders and thereby make an educated choice. We are endeavoring to alleviate that problem through pilot reports, beginning with the Foil Racer last summer and continuing with the Sensor 510C in this issue, the Magic Kiss in a subsequent issue. Later we'll cover a few other new wings waiting in the wings.

The Test Glider

My barn has become an aviary with three relics (two standards and a Seagull V), four trainers, a tandem, several single-surface survivors and five state-of-the-art soaring devices. Of the five current designs three are Sensors: a 510B, a 510B cum C and a 510C. Thus, when I want to test fly a particular glider I just dial in the model on my Sensor dispenser, pick it up and head for the hill. Lately I've been taking out the 510C.

The particular glider I am flying is famous. It is the very glider that Ian Huss flew coast-to-coast with Fly America. When I received the glider it had 149 hours, 35 minutes of logged airtime while it acquired 2,281 cross-country miles. It certainly isn't a spring chicken, but thanks to Ian's piloting skills and the Sensor's well-reinforced sail, I could detect no stretching and probably have a glider performing 99% as well as a new one.

This glider is a full-race 510C but does not have faired downtubes. One other feature makes it unique: It is a Francis Rogallo signature model. Dr. Rogallo himself signed the sail when the glider arrived at Kitty Hawk, North Carolina after traversing the country. Anyone wishing to own this collector's item should phone the Seedwings factory and make an offer.

Changes—B to C

One of the purposes of this piece is to explain the differences in the B and C models of the Sensor 510. The obvious changes are the addition of a VG compensator and a fully enclosed tip. Less apparent is the new luff curve cut in the sail and kingpost slider. We will consider each item.

A VG compensator is a system to tighten the reflex bridle lines as the VG is loosened. (VG is short for variable geometry.) As you loosen a VG the crossbar angles forward, allowing the leading edges to move inward like a collapsing umbrella. This, in turn, loosens the sail which renders the reflex bridles less effective at zero angle of attack.

With a VG compensator, however, the reflex bridles are tightened as the crossbar moves forward, thus maintaining pitch stability. The Sensor 510C uses the standard system whereby the kingpost is tilted forward and back about two inches at the top to effect the tightening and loosening of the reflex bridles.

As a result of the compensator, the crossbar of the C model is allowed to move about 1-1/2" farther forward than the B model, greatly enhancing ease of handling

in the full-loose position. In addition, the Sensor C is more pitch stable than the B. With the older model the pitching moment coefficient (C_{mo}, a measure of static pitch stability) was about the same in both tight and loose positions. With the C model the C_{mo} is greater than the B in the tight position and almost two times greater in the loose position (according to the Seedwings factory this is more than twice the minimum HGMA standards). Thus, in severe turbulence a pilot can loosen the VG on the C model to get the best pitch stability and the best handling.

Generally, a VG-equipped glider trims a little more nose down with the VG loose. Although such a glider washes out more (the wing twists) in the loose position, the combined effects of moving the crossbar forward and the wing tips back, with respect to the center of gravity of the system, results in more weight forward. With the Sensor, the kingpost hang point also moves forward about 1/4" as the VG is loosened and the compensator pulls the kingpost forward.

The result of all this action is very little pitch pressure in the tight setting (aided by the kingpost hang point that acts like a French Connection), with more pitch pressure and faster trim in the loose setting. This is the opposite pitch pressure effect as compared to the B model.

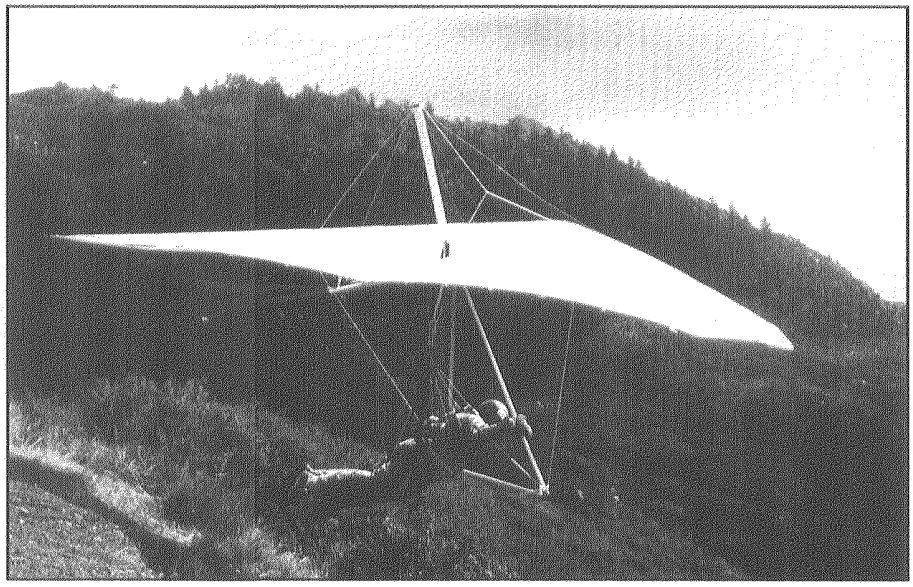
The fully enclosed tip and the new luff curve enhance performance at the top end, somewhat. The cleaner tip and tighter sail reduce drag at lower angles of attack. We'll discuss this below.

Finally, the kingpost slider allows a pilot to adjust his or her CG position without moving up or down the kingpost. This is a welcome change from the B model.

C Performance

Foremost in most pilots' minds concerning flying equipment is performance. Now that gliders are more or less on par, giving accurate performance comparisons is a dubious matter. However, if we may speak in generalities we can exchange some information.

