

# HHI-Channel-Sounder

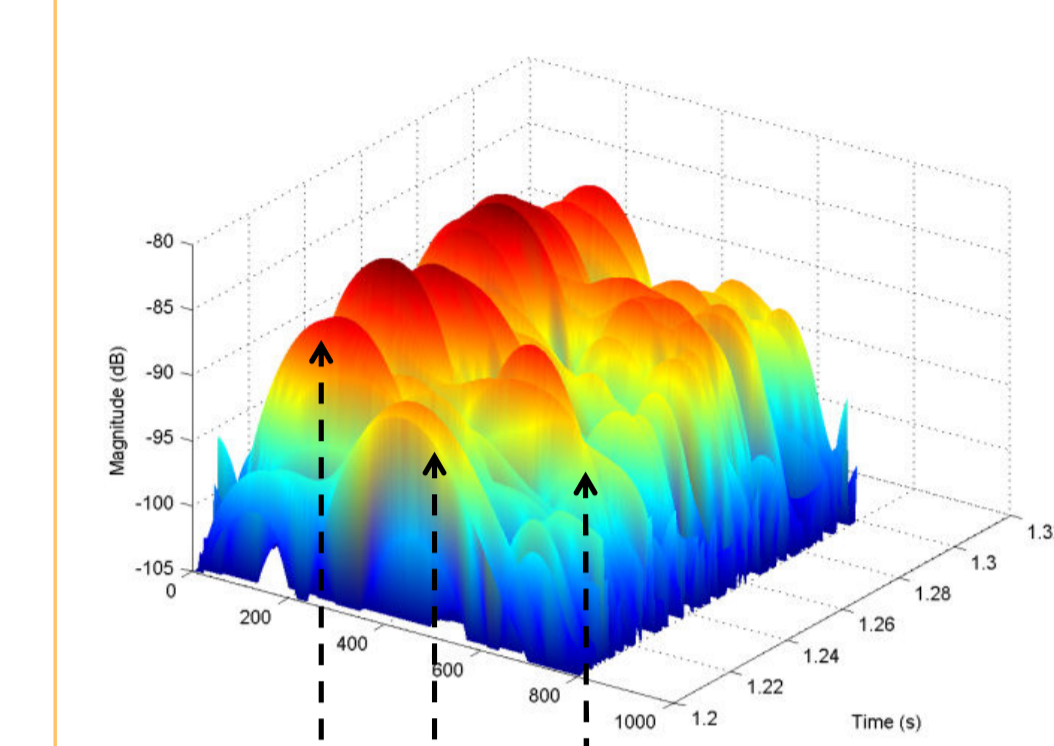
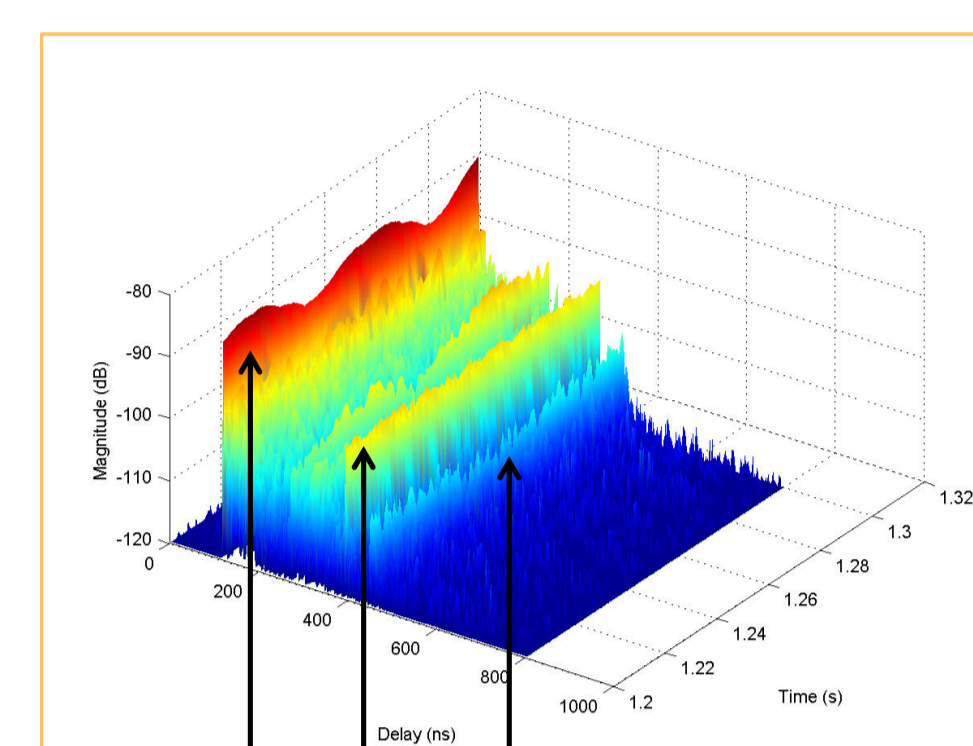
## Measuring the vehicular channel

