# TNAV2.0

## Wheeled Robot Positioning & Navigation Kit

Multi-sensor navigation platform integrating 3D LiDAR, ToF depth vision and industrial ultrasonic obstacle sensing

| Item | Specification / Description |
|---|---|
| Product type | Positioning and navigation kit for wheeled robots |
| Positioning accuracy | ±1 cm (stated in supplied product material) |
| Primary ranging / mapping sensor | 3D LiDAR |
| 3D LiDAR shown | Livox MID-360 |
| Vision sensor | ToF depth camera |
| Ultrasonic sensing | 6 industrial-grade ultrasonic radar units |
| Navigation capability | Autonomous positioning and navigation |
| Topology capability | Multi-station / multi-waypoint topology navigation |
| Obstacle avoidance | Multi-sensor obstacle avoidance / all-around safety protection |

## Product Overview

TNAV2.0 is a positioning and navigation sensor suite intended for wheeled robotic platforms. The supplied product material presents a fused sensing architecture built around a 3D LiDAR, a ToF depth camera and six industrial-grade ultrasonic ranging sensors. The system is promoted for autonomous localization, navigation and obstacle avoidance, with centimeter-class positioning accuracy and support for multi-station topology navigation.

## 1. Key Selling Points & Features

- High-precision positioning function with stated ±1 cm positioning accuracy.
- 3D LiDAR-based environmental perception and navigation.
- Livox MID-360 LiDAR is shown as the 3D laser-scanning sensor in the supplied product images.
- ToF depth camera adds depth-based visual perception to the navigation stack.
- Six industrial-grade ultrasonic ranging sensors provide close-range obstacle awareness.
- Multi-sensor obstacle avoidance for all-around safety protection.
- Autonomous positioning and navigation for wheeled robotic platforms.
- Supports multi-station / multi-waypoint topology navigation.
- Combines complementary sensing modalities to cover long-range spatial perception, depth sensing and short-range obstacle detection.
- Designed as an integrated navigation package rather than a single standalone sensor.

## 2. System Architecture

| Item | Specification / Description |
|---|---|
| 3D LiDAR | Primary spatial perception sensor for 3D environmental ranging, localization and navigation. The prod |
| ToF depth camera | Provides depth information for scene perception and obstacle/environment sensing. |
| 6 × industrial ultrasonic radar | Provides distributed short-range ranging for near-field obstacle detection around the robot. |
| Navigation function | Autonomous localization and navigation using the combined sensor suite. |
| Topology navigation | Supports navigation across multiple stations / waypoints according to the supplied product description |
| Safety sensing | Multi-sensor obstacle avoidance intended to provide all-around protective coverage. |

## 3. Positioning & Navigation Performance

| Item | Specification / Description |
|---|---|
| Positioning accuracy | ±1 cm |
| Localization mode | Autonomous positioning |
| Navigation mode | Autonomous navigation |
| Topology support | Multi-station / multi-waypoint topology navigation |
| Environmental perception | 3D LiDAR + ToF depth sensing + ultrasonic ranging |
| Obstacle detection concept | Multi-sensor, all-around obstacle avoidance |

*The supplied package states the ±1 cm positioning figure but does not define the test environment, map conditions, reference method, statistical confidence, or whether the value is repeatability or absolute position accuracy. It is therefore reproduced here exactly as a source-stated system capability without adding an unsupported test definition.*

## 4. Sensor Fusion Advantages

- 3D LiDAR provides geometric information over a broad surrounding environment and supports localization against spatial features.
- The ToF depth camera adds image-aligned depth information that can complement LiDAR perception in front-facing or task-specific regions.
- Ultrasonic sensors are useful for short-range detection near the robot body, including areas where optical sensing may be less effective.
- Using multiple sensor types can improve obstacle-awareness coverage by avoiding dependence on a single sensing principle.
- The architecture is suitable for wheeled mobile robots requiring both navigation and near-field collision avoidance.

## 5. Typical Applications

- Autonomous mobile robots (AMRs)
- Indoor service robots
- Material-handling and logistics robots
- Inspection robots
- Research and development mobile platforms
- Autonomous wheeled robot chassis
- Robotic systems requiring multi-waypoint navigation and obstacle avoidance

## 6. Parameters Not Provided in the Supplied Package

The supplied four product images do not provide a complete engineering specification table. The following values are therefore intentionally not invented:

- System input voltage, current and total power consumption
- Controller / computing-platform specification
- Communication interfaces and connector pinout
- Navigation update rate and control-loop latency
- Operating and storage temperature
- Ingress-protection rating
- Overall kit dimensions and mass
- ToF camera model, field of view, range and resolution
- Ultrasonic sensor range, beam angle and update rate
- MID-360 operating parameters beyond identification of the shown sensor
- Supported robot chassis size, payload or speed
- Software API, ROS/ROS2 version and supported operating system
- Certification and compliance information

## 7. Source Notes

This datasheet was created only from the supplied TNAV2.0 image package. Every source image contains Chinese text, so none of the original images are reproduced in this PDF. The images were used solely to extract the product identity, system composition, stated positioning accuracy and functional claims. No unsupported technical values have been added.