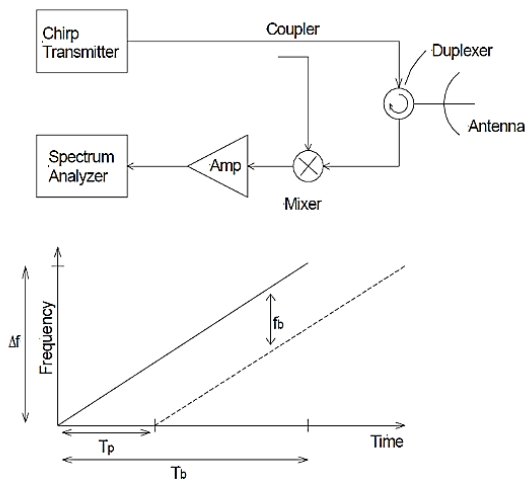


## Development of FMCW radar backend for road surface identification



Frequency Modulated Continuous Wave (FMCW) radars are standard equipment in modern cars for improving traffic safety and collision avoidance. We want to extend the applications of this type of radar and try to detect black ice, water or other spill formations on the surface of the road in front of a moving vehicle. In this project we want to construct our own radar and use it to perform experiments at different frequency bands beyond 100 GHz by up converting a chirp-waveform generated in baseband. The reflected signal is down converted in the receiver and the acquired baseband signal is sampled and processed.

### Objectives

- To identify and set up the hardware needed to generate and receive the FMCW waveform.
- To use a platform (preferably “Matlab”) to control the frequency generation in the transmitter and sampling of the baseband signal in the receiver.
- To perform signal processing in “real time” and identify detection criteria.
- To perform initial experiments with the radar when connected to radio front end. We will offer a radio front end (transmitter and receiver) for 110-170 GHz.

### Qualifications

1 –2 engineering students, preferably with a background towards microwaverelated subjects.

### References

[Graham M Brooker, “Understanding Millimetre Wave FMCW Radars”](#)

### Contact

For more information contact Vessen Vassilev

[vessen.vassilev@chalmers.se](mailto:vessen.vassilev@chalmers.se)