# PITLAB
SKY ASSISTANT
VARIOMETER

Sound from the Blue Sky

In the 'ancient' times of the soaring flight, pilots did not have anything else but their own senses to feel changes and find the important updrafts, the 'thermals' that helped them to perform long-term flights with their glider airplane. The human sense organs, however are far less sensitive than those of the birds, that born to fly. In 1928, Robert Kronfeld with the help of his friend, a meteorologist, developed a small unit, an instrument that helped him to fly newer and newer world records in distance and duration flight. Their fellow pilots used to ask him, what was that small metal box that he takes with him to each and every flight – the answer was: it is a coffee thermos bottle ù. In fact, this was the very first variometer used in a sailplane.

Similarly to pilots, we can only recline upon our senses in piloting our model aeroplanes, however even without the direct physical contact to the glider. Here is the point, where the clever electronics, developed by Pitlab, can help us, the Sky Assistant variometer and data processor, that is now held by my hand. The development is continuous, both in flight and in radio controlled models, so the instrument is much smaller than a thermos bottle. Its weight is only 22 grams. As I received it, I immediately put the Sky Assistant into one of my models; the one that was the easiest and quickest to install. Its installation is rather simple anyway, since the only thing we have to do is to plug into a free channel in the receiver, and the variometer is ready to go. In the package, there was a 2 GB capacity pendrive, equipped with the necessary software for use. The information, sent from the variometer, can be received on the ground, during the flight session by a PMR radio receiver, that can also be ordered from the manufacturer or we can also by anywhere in the nearby shops.
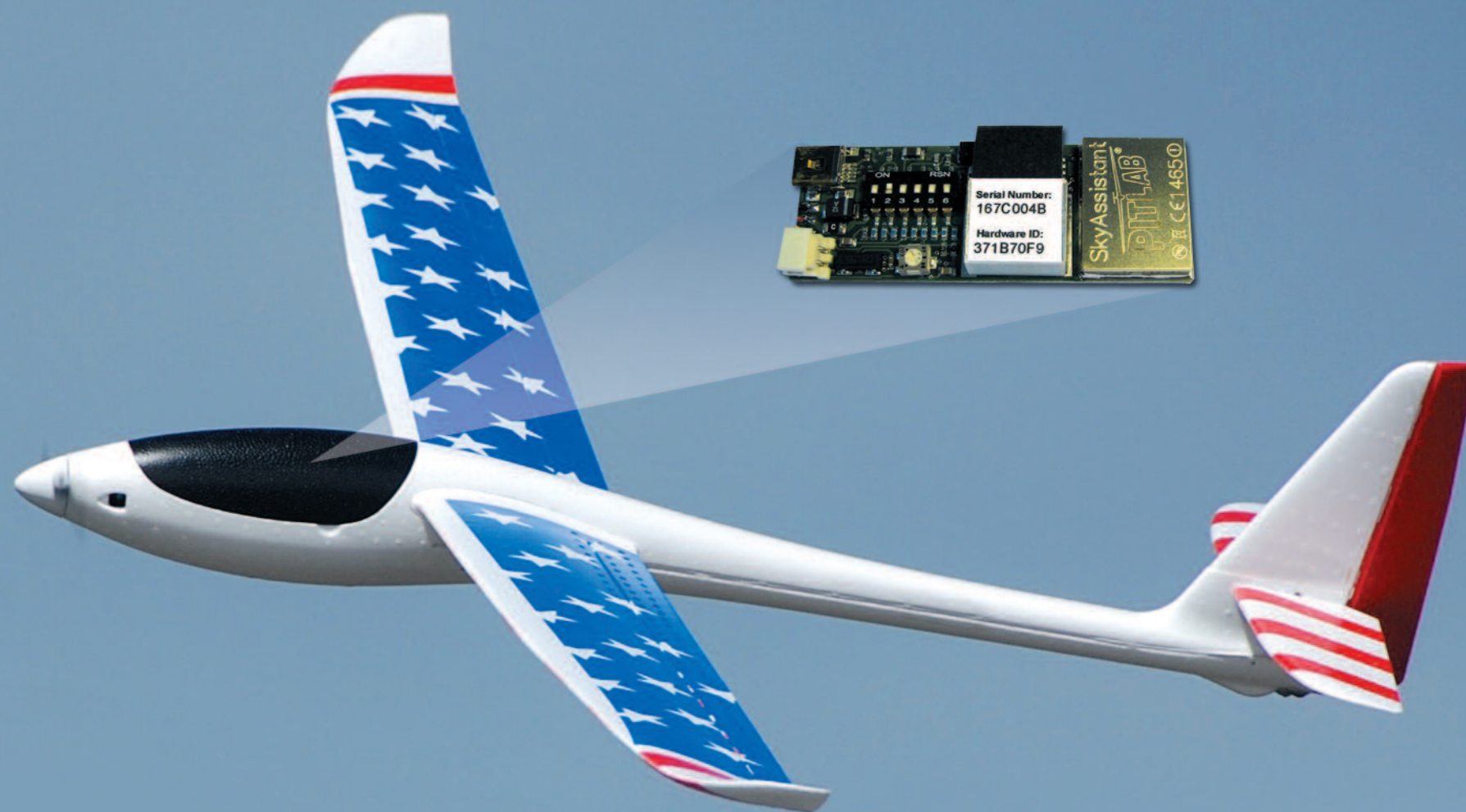
TEST FLYING

