Sensys Traffic AB
2000-03-29

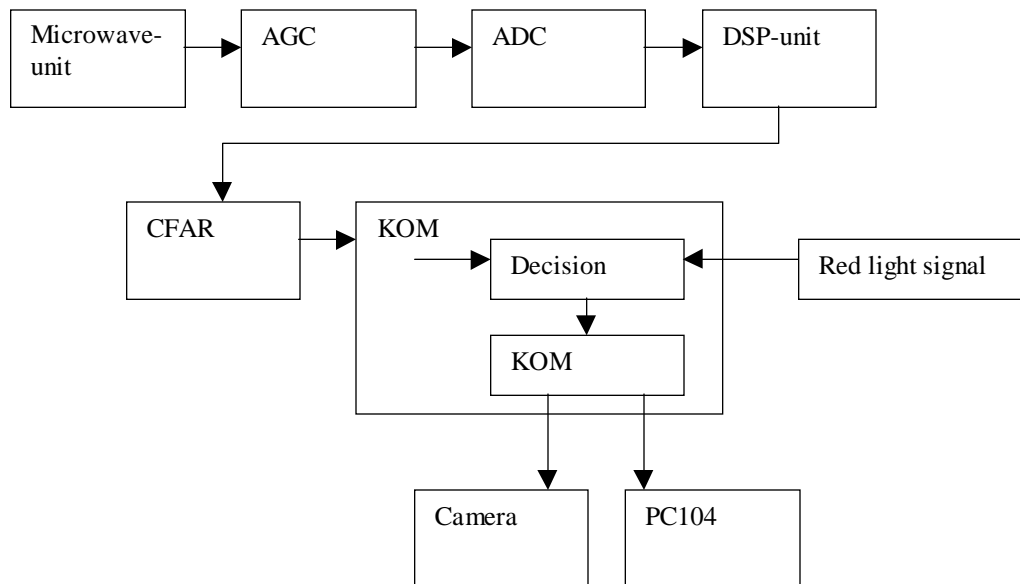# Technical report AMIR 210

1: Manufacturer: Sensys Traffic AB
                 Slottsgatan 14
                 Box 2174
                 SE-55002 Jönköping
                 Sweden
        Phone: +46 36 34 29 85
        e-mail: sven.nilsson@sensystraffic.se

2: FCC ID: AMIR210

3: Installations see document: List of contents and manual for operation.

4: Brief description:

Microwave unit

Withholding a transmitter and a receiver. Transmitting frequency is 10.525 GHz. The unit is comparing the difference between the frequency sent out and the received frequency. A received frequency that is lower than the transmitting frequency indicates a car moving away from the radar and a higher frequency for a car approaching.

AGC – Automatic gain controller

The microwave unit sends the signal to the AGC-board. The frequency of that signal is the difference of the signals in the microwave unit. The AGC consist of filters on three different channels, A, B and C. Channel A measures the speed of the car. The difference in frequency from the microwave unit correspond to a certain speed. 1.2 kHz is 60 km/h ~38 mph. The frequency will be between 300 – 5.5 kHz.

By comparing the phase shift between the A and B channel we can determine the distance to the car.

Channel C is used to make sure that the car the radar sees is not further away than 250ft.

ADC – Analog digital converter

The ADC converts the signal to a digital signal through a 12 bit converter.

DSP – Unit   Digital signal processor

The DSP has a FFT – Fast Fourier Transfer, that transfers the signal by looking at the frequency and the amplitude. Here is were the data is read. The result will appear like shown below. The result will be placed in a bin. Each bin in the diagram is 3,2 km/h, and the radar only sees one each bin. That means that the cars must have a 3 km/h difference in speed to be detected. If there is two cars in the same bin the car with the highest magnitude will be measured, that will say, the closest one.

Magnitude

3,2km/h
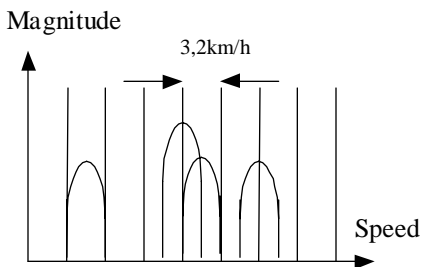
Speed

CFAR – Constant False Alarm Rate

Noise reduction. It's basically a filter

Decisions processor

It decides if it's going to send the data to the KOM-processor or not. The speed has to be in accordance with the change of distance of the target.
The red light signal is also wired to the decisions processor.

KOM Processor

The KOM processor is sending data to PC and camera

Report

Following description is for approaching vehicles.
To get a accurate report, out of 10 samples, 5 has to be correct, 4 before the limit line and 1 after. If a lot of the samples are not approved, the radar keeps on trying to get samples approved. That gives sometimes a report line that "floats". The distance to the report line will sometimes be shorter than preset. The programming allows the radar to keep looking for the car up to five meter closer than the report line.
For leaving vehicles the distance to the report line will be more distant.

Radar loob

The angle of the loob is 13 degrees. On 40m the loob will be approx. 8 m wide, at 50 it's 10 and at 70 it's 15. The width above is within the area where the power of the loob is more than 50%. The radar will still measure cars outside the loob, depending of distance angle and where it's mounted.