

Magnets in a carriageway part 2; magnetic background noise and markers pattern study

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Summary: Research project regarding position autonomous vehicles by embedding magnetic markers in the carriageway. Focus on magnetic background noise affecting the vehicle magnetic positioning system and the pattern of the magnetic markers embedded within the road.

Background: Continuance of previous project in same area. Collaboration between ÅF, VCC and TrV (financier).

Purpose: To investigate which magnetic background noises and disturbances exist in proximities to the Swedish roads and how to handle those. To suggest how the magnetic markers pattern shall be design with aspects of type, lateral and longitudinal pattern and possibility to encode information within the suggested pattern.

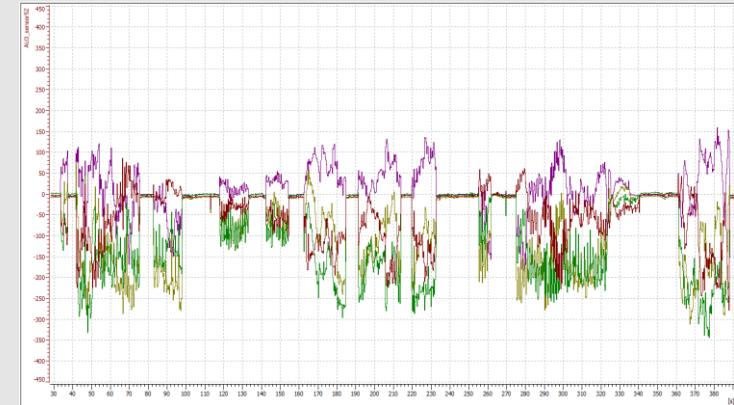


The magnetic field sensor system test rig

Measurement methods: A magnetic field sensor system test rig was used for the magnetic background noise measurements. The collected data was analysed via CANalyzer using CAPL-scripts.

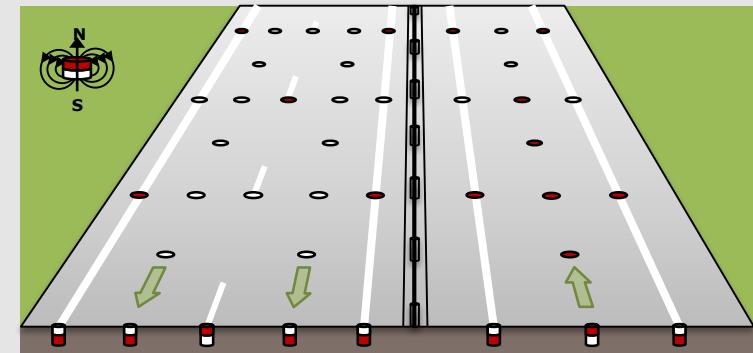
Magnetic background noise: Swedish national highways and local roads in Göteborg were driven to find magnetic disturbances from sources such as bridges, electrical power lines and tramways. Data were analysed and compared to different magnets' intensity.

Keywords: Autonomous vehicles, positioning system, magnetic disturbances, road infrastructure



Measured magnetic disturbances of bridges close to Stockholm.

Magnetic markers pattern: Simple and complex systematic patterns were compared, possibilities to encode information within the pattern were analysed and limitations on lateral and longitudinal distances between the magnetic markers were investigated.



Suggestion of the magnetic markers pattern on a 2+1 highway

Conclusions: A lot of different magnetic disturbances were found from a number of sources, large enough to require magnets with stronger intensity than suggested in previous project. A simple systematic pattern with the road marks as base and with encoded information was suggested for the magnetic markers.