

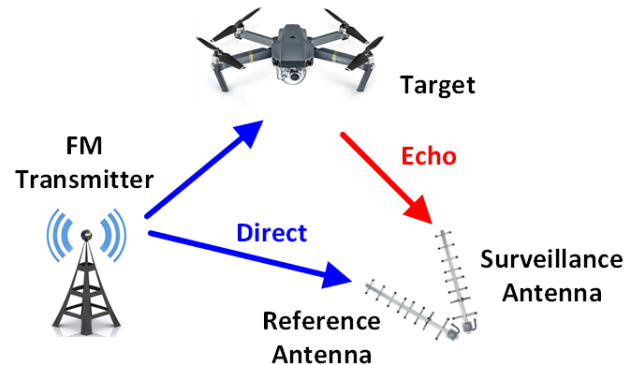
Projektförslag för kandidatarbete inom Elektroteknik (E2)

EENX15-21-38 Passive Radar for Airplane Detection

Background:

Radar is used to detect objects in many areas today, such as self-driving cars, security applications, medical applications etc. A conventional radar transmits a radio frequency (RF) signal towards an object, and then receives the reflections. By comparing the reflections with the transmitted signal, many conclusions about the object can be made.

An interesting alternative idea is to **not** send an RF signal, but instead use pre-existing RF signals in the air, such as television signals, WIFI, FM radio etc. A simple and efficient radar system can be constructed through this concept, denoted *passive radar*. Compared to conventional radar a passive radar consumes less energy, is less complex, and is not possible to detect.



Problem description:

The task is to implement the signal processing necessary to make the passive radar operational. The intended testbed will have eight antennas and radios that must be synchronized and calibrated, and algorithms to perform this should be developed. Then, new algorithms to detect the reflected signals should be developed, and calculating distance, angle and speed of the object. The algorithms are developed with the use of a MATLAB simulator.

When the algorithms are operational, it is time to read the incoming signals from our software-defined radio testbed. It should be possible to lock on the transmitted signal from the Gothenburg television tower, and then detect the television signal when it is reflected from airplanes. The final result is a fully operational demonstration of the passive radar system.

Målgrupp: TKAUT, TKMAS, TKELT, TKTFY, TKTMA,

Gruppstorlek: 3–6 students

Antal grupper: 1 group

Förkunskapskrav: Some signal-processing related course is useful, e.g. control theory or linear systems.

Kontaktperson: Thomas Eriksson, thomase@chalmers.se