In the words of Ian Huss the important features of a glider for downwind cross-country flying are, "circling performance, climb performance and the instilling of confidence in the landing zone." I agree with him when he states that these features are more important than maximum glide ratio.



Launching the 510C. Note VG compensator attached to kingpost.

Sensors have always excelled at sink rate in light to moderate conditions. I believe the C model Sensor continues this tradition. In stronger air the Sensor's turn coordination (see below) sometimes gets in the way, so other gliders equal or better the Sensor in net climb as the thermals roughen. This is one of the many compromises evident in gliders today, and a pilot must make a choice based on the flying he or she does most.

The maximum glide ratio of the Sensor C probably hasn't improved much over the B. Ian Huss flew mile after mile over the flat sections of Nebraska on many evening final glides and calculated between 10 and 11 to 1 max glide on this test glider. This correlates with what we found in last year's glide ratio contest on Sensor Bs.

I do perceive the C model to have a better glide ratio at the top end, however. This is due to the cleaner aspect and tighter sail as mentioned above. What this means is that the glider is not so draggy at higher speeds. I base my observations on ten hours of airtime on the C model with some comparison speed runs against known quantities (Sensor Bs) and on the performance of the glider in last year's meets. Of course wing loading and harness type make a difference in high speed performance, but as near as I can judge the new model takes up some of the slack between the Sensor and other designs that are optimized for speed (again we have hints of a compromise).

One of the important matters many pilots fail to consider is longevity of performance. Usually performance goes down as a sail wears and stretches. Upon inspection it is easy to see that the Sensor has the most reinforced sail in the business, with many extra patches at critical points, a trailing edge line and warp-oriented sailcloth. This is a consideration for those who intend to keep a glider more than one season.

C Handling

Perhaps many pilots are not aware that the Sensor 510C comes in three versions designated SS (standard), ES (easy race) and FS (full race). The differences are in the number of battens, options and sail material applied to the basic planform and frame. I will state unequivocally that I have flown a standard Sensor that exhibited handling as easy as the best gliders I have flown (Olympus, Seagull 10M or Vision). Thus a pilot wishing to own a Sensor need not dread the handling.

A full race Sensor is a different matter. The Sensor's wide nose angle makes it yaw with less than perfect handling at slow speeds. This can be an advantage and a disadvantage. When flying in widespread lift you can use this yaw tendency to initiate a nice flat turn in the direction of the yaw. On the other hand, if the glider adverse yaws when one wing gets lifted by a thermal, you need extra time and power to center in the lift. Due to the dihedral balance of a Sensor, you have to high-side

(move to the outside) of a turn to coordinate. This too is a tradeoff, for although this takes extra effort, a flatter and more efficient turn can result since the mass of the system is placed further out in the circle, and the net speed of the entire wing is slower (conservation of angular momentum).

Incidentally, the faster you fly in a Sensor the more stable in yaw it becomes, unlike many other designs. Pulling on speed in a turbulent landing field is thus not a problem. In general it takes a number of hours for a pilot to transition from some gliders to a Sensor, due to its handling differences. However, after familiarity comes a satisfaction with the handling/performance trade-off.

C Landing

One purpose of a VG system is to allow you even greater flexibility in the handling/performance trade-off. This is a great asset during the landing phase, for you can loosen the glider, reduce its glide ratio and enhance handling at such a critical time. The Sensor C in the full-loose mode handles as easily as any other glider in the same performance category. The confidence you have during landing thus depends on your competence. Of course, no high performance glider is going to be as easy to land as an intermediate glider.

In my recent experience on the Sensor C I have landed downwind in a switchy field and parachuted with my feet three feet off the ground with no nose drop in either case. The ease of flaring along with good static balance leads me to say that the Sensor C is adequate in landing setup and moderately simple in final flare mode.

C Aesthetics

This topic includes many things such as finish, convenience and pure beauty. The Seedwings policy has always seemed to be to eschew trick hardware for simplicity and safety. Thus, we have clevis pins and safety pins instead of quick pip pins. We have shackles instead of internal control bar fittings. The list goes on, but the final picture is one of a Spartan dressed in a fine robe. The latter refers to the Sensor's impeccable sail. It is easy to see where all the design energy goes.

Setup and breakdown of the Sensor is complicated by the fiberglass tip wands. They tend to be the stiffest in the business (I have flown four other designs incorporating such tips), and require a humble position with butt on the ground, two arms and a leg to install. However, Sensor devotees soon learn to handle this adversity for the benefit it affords—a nice elliptical planform.

If I had the benefit of bending Bob Trampenau's ear for one minute I would request that he incorporate a quick catch at the nose of the glider for fastening the lower control bar cables. This would be the easiest change to make with the greatest time and hassle saving. In general, the setup of the Sensor is not much different than any top-of-the-line design. They all have about the same number of battens. Don't forget that Sensor tail, however, which takes all of ten seconds.

And so we come to the final point to recommend the Sensor. That is its pure beauty in the sky. The graceful curved lines make it easily recognizable and it rivals the aesthetics of a frigate bird or an arctic tern. That accounts for something in many pilots' minds.

The Sensor C is not for everyone, but then neither is any design. For a pilot looking for sink rate and good cross-country performance, I suggest a trip to your friendly dealer to try the latest version Sensor 510C. ■

Sensor 510C Specifications

SPAN:	34.8 ft.
AREA:	161 sq. ft.
ASPECT RATIO:	7.5
EMPTY WEIGHT:	68-70 lbs.
HOOK-IN WEIGHT:	145-225 lbs.
PRICE:	$2,820 to $3,290
(basic standard to full race)	