



[I have built variometers and flight computers for myself since 1973.](#) In recent times I had my own computer tied up to a PNI compass, and my goal was to tweak it to give me a fast and accurate wind indication. Yet, besides the job my time was limited as were my abilities and possibilities to create complex PCBs, and so I did not fully succeed.

When the Butterfly gang first presented their vario at the Deutscher Segelfliegertag in Darmstadt in 2012 (German Soaring Convention), it dawned to me immediately, that they had built the sensor platform I was striving for since years, without success. And so I placed my order right away.

The really new assets of this vario are the turn and acceleration sensors in all axes. Derived sensor values are combined in a complex algorithm to make up a quasi inertial platform. The algorithm is based on Kalman filtering. For those who are interested, Kalman was a Hungarian mathematician who devised these numerical methods in the 1950-ies. As far as I know they are part of all inertial navigation systems. Now, [Stefan Leutenegger](#) and [Sam Gisiger](#) adapted them, in cooperation with Butterfly, for what in Butterfly jargon is called "AHRS", an inertial platform to derive atmospheric data (lateral wind, vertical movement).

Back to my order: Like everybody else I had to wait for, as I felt, ages to receive the product, and then to be completely disappointed by what I got - or got not. Many of the features from the papers did not work : No automatic climb-cruise-switching, no usable SC-signal or audio, no usable wind, etc, etc. Beforehand I used a CAI 302, as my measure to judge the Butterfly by and it failed by far.

So, through the complaints, I got in touch with the Butterfly people. Many of the problems I encountered in the Butterfly seemed to be old acquaintances of mine, pretty well remembered from my own years of experience in vario and flight computer construction attempts. And I dared to utter a hint or two.

From the first reluctance to accept unsolicited advice, now after two years, the relation between the Butterflies and me has changed so that they take advantage of my experience and solid hints. I have proudly acquired the status of an alpha-plus to beta tester :-)

I hope Marc Förderer is happy with my presentation of this modest influence I take on the ongoing Butterfly development.

Now two years hence, with the emerging version 1.1 of the SW, IMHO the variometers is pretty fully fledged. My list of requirements and improvements is finite and cleared with Marc, and I know more or less with what priority what will when be added to the SW.

But most importantly, as it is now with V1.1, the vario works perfectly, better than the CAI 302 which was my measure of things in this realm. The wind indication has a swiftness and accuracy not known in any other device. It is exactly the way I wanted it for 20 some years.

The wind indication is so fast, that any Butterfly newcomer falls in doubt if that indication could be really true. But, according to my experience and after all my own doubts have evaporated, I can assure you the indications are correct, even when at a given moment they seem to be implausible. Concerning wind measurement, the Butterfly is from a different world. If we deem an indication implausible, this is due to the fact that until now we never saw such a fast indication, and we had a too simplified model of the wind field around us. Wind is by far not as homogeneous an air movement as we all thought.

The only remaining itch I have is the SC and the SC indication. There is a lot of potential for improvement here, but I also know from Marc, that this is the topmost item on the list.

Now, after this lengthy introduction, here is [my list of todo items](#) in order to have a smoothly ticking Butterfly variometer.