

Sky-Sailor Tests and Results 2007

In summer 2007, the objective on the Sky-Sailor project was to test the solar airplane during solar-powered long duration flight, and if possible, 24 hours continuously. Due to the state of technology, especially concerning batteries, this ultimate goal is only possible under our latitude from middle May to the end of July, with very good weather conditions. The critical part is not the day time but the night time when the energy comes only from the battery, which has to last until the next morning, when the first sunrays arrive.

After having improved the lightweight autopilot system, the motorization that was turned into a brushless one in order to save weight, the ailerons actuators and the solar generator, the airplane was ready for the long duration tests in June. With the bad weather conditions in Switzerland, the first appropriate day was the 13th of July.

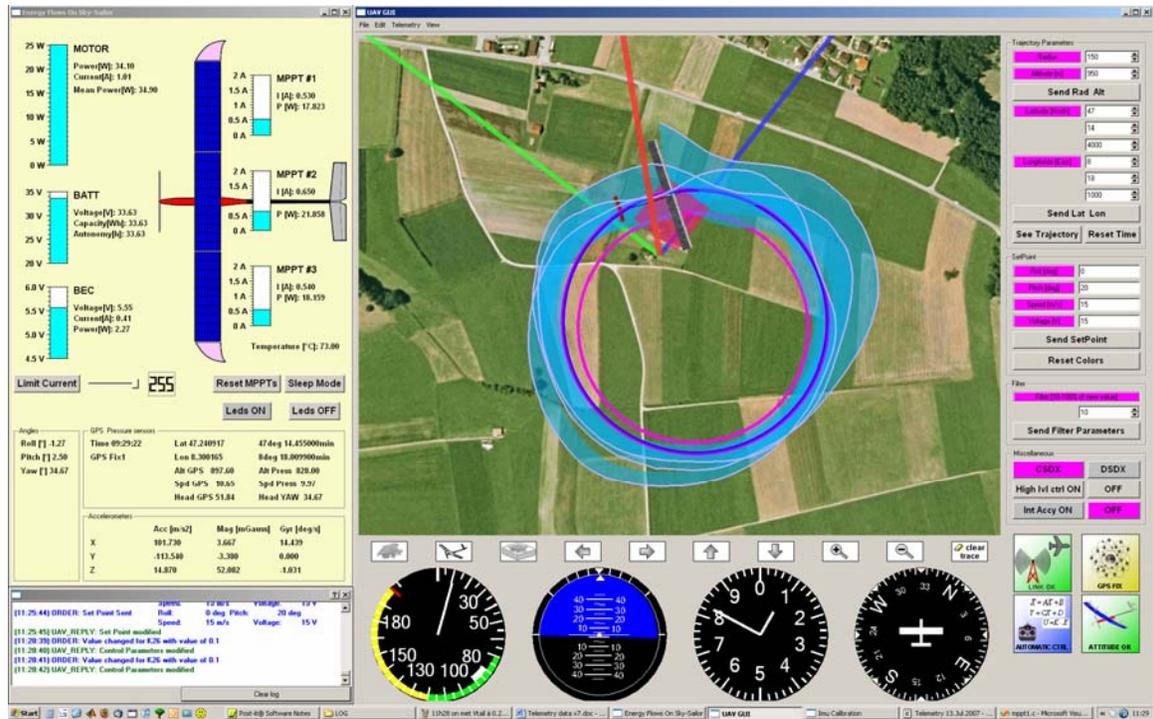


Decision was taken to start at the end of the afternoon with a full battery, charged by the sun, and try to overcome the night and continue on the next day. The 2.5 Kg airplane, from which 1.15 Kg constitutes the battery, flew 10 hours 12 minutes before landing early in the morning. Instead of the 14 W that were necessary for level flight, down winds forced the airplane to consume an average of 20.5 W to stay at the same altitude. Thus, despite the margin that we had in capacity, the battery discharged too rapidly and the airplane couldn't stay in the air until sunrise. The same test was achieved on the 25th of July, starting this time in

the morning with an empty battery and charging it in the air along the day. In the evening, the battery was full but observing the same down winds and considering the night duration that was significantly longer compared to June, one decided not to risk a night flight. Yet, the airplane has proven its capabilities, flying two times more than 10 hours autonomously a distance of 330 km each test, using solely the energy of the sun. Further experiments will take place in summer 2008.

Currently, flying continuously with solar energy is still a big challenge that requires special conditions and that is possible only during a short interval in Summer. But in the future, improvements in battery, solar cells and composite technologies will make the task easier, over a larger period and make such systems used for a wide range of applications.

André Noth



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