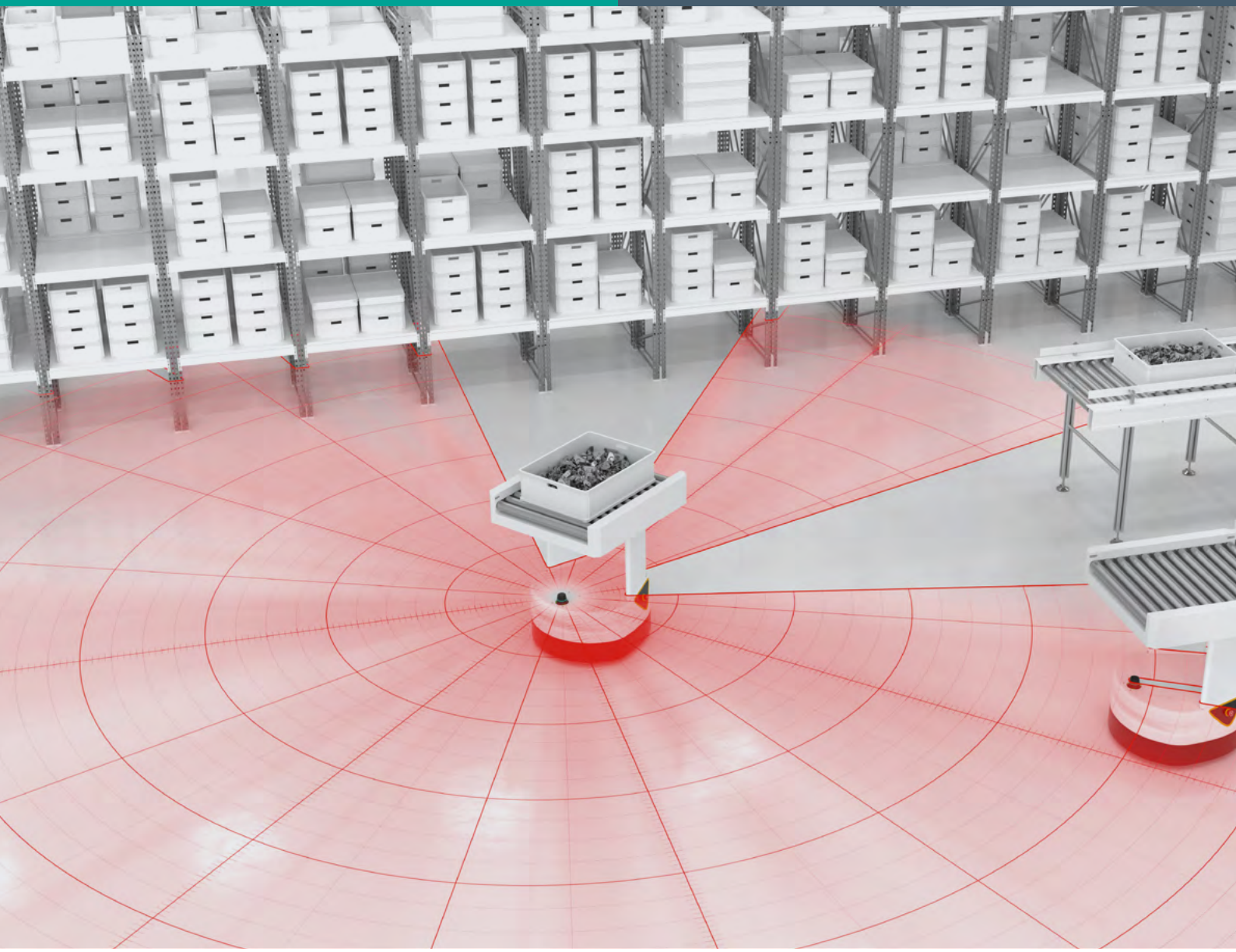
SLAM Navigation for Compact Autonomous Mobile Robots (AMR)

R2400 2-D LiDAR Sensor Combines Compact Design and 360° Environmental Sensing

At a Glance

- Compact design with a height of 81 mm for integration into confined AMR spaces
- Complete 360° environmental sensing for reliable SLAM (simultaneous localization and mapping) navigation
- High angular resolution of 0.05° for precise contour and reflector navigation
- Fast system integration via ROS drivers for mobile robotics applications
- Robust design and optical isolation of transmitter and receiver for stable measurement data



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The Application

In logistics automation, compact autonomous mobile robots (AMRs) with integrated conveyor modules are used to transport crates of semi-finished or finished products flexibly and efficiently. For reliable navigation in dynamic production environments, these vehicles require precise environmental sensing that enables both contour-based navigation and reflector-based guidance.

The Goal

The key challenge lies in providing reliable and precise sensor data for SLAM-based navigation while minimizing the required installation space. The sensor must be integrated into compact AMRs and deliver stable measurement results under varying conditions. The goal is to achieve optimal navigation reliability through high-resolution environmental data.



The Solution

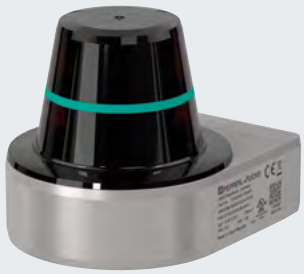
The 2-D LiDAR sensor R2400 offers a compact height of just 81 mm and its full 360° all-around coverage, the R2400 2-D LiDAR sensor offers ideal conditions for integration into space-constrained AMR systems. With a high angular resolution of up to 0.05° and a scan rate of 10–20 Hz, the sensor generates dense, high-resolution point clouds for precise SLAM algorithms. The optical separation of the transmitter and receiver ensures stable measurement results even under changing ambient conditions such as dust or condensation. Using the ROS driver, the sensor can be quickly integrated into existing mobile robotics platforms and enables both contour-based navigation and reliable reflector detection. The precise angular accuracy ensures geometrically correct mapping of the environment, while the durable metal construction guarantees long-term, stable performance.

The Benefits

The combination of a compact design, 360° field of view, and high angular resolution makes the R2400 the ideal sensor solution for SLAM-based AMR navigation. Users benefit from precise, reproducible environmental data that enables reliable mapping and localization. The dense point cloud supports both the recognition of fine structures for contour navigation and the precise detection of reflectors for a hybrid navigation strategy. The durable design, featuring a sturdy metal base and large bearings, guarantees consistent measurement performance even in the presence of vibrations during operation, resulting in high availability and process reliability.

Technical Features

- Measuring range: 25 m at 90% reflectivity, 10 m at 10% reflectivity, 40 m with reflector
- Scanning angle: 360° for complete 360-degree coverage
- Scan rate: 10–20 Hz for dynamic SLAM applications
- Angular resolution: up to 0.05° for high-resolution point clouds and precise mapping
- Repeat accuracy: < 16 mm
- Compact height of 81 mm for integration into space-constrained AMR systems
- Optical separation of transmitter and receiver for stable measurement under varying ambient conditions



For more information, visit: **pepperl-fuchs.com/px-R2400**