- The vehicular channel plays a decisive role on the success of the communication system. Most important attributes are determined by the geometry and movement direction. The measurement of the vehicular channel needs explicit attention on the scenario selection and categorization.
- Experiments with communication systems can only yield statistical results on transmission success rates but cannot provide information about the reasons, thus cannot help to identify the potential in the channel.
- The challenging vehicular channel requires a channel sounder with specific properties.
  - High channel sampling rate
  - High dynamic range
  - Accurate synchronization
  - Robustness and compact form factor

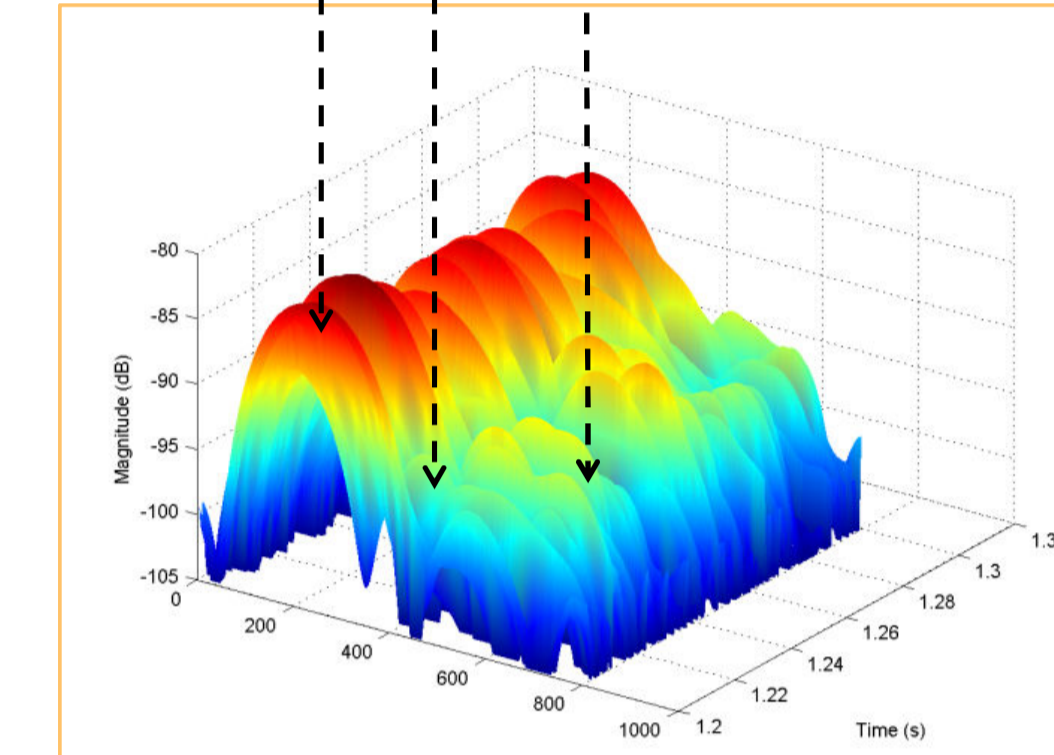
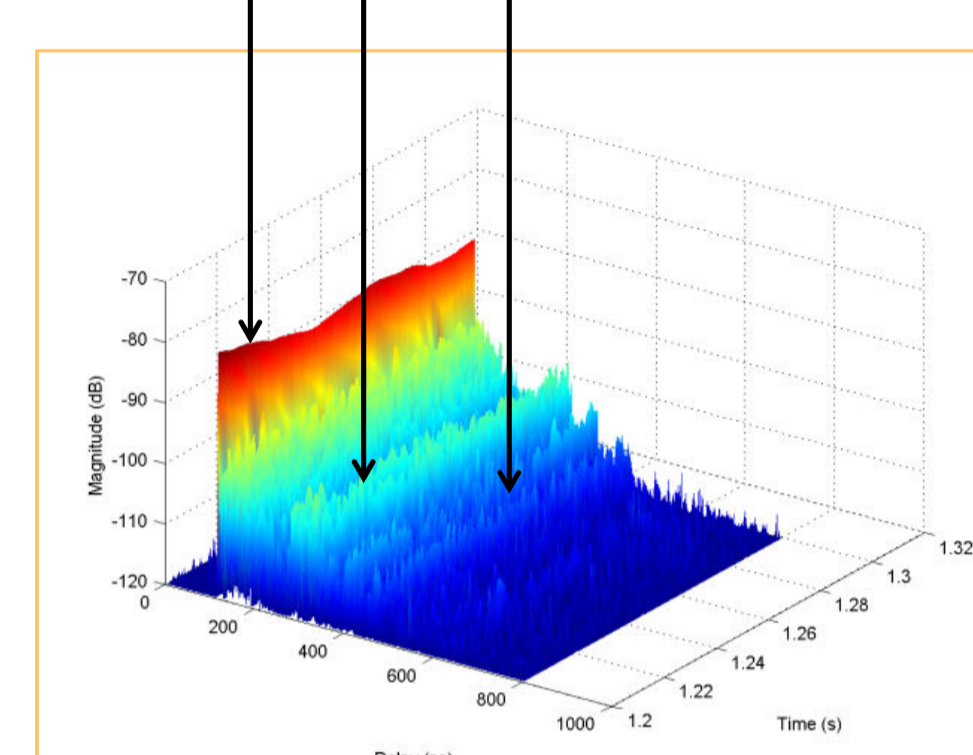
High bandwidth

