Technical data of a typical sensor system:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tire rotation frequency</td>
<td>typ. 65 rps</td>
</tr>
<tr>
<td>Tire Speed</td>
<td>up to 460 km/h</td>
</tr>
<tr>
<td>Synchronization</td>
<td>rotary encoder provides accurate position reference</td>
</tr>
<tr>
<td>Measurement width/height</td>
<td>customer specific *</td>
</tr>
<tr>
<td>Laser</td>
<td>Class 3B</td>
</tr>
<tr>
<td><strong>Height resolution</strong></td>
<td>0.05 mm *</td>
</tr>
<tr>
<td><strong>Lateral resolution</strong></td>
<td>0.15 mm *</td>
</tr>
<tr>
<td><strong>Circumferential resolution</strong></td>
<td>dependent on resolution of rotary encoder (max. 4096)</td>
</tr>
</tbody>
</table>

* All technical data can be adapted to meet specific customer requirements.

WWW.IIS.FRAUNHOFER.DE

HIGH SPEED 3D TIRE CONTOUR MEASUREMENT

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X-ray Technology EZRT
a division of Fraunhofer Institute for Integrated Circuits IIS
in cooperation with Fraunhofer IZFP

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MOTIVATION

Knowledge about the dynamic deformation of tires at extreme speeds is an important issue for tire development. Fraunhofer IIS has developed a dedicated laser sheet-of-light technology based 3D sensor and software system for fast 3D measurement of tire geometries at high speeds. This sensor system can capture the complete surface of a tire at surface velocities of up to 460 km/h.

The laser sheet-of-light technology can be combined with a mechanical precision handling system yielding the overall bead-to-bead contour of a tire of almost arbitrary dimensions. 3D reconstructed data, real-time 3D views and profile cuts of the tire can be analyzed.

OPERATING PRINCIPLE

The tire’s surface is captured in its entirety at high speeds using bead-to-bead laser sheet-of-light measurement with a multi-sensor array. The number of sensors is scalable according to the specific customer’s requirements.

SOFTWARE

The Windows-based software features include:

- Automatic fusion of sensor data into single calibrated tire surface contour
- Analysis of height profiles as well as raw measurement data
- Automatic measurement parameter configuration
- Automatic sensor adjustment procedure
- Generation and export of calibrated 3D data

1 Visualization of high resolution 3D measurement

False color view of tire measurement data and height profile display

Bead-to-bead profile visualisation