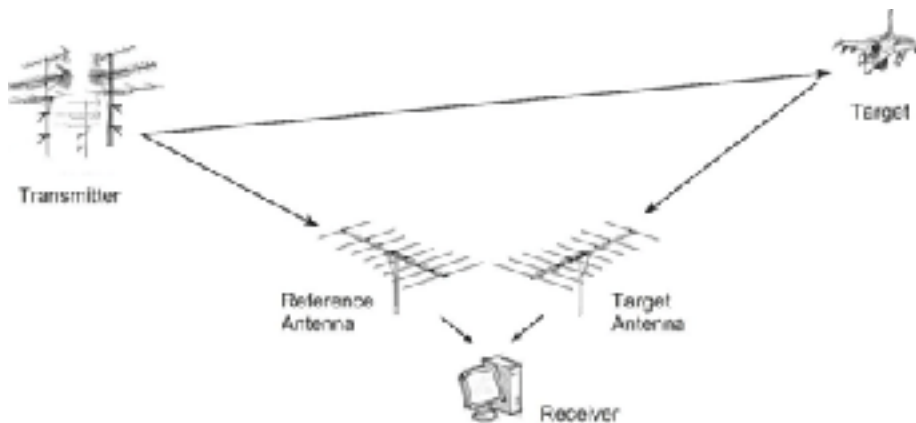


## Passive Radar for aircraft detection



### Background

The Swedish Sea Rescue Society is exploring how a fleet of small, remotely launched drones could help us make our sea rescue work safer and more efficient.

One problem in the way of flying drones beyond line of sight (BLOS) is that not all low flying manned aircraft have transponders, and thus are very hard to detect from a remote location. One way to detect non-cooperative aircraft is by means of a radar, but conventional radars are too heavy and power-hungry for use in small drones.

### Problem description

Might it be possible to design a passive radar that uses available ground radio sources such as cell networks and TV-stations to detect uncooperative low flying aircraft? Could the receiver and computation unit be small and light enough to carry on a small drone? Or could parts of the calculations be made on the ground, possibly in the edge cloud provided by cell base stations.

There are several videos and articles explaining the concept of passive radar, but so far we haven't seen an airborne solution that would allow for the detection of small noncooperative aircraft at short to medium range (up to  $\approx 10$  km).

- [youtube.com/watch?v=Ye-ZdrJl6kA](https://www.youtube.com/watch?v=Ye-ZdrJl6kA)
- [diydrones.com/profiles/blogs/sense-and-avoid-explained](https://diydrones.com/profiles/blogs/sense-and-avoid-explained)
- [hackaday.com/2015/06/05/building-your-own-sdr-based-passive-radar-on-a-shoestring/](https://hackaday.com/2015/06/05/building-your-own-sdr-based-passive-radar-on-a-shoestring/)
- [www.rtl-sdr.com/tag/passive-radar/](http://www.rtl-sdr.com/tag/passive-radar/)

### Objective

Possible scopes might include:

- Exploring the feasibility of using existing terrestrial radio sources to detect low-lying aircraft with passive radar
- Developing a prototype to demonstrate feasibility
- Design and develop a small and lightweight unit for airborne testing

Number of students: 1-2

Target group: Automation & mechatronics, Computer engineering, Engineering Physics

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