ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

TIK
Institut für Technische Informatik
und Kommunikationsnetze
Computer Engineering and
Networks Laboratory

Prof. L. Thiele

Semester / Master Thesis:

Towards Autonomous Navigation for Nano-Blimps

Motivation In recent years, the popularity of unmanned aerial vehicles (UAV's) has soared. The most common type of UAV's, the quadcopter, requires a large amount of energy to create lift and stay in the air. For this reason, it suffers from very large charging times and very short flight times. In this project, we explore another type of UAV, a blimp, whose helium filled balloon makes it almost as light as air. While this limits the speed and maneuverability of the craft, if significantly reduces its energy needs. Our existing prototype is already capable of harvesting ambient energy, giving it an autonomy of over a month, which is bounded by the balloon's deflation rate.

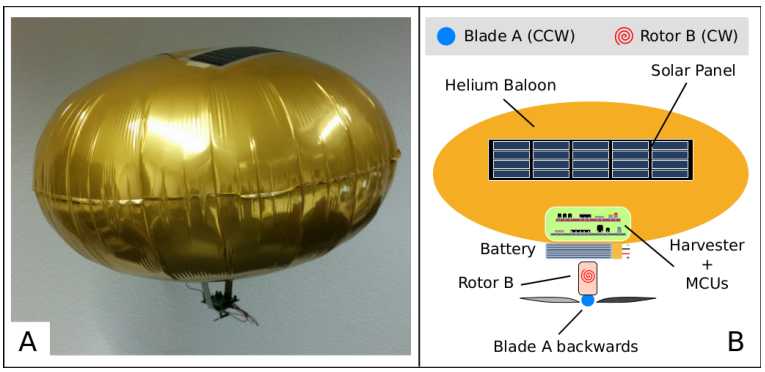

Figure 1: Slightly heavier-than-air Vehicle

Your Project During this project you will extend our existing work [1], which focused on hovering for blimps. We are now ready to add movement in three dimensions, which will require additional hardware and control algorithms. You will need to validate you approach theoretically and experimentally, using our initial prototype to test your implementation. This project is a collaboration between TIK and IIS, under the supervision of both Prof. L Thiele and Prof. L Benini.

Requirements: You should be highly motivated and be comfortable with Linux OS and a scripting language such as python or matlab. Experience with embedded system programming in C is a plus.

Interested? Please have a look at `http://www.tec.ethz.ch/research.html` and contact us for more details!

Contacts

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References

[1] Self-sustainability in Nano Unmanned Aerial Vehicles: A Blimp Case Study. Palossi, D. et al. Proc. Computing Frontiers Conf. 2017.