



## Practical Airborne Collision Avoidance System

An airborne collision avoidance system (ACAS) serves to prevent in-air collisions of aircraft. Its main function is to warn pilots of other aircraft in their vicinity, and in more sophisticated cases, to also advise them on measures to be taken to steer clear of the so-called “intruder” aircraft.

The collision avoidance problem is essentially solved for large aircraft, whose flight trajectories are usually easily predictable, and which quite often even boast an on-board radar. The wide-spread solution for light and sporting aircraft (LSA), called FLARM, is, however, deemed by many not to be up to the task, and that for good reasons. Firstly, LSA are far more agile and tend to cluster around landmarks and areas with lift. Secondly, the solution is only suitable for human-controlled fixed-wing aircraft, and as such excludes paragliders, hang-gliders, skydivers, airships, balloons, or drones, to name but a few.



### Goal

To develop a general solution for all small flying devices (LSA plus the above-mentioned). Such a solution begs to

- be reliable,
- outperform FLARM in terms of its collision detection capabilities in situations where flying devices are in close proximity to each other and/or execute involved but standard maneuvers,
- be practical enough to stand a chance of being widely adapted.

There is a real appetite for these devices, and there is a potential for co-operation with the Swiss Hang Gliding and Paragliding Association (SHV).

### Structure

This project can be undertaken as a whole, perhaps more preferably by a group, or dissected into stand-alone parts, possibly the following:

1. algorithms for collision prediction;
2. communication protocol design (something needs to be broadcast on some IMS frequencies, but how and what?);
3. electronic device design and implementation.

**Who is this for?** Anyone who feels like tackling any of the problems 1.-3.. Familiarity with spatial geometry, experience with protocol design and circuit design will all be helpful. A special liking for aviation is a plus.

**Interested? Please reach out to us for more details.**

Point of contact: Peter Belcak, email [pbelcak@ethz.ch](mailto:pbelcak@ethz.ch), ETZ G63.