A.T.S.P. (Autonomic Thermal Soaring Platform)

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Our project A.T.S.P. (Autonomic Thermal Soaring Platform) is an embedded system, which allows a fixed-wing aircraft an autonomic flight without requiring a motor permanently. The energy for the motorless flight phases is provided by thermal updrafts. This offers optimized operation by increased endurance and flight time. The system is realized on a former RC airplane by integration of various sensors and a Raspberry Pi. For full autonomic flight, we designed algorithms for position detection, position control and thermal flight. These algorithms are realized in python and run under Linux on the Raspberry Pi. We included a GPS, a gyro, an accelerometer and an air-pressure sensor to allow precise position detection. The flight control output signals are transferred to the standard RC plane servomotors. In our project we developed the hard- and software on a generic, airplane independent basis. Our plane itself is only the testbed and can be changed easily to another one with an adequate gliding ratio by parameter adaption. In our flight test campaign we used two airplanes. The first, smaller one was replaced after we got a sponsoring for a high end glider with 13 feet wingspan. We tested our system in multiple flight tests successfully. The system showed a stable autonomic flight, a lot more accurate than pilots do. Thermals were successfully detected and used.

Awards Won:

Fourth Award of $500

Society of Experimental Test Pilots: Certificate of Honorable Mention