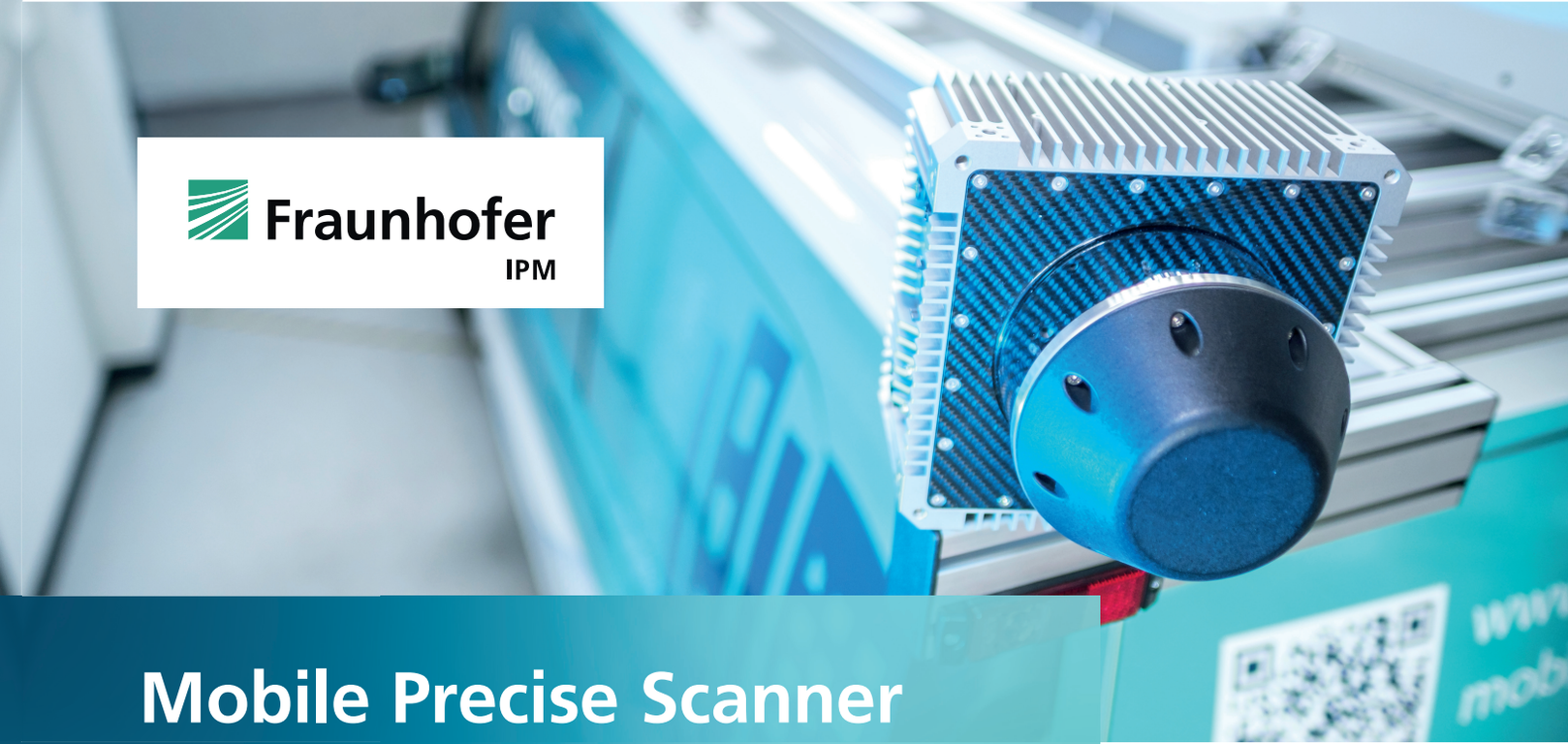


Fraunhofer IPM

Mobile Precise Scanner

Compact LiDAR system for high-precision 3D mapping

The three-kilogram LiDAR sensor is about half the size of a shoe box and can be mounted on road and rail vehicles.

The Mobile Precise Scanner (MPS) by Fraunhofer IPM is a versatile mobile mapping tool. Designed for outdoor use, the high-end profile scanner can be easily deployed on a variety of mobile platforms. Featuring an extremely high scanning rate, the MPS achieves a unique profile density, even at high travelling speeds, and over a large measurement range. The MPS is available with an integrated IMU and GNSS, operating as a self-contained system.