Low bandwidth

Antenna 1

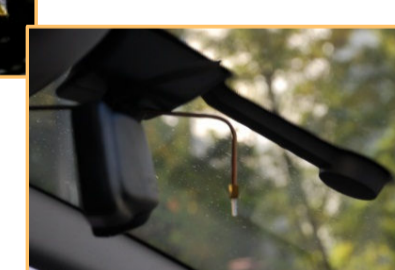
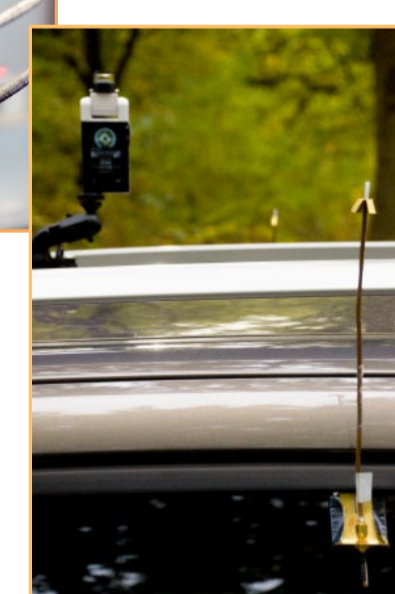
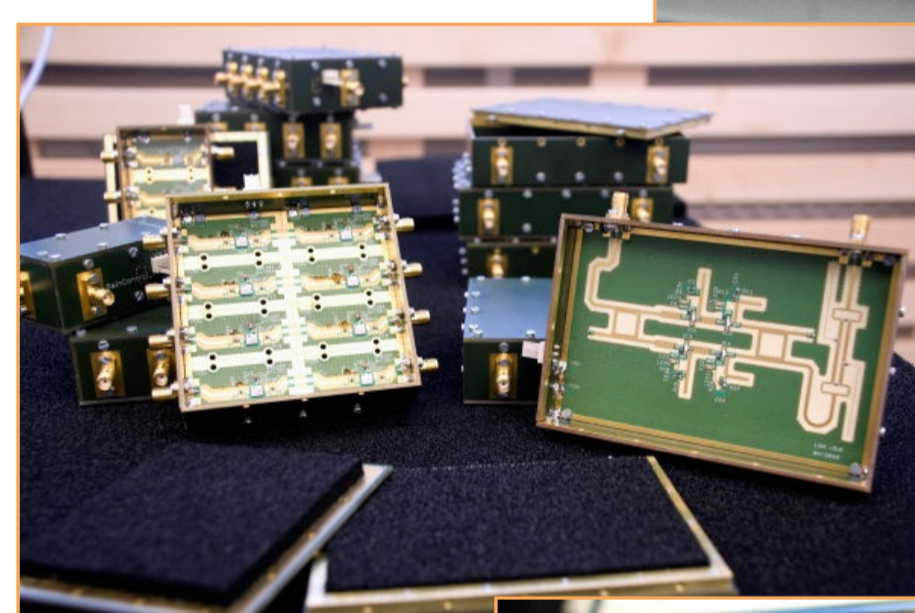
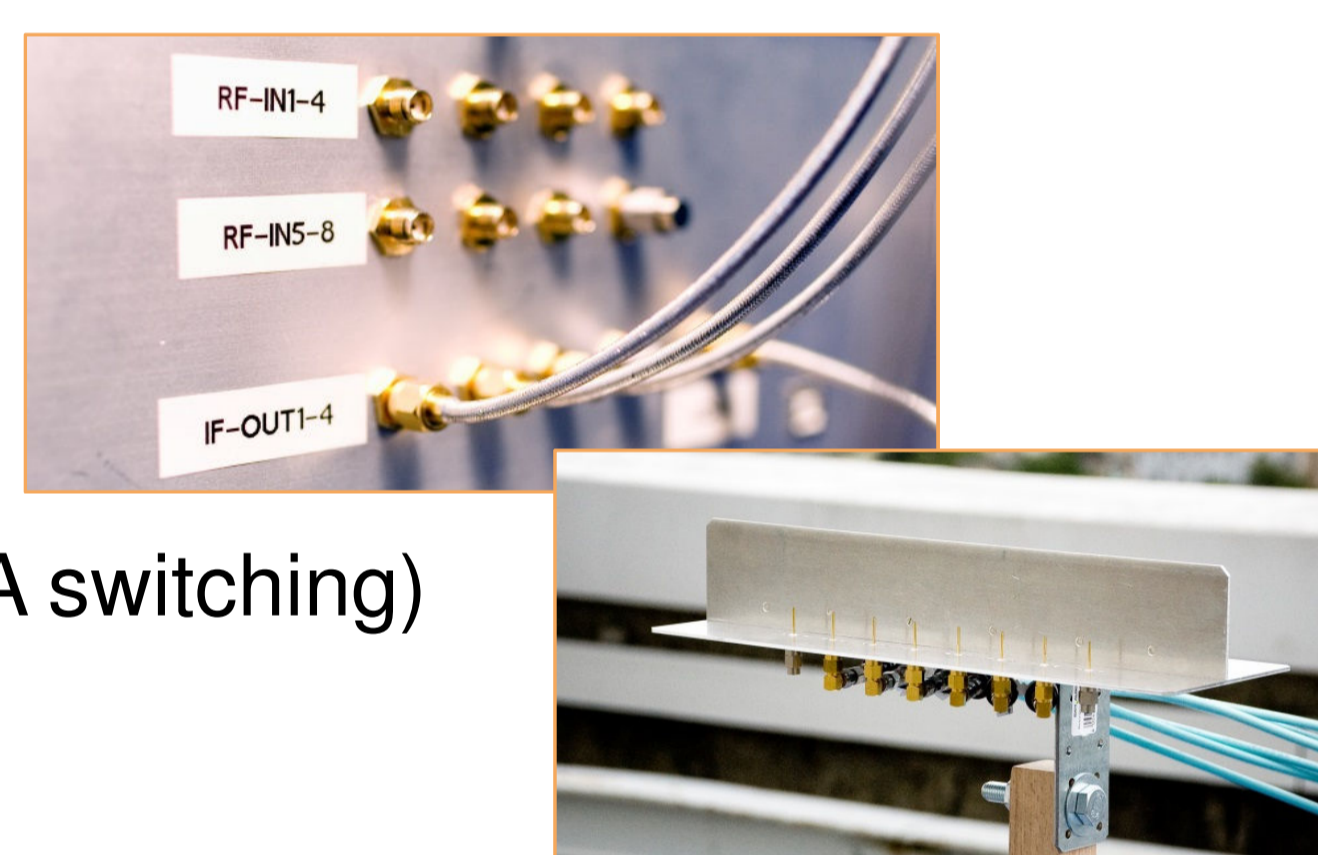


