



The Mobile Robot Company

Knowledge Center — Navigation Sensors vs. Safety Sensors · 2026-08-04

<https://info.mobilerobot.com/safety-compliance/safety-overview/navigation-sensors-vs-safety-sensors>

Navigation Sensors vs. Safety Sensors

The J1600 carries two distinct sensor systems that are easy to confuse: the navigation stack that drives the vehicle, and the safety stack that protects people. This page explains what each does and why they are separate.

Two stacks at a glance

	Navigation stack	Safety stack
Sensors	3D LiDAR, RGB AI camera	Two 2D safety LiDAR scanners, front and rear
Processing	Industrial NVIDIA Jetson AI computer	Independent safety controller
Job	Mapping, localization, route planning, obstacle avoidance	Certified person detection and protective fields
Certification role	Control/navigation function	Certified safety functions with assigned Performance Levels

The navigation stack

The 3D LiDAR performs [SLAM](https://info.mobilerobot.com/products/j1600/navigation-and-obstacle-avoidance/) (simultaneous localization and mapping): it builds and continuously updates a three-dimensional map of the facility while an operator drives, then localizes the vehicle and plans routes to saved destinations. It scans environmental structures at heights reaching up to 70 m above the vehicle, works without fixed tracks, wires, reflectors, or building modifications, and routes around obstacles in dynamic environments. An RGB AI camera is part of the same control stack, and preferred travel zones can be defined for safer routing through production areas.

3D mapping is designed for greater precision and reliability than traditional 2D navigation in complex or changing environments — one reason the vehicle suits [brownfield sites](https://info.mobilerobot.com/applications/use-cases/brownfield-automation/).

For exact sensor geometry, range, accuracy, minimum aisle width, and localization tolerances, contact the company or a partner.

The safety stack

Personnel protection does not depend on the navigation system. Two separate 2D safety LiDAR scanners feed an independent safety controller and certified components. Together they produce a full 360-degree protective field that supports forward and reverse autonomous travel, changes size with speed, and triggers certified reactions:

- [Person detection in the safety field](https://info.mobilerobot.com/safety-compliance/safety-functions/person-detection/) (https://info.mobilerobot.com/safety-compliance/safety-functions/person-detection/) — PL d
- [Safety-field size adjustment](https://info.mobilerobot.com/safety-compliance/safety-functions/safety-field-adjustment/) (https://info.mobilerobot.com/safety-compliance/safety-functions/safety-field-adjustment/) — PL d
- [Braking](https://info.mobilerobot.com/safety-compliance/safety-functions/braking/) (https://info.mobilerobot.com/safety-compliance/safety-functions/braking/) — PL d
- [Speed monitoring and control](https://info.mobilerobot.com/safety-compliance/safety-functions/speed-monitoring/) (https://info.mobilerobot.com/safety-compliance/safety-functions/speed-monitoring/) — PL c

Why the separation matters

Obstacle avoidance by the navigation stack is a productivity feature: it keeps the vehicle moving efficiently around whatever is in the way. The 2D safety stack is the certified protection layer: it guarantees [the response when a person enters the protective field](https://info.mobilerobot.com/support/troubleshooting/obstacle-or-safety-field-stops/) (https://info.mobilerobot.com/support/troubleshooting/obstacle-or-safety-field-stops/), independently of what the navigation software decides. Keeping the two systems separate means personnel protection rests on certified components rather than on the AI navigation stack.

For the complete component list, see [Safety architecture](https://info.mobilerobot.com/safety-compliance/safety-overview/safety-architecture/) (https://info.mobilerobot.com/safety-compliance/safety-overview/safety-architecture/). For terms such as LiDAR, SLAM, and Performance Level, see the [glossary](https://info.mobilerobot.com/documentation/concepts/glossary/) (https://info.mobilerobot.com/documentation/concepts/glossary/).