High-performance, easy integration

The MPS is ideally suited for surveying tasks that require high precision. The compact, lightweight laser scanner provides sub-millimeter measurement precision and a full 360° scanning angle, capturing even narrow objects, such as signs or overhead lines, at high traveling speeds. Laser wavelength, scanning rate, and measurement rate can be customized as needed. The sensor uses time-of-flight (ToF) technology to cover measurement distances exceeding 100 meters.

Maximum configuration flexibility

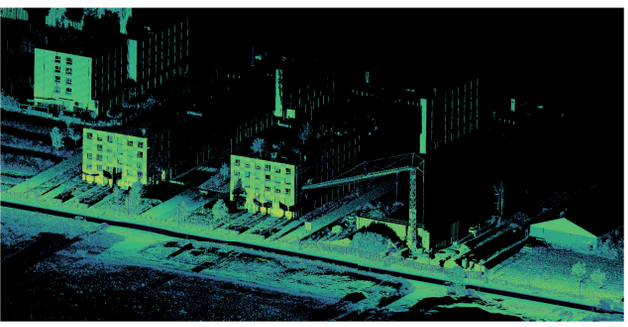
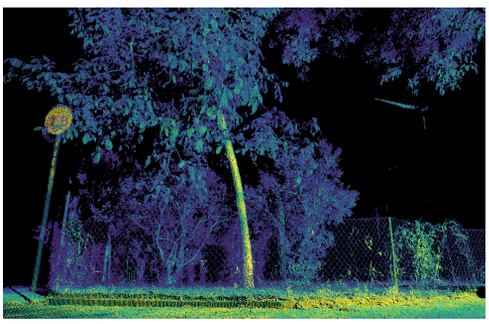
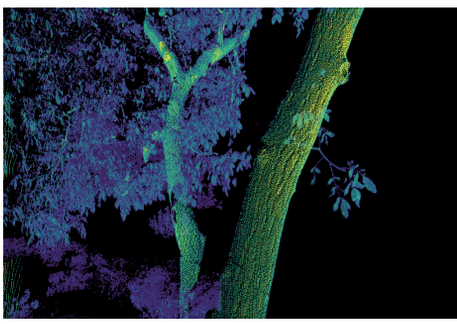
The MPS can be equipped with an inertial measurement unit (IMU), GNSS receivers and up to two cameras to function as a universal stand-alone system. Interfaces are available for easy integration into existing mobile mapping systems. Fraunhofer IPM also offers the MPS as part of a customized overall mobile mapping system setup that comes calibrated and ready to use. Additional sensors can be integrated as needed. To increase point density or acquire multispectral information, multiple scanners can be combined, sharing central components, such as the processing unit. The mechanical design eliminates the need for individual calibration.

Applications

Designed for outdoor use, the MPS can easily be deployed on road or rail vehicles. The lightweight scanner can also be mounted on autonomous robotic platforms for indoor

Advantages at a glance

- Sub-millimeter precision
- Customizable according to application
- Autonomous measurement operation with integrated IMU and GNSS
- High measurement range and scanning rate
- Possibility of deep integration thanks to open interfaces
- Robust, lightweight design

Point clouds recorded by the MPS at different scales at the same time. The MPS captures large-scale structures, from buildings and cranes (left), to fences and vegetation (middle), showing their nature in great detail (right).

applications or use in environments that are difficult to access. Possible applications include:

- General infrastructure mapping and assessment
- Clearance profile measurement
- Road environment
- Track monitoring
- Tunnel condition monitoring
- Sewer inspection
- Open-pit mining surveying

Data processing and evaluation

A powerful processing unit controls the system's subcomponents, evaluates the data and stores them internally. The full echo sequence of each laser pulse is analyzed, enabling the reliable detection of multiple echoes (full waveform signal can be provided). This means that objects can even be detected through obstacles such as vegetation or fencing. Live streaming of the data is also possible.

Tools for automated data analysis

Fraunhofer IPM offers AI-based tools for the automated interpretation of 2D and 3D mobile mapping data. The 3D-AI software framework is specifically designed for reliable and efficient object recognition in mobile mapping data. It uses a combination of artificial intelligence (AI) and 3D geometry-based object detection.

Technical data

Measurement precision	< 1 mm at 10 m distance; 90% reflectivity
Scanning rate	up to 300 Hz
Scanning angle	360°
Measurement rate	up to 3 MHz
Measurement distance	1 m up to several hundred meters (depending on measurement rate and target reflectivity)
Profile distance	4.6 cm at 50 km/h 9.3 cm at 100 km/h
Weight	approx. 3.2 kg
Laser wavelength	1,550 nm (standard, can be customized)
Eye safety	Laser class 1

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