I decided to go to fly, to see, what advantages I can gain from its use. During the first flight, I intended to find a calm weather condition without significant thermals and wind, since it is important to establish first the model's (that the vario is built into) characteristics, i.e. to set a baseline. As the main focus, the primary role was on the variometer, and I was also very curious, I chose a simple F5J 400 electric glider airplane with 1.8 m wingspan. The logger of the variometer was setup to show the values of height, climb/descend, on-board voltage and temperature, and also to speak these values via the radio regularly, as requested by a switchable channel. The first test day resulted in only a partial success. Right after the beginning of the test-flight, I received a message: Warning! Low power: 4.4 V! First I did not care, by thinking it is not serious, however, as continuously received the warning messages with lower and lower values, that convinced me to land suddenly. Already on the ground, I wanted to check, what should be wrong with my model's electronics, servos

and the speed controller. It turned out that the BEC electronics of my speed controller was far from perfect, so it was just the last minute for me to land without crash. So, though the Sky Assistant did not help me – until that time – to find thermals, but first saved my model, since, without the warning messages I would continue the flight session and crash the plain, as the power drops because of the erroneous BEC circuit; in addition, that would have been even more frustrating, I would have never known the reason. So I went home on that day to find a good speed controller. The next testflight session, however was performed by another model, an F3B glider; here, not only the model's size is bigger, but the flight characteristics and performace are far better. I only had to spend a little bit longer time for preparation. I was not fortunate, however with the weather conditions, so I only could use the test results to know my F3B model characteristics better; there was no thermals during this time period. I got the possibility to fine tune the setup of the variometer for the F3B

glider. From the data collected and plotted on graphs, I could adjust the down insensitivity zone and upper insensitivity zone setpoint values for monitoring of my plane's descending speed. This is very useful, as it helps the pilot to neutralize the unnecessary signs of the glider's own descending, and we could concentrate only the necessary information provided by the variometer. So, until the descending speed is below this setpoint limit, the equipment keeps silent. I adjusted the upper limit in a way, to already show the zero climb value, i.e. the very light thermal that only keeps the glider without descending. The next flights were performed – first without the variometer - after some rainy days, so, as the ground did not have the chance to warm up and to develop thermals, the flight times were shortish. I thought to

