



LAB ON THE ROAD: AIT 3D ROAD TEXTURE SCANNER

At the AIT Center for Transport Technologies, we investigate tyre-road interaction to reduce tyre rolling noise, increase safety (grip) and reduce tyre rolling resistance (CO₂ emission). We have therefore developed a new high-performance 3D road texture scanner that enables precise scanning of the road surface - on test panels or small sections, or even in moving traffic. The scanner can be used on a transportable trolley or on a measurement trailer. This novel technology and our many years of experience in acoustic measurement are the basis for the coupled modelling and simulation of the tyre-road interaction generated by the texture.

BACKGROUND

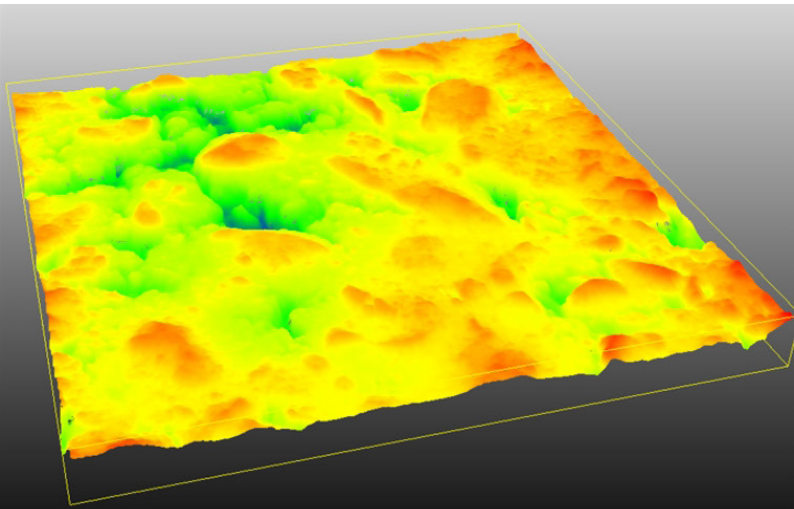
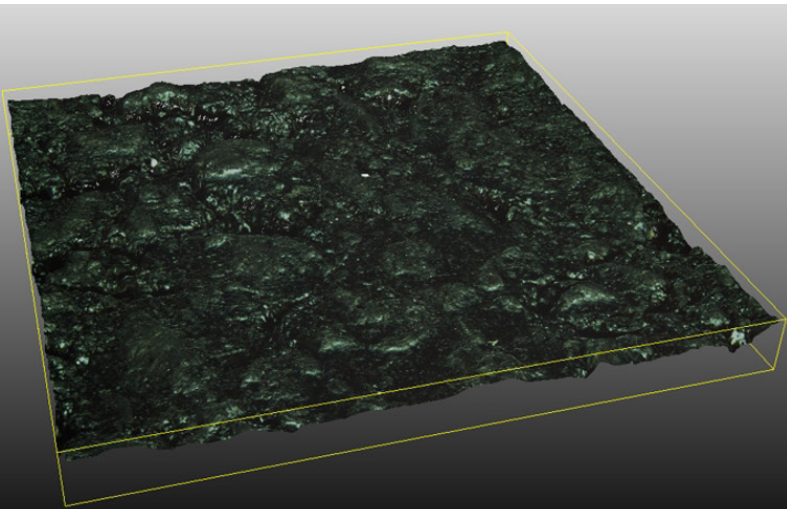
The microstructure of the road surface (< 1mm) contributes to grip and rolling resistance of tyres. Unfortunately the microstructure is not easily accessible by common measurement technologies (slow & low accuracy).

However, an accurate measurement of the road surface is of utmost importance for:

- scientific research on tyre-road interaction (noise, grip, rolling resistance, ...)
- road maintenance and road condition monitoring

OUR SOLUTION

- The AIT 3D road texture scanner applies the stereo vision by using two xposure line scan cameras developed by AIT.
- The AIT xposure camera is the world's fastest line scan camera with a scanning rate of 600 kHz.
- This high-speed equipment enables us to measure the road surface at a maximum speed of 130 km/h.
- In the post processing a resolution of 60 µm in all three spatial directions is achieved.



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approx. 1 cm

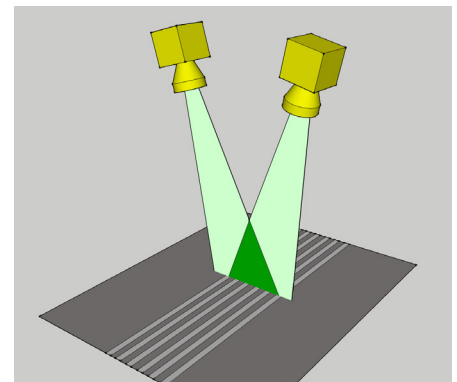
- With a recording width of 12 cm, the majority of the road surface that is in contact with the tyre can be recorded in one measurement.
- In-situ measurements on the road are easily done and no traffic lanes need to be closed for measurements.
- The simultaneous acquisition and coupled modelling of road surface, tyre/road noise and road texture is made possible.
- The scanner can be easily mounted on a measuring trailer or trolley.
- No laser radiation necessary.
- The measurement is possible under traffic in combination with rolling noise, road absorption or grip.
- Highly precise input data for further modelling of tyre-road interaction is generated.

KEY FEATURES

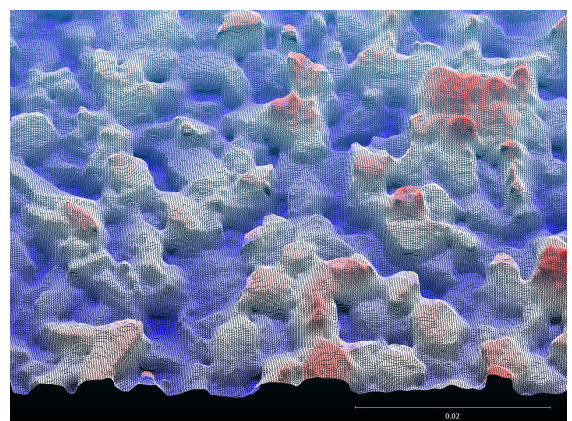
- High accuracy (resolution of 60 µm in X/Y/Z)
- High measurement speed of 130 km/h
- High raw data rate of 64 Gbyte/km
- Mountable on a transportable trolley or measuring trailer

POSSIBLE APPLICATIONS

- High-precision capture of the 3D texture of a road surface
- “Lab on the road” for science and industry
- Automated road condition monitoring for road authorities
- Correlation of 3D texture parameters with rolling noise or other parameters (grip, rolling resistance)
- Modelling of tyre/road interaction for the optimisation of road surfaces and investigations regarding ageing and long-term behaviour of road surfaces



Working principle of AIT 3D road texture scanner



Road surface recorded with the 3D texture scanner



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