Antenna 2



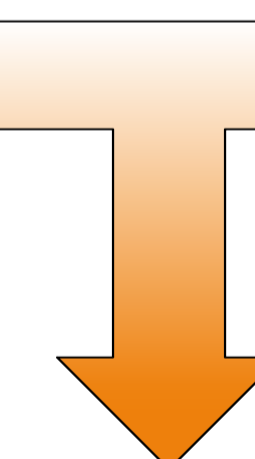
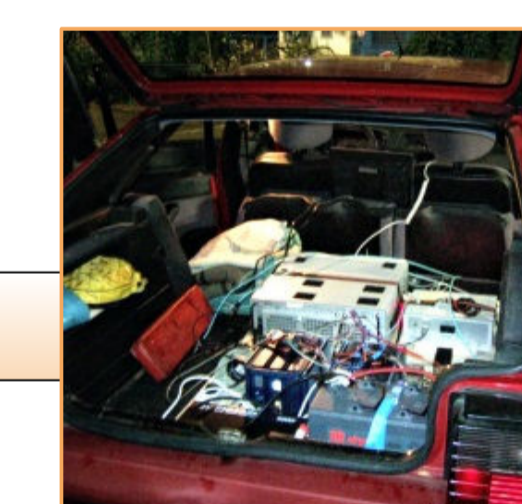
## Performance and highlights

- 2x4 parallel MIMO and 2x8 MIMO switched (TDM)
  - 2x4 parallel frontend chains for true MIMO
  - Separate gain control for each channel
  - High isolation switches for 2x8 MIMO (post-LNA switching)
- Customized modular frontend design
  - Flexible lightweight RF-modules
  - RF-Modules with increased performance and isolation
- Signal generation and acquisition
  - Specialized modules with very high performance
  - Practically unlimited data storage with HDD array
  - Very low storing time
  - Efficient power usage
- Robust casing and compact design
  - Measurements with conventional passenger vehicles
  - Optimized calibration procedures for efficient measurement flow

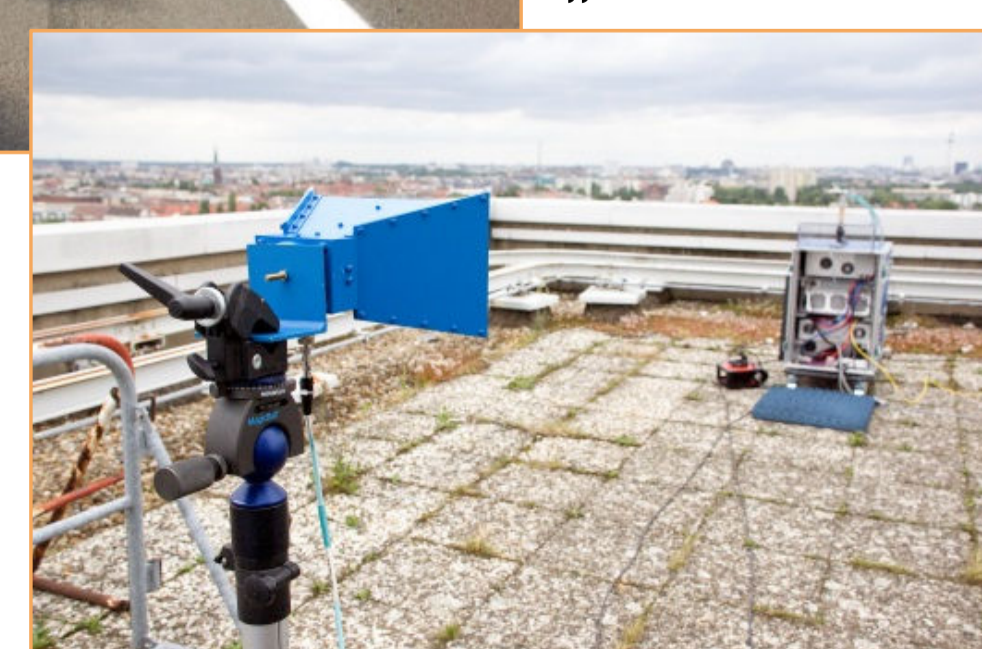


- High bandwidth provides high resolution. In combination with solid documentation, most objects can be identified.
- The channel changes with very small space variations. MIMO techniques exploit the diversity in space and provide more robust communication.

Within Ko-FAS, the HHI-Channel-Sounder has evolved from a high performance prototype to a robust and reliable high-end channel sounder.



- MIMO 2x4 parallel and 2x8 switched
- Carrier frequency 5.7 GHz
- Flexible bandwidth up to 1 GHz
- Accurate synchronization (10e-12s /2h)
- High dynamic range (>50 dB / 80 dB)
- Long operating range (approx. 1 km)
- Optimized signals



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