set in the Sky Assistant to see, what does it know in this type of weather conditions. The difference was really significant already after the first flight. By the help of the variometer, I could easily reach the total time of the F3B "A" task of competition (10 minutes), only with detecting the "zeros"that kept the glider in level without descending, as described above. Moreover, as it was not a competition,
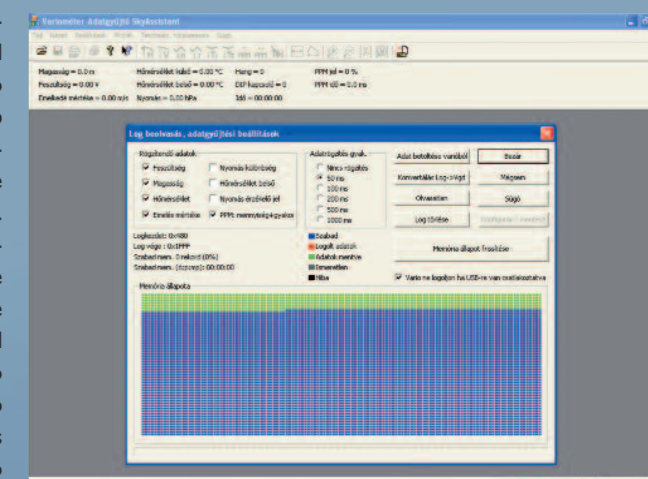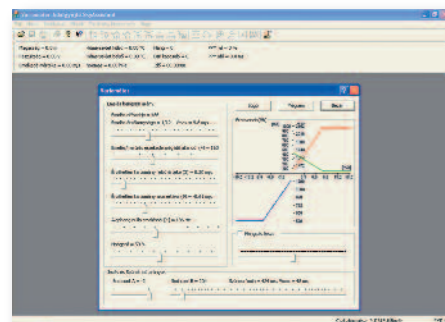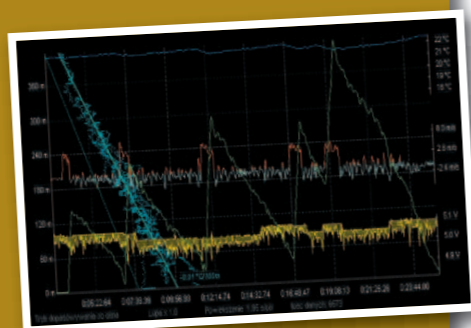
I did not have to land exactly in time, I reached over 10 minutes many times, though I could not reach altitudes over 200m, since the winch-starts were either not perfect. However, because the variometer was continuously speaking the useful flight data across the PMR radio on my belt, I did dare to go far away, where the visibility of the glider was not perfect, to find better conditions. This day also ended, and during the next test-flight, the really good weather arrived, so I had the chance to hear the very pleasant vario sound: the more frequent and higher pitch beeps. Now it was really good to experience that the equipment detected all and every, smaller and bigger thermals, so it was no problem to remain in the air for any duration I want, since I got the safe feeling, that I am always the best possible place, by the aid of the variometer. These are, however all personal feelings, but let's now investigate the facts, what the Sky Assistant is really able to.

» Variometer

» PPM switch mode
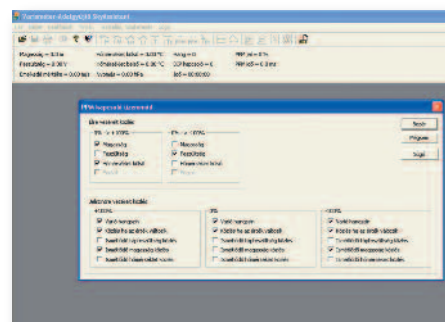

» Warning informatios

FUNCTION

The variometer, first of all, gives feedback from our model's climbing (elevation) and descending (sinking) speed. The elevation is communicated by a dotted, beep-beep sound, that's frequency and pitch is higher, as the elevation speed is increasing. The sinking of the model is communicated by a continuous, deeper sound, where the deepness is proportional with the descending speed. In addition to that, there is a speech-generator, which tells you the required information about your flight. Before the flight session you configure, what kind of information in which frequency should it be given, and the system tells you that in human voice. We also have the possibility to query the data we want any time, by means of a channel switch in our fight radio. These informations can be the current height, temperature, on-board voltage. In addition to these, there is a possibility to monitor the temperature of our battery, speed controller and the electromotor, as the Sky Assistant have an internal and an attachable external temperature sensor. It is possible to preset warning limits for certain height, voltage and temperature values, it also monitors the PPM signal's deterioration, and communicates these warning signs with us by a preset, customized sound signal. In case of a warning message, unlike the communication of normal data during the flight, after saying "Warning!" tells us the specific message. It also have a built in logger data collector unit, by means of that we can record our pre-specified parameters to a long-term memo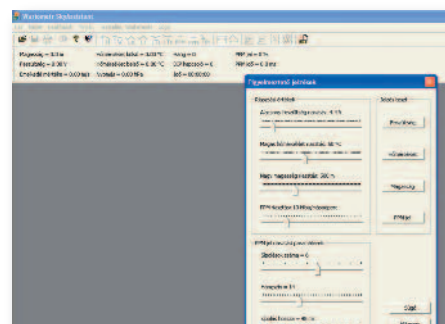ry unit. In addition to the specific type of data we want to collect, we can also setup the frequency of data collection. The communication can be performed via 40 radiofrequency channels altogether. The unit's radio transmission can be on the authorized 8 PMR channels, or the other EU countries' approved LPD channels, as well. As the model's control is being via radio frequency channels, we have to be careful when installing the variometer into our model, especially to be as far as possible from the receiver. In my special case, it was not very easy to solve this problem, as the space is extremely small in az F3B glider, however, because of the variometer's high quality and its covering metal case, I did not have experienced any kind of radio transmission problems during my flights. There is a possibility to adjust all the important parameters of the variometer right on the airfield, by means of a switch channel from our flight radio via the online configuration menu of the variometer. The variometer tells us all the parameters that were setup, in real words, and also tells anytime, in case of the change of any value, and tells us the new parameter, as well. The change of communication channels can be performed by DIP switches.

SUMMARY

In conclusion, I would like to tell, it was really a great fun to extend my flight experience with the help of the Sky Assistant. As a model pilot, I could have the same feeling what Kronfeld could have anno in 1928 ù. It is extremely useful for a hobby modeller, but it can provide real help for competitors during trainings, for example, as the use of variometers is not allowed during the competition. It is possible to fine tune start setups for F3B/J gliders, to practice starts by means of immediate data evaluation possibilities. In addition, the other tasks' evaluation by the logger data can be of great help. If you ever had a thought in your mind "where could I have more elevation?" or you just was curious, how high you were at a special moment etc, you can have the immediate answer from the Sky Assistant.
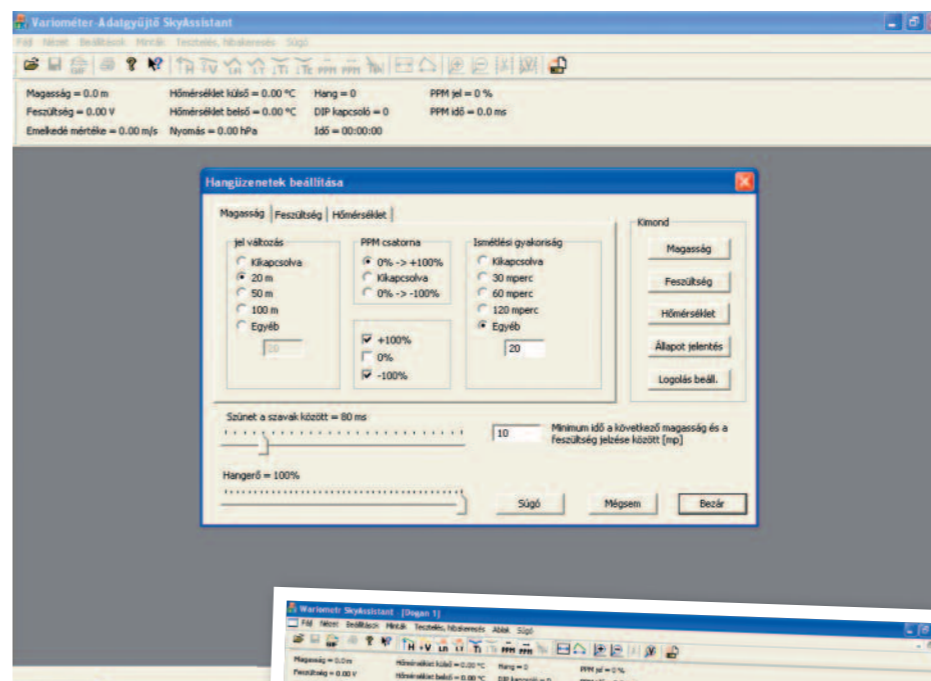
I left the best news to the end: I could already test a Hungarian speaking variometer, however, by the time you read this article, the full documentation and help will be also available in Hungarian translation. Those of you, who are interested in the subject and the equipment, you can visit the manufacturer's website on www.pitlab.pl. Here you can find a tremendous amount of information for those interested in more details. You can download the full documentation, and you can also listen to speech samples from all the available languages. The firmware version and the software of the variometer is updated continuously, and the newest versions can be downloaded, as well. I was so much satisfied with the Sky Assistant, that I decided to keep the test unit for myself.

TECHNICAL DATA

PITLAB
SKY ASSISTANT

- » **Climb sensitivity:** about 5 cm/s
- » **Altitude resolution:** 1m
- » **Altitude range:** +/- 3000 m
- » **Temperature range:** -20-+100 C
- » **Dimensions:** 70x26x11 mm
- » **Weight:** 22 g
- » **Power supply:** 3,5-12 V
- » **Power consumption:** at 4.8 V: 50 mA

Ára: **249 Euro**

Made the test product available: www.pitlab.pl

PROS
» Easy installation, requires small space in your model, lightweight, plenty of information, data to help in advanced sailplane models. The continuous, during-the flight feedback of on-board voltage and radio signal interference monitoring provides increased safety for the model. Continuous software and firmware upgrade.

CONS
» There is no domestic retailer in Hungary. (The product have to be ordered directly from the manufacturer, however arrives only within 2-5 days after the order.)