MANIFOLD TECH ODIN 1

— The World's First Spatial Memory Module

留形科技
MANIFOLD TECH

www. manifoldtech.cn

COMPANY INTRODUCTION

Multi-sensor

Deep Fusion and Synchronization Framework

MindSLAM™

High-performance navigation and mapping algorithm

MindCloud

Proprietary Platform

Manifold Tech is a technology innovation company specializing in spatial perception and reconstruction technologies. It is dedicated to providing high-precision environmental perception and 3D modeling capabilities for embodied intelligent devices such as robots and drones. The core founding team members hail from the Mechanical Engineering and Robotic Systems Laboratory (HKU MaRS Lab) at the University of Hong Kong, bringing profound expertise and extensive industry experience in 3D perception, 3D reconstruction, and embodied intelligence. The company drives cutting-edge innovation and practical application of spatial intelligence technologies.

Mission

To empower intelligent devices with "eyes" and a "hippocampus-like brain," enabling the virtual world to precisely mirror the real world and fostering the intelligent evolution of the physical world. Through spatial intelligence, we aim to accelerate the large-scale deployment and broad adoption of transformative technologies.

Core Technologies

Enabling Spatial Intelligence — Manifold Tech leverages a multi-sensor deep fusion and synchronization framework and the proprietary MindSLAM™ high-performance navigation and mapping algorithm to construct high-precision spatial environmental perception and a hippocampus-like spatial memory system. The technology delivers robust localization and mapping capabilities even in extreme environments with no-light, featureless, or highly transparent conditions. Through its proprietary MindCloud platform, the company enables spatial data annotation, 3D reconstruction, and efficient simulation, empowering embodied intelligent platforms with advanced environmental understanding and autonomous learning capabilities. This accelerates the deep integration of the physical and digital worlds.

What is Manifold Odin1 ?

Manifold Odin1 is the world's first spatial memory module that deeply integrates high-performance hardware with multi-sensor fusion and the built-in MindSLAM™ algorithm. Mimicking the brain's hippocampus, it equips robots and drones with critical spatial perception and spatial memory capabilities. When paired with the MindCloud platform, Manifold Odin1 optimizes, annotates, and reconstructs captured 3D data, enabling a complete closed-loop workflow from front-end perception to back-end training.

APPLICATION SCENARIOS

Autonomous Robot Navigation

Warehousing, Commercial, and Agricultural Robot Automation

Drone Inspection & Mapping

Precision Flight & Obstacle Avoidance

Embodied Intelligence & AI Simulation

MindCloud One-click Real2Sim

Industrial Manufacturing

Empowering Robotic Arms & Flexible Production

Digital Twin & Cultural Heritage Preservation

3D Scanning & AI Restoration

Emergency Rescue & Intelligent Firefighting

Precision Detection of Hazardous Areas

SPATIAL PERCEPTION

High-performance spatial perception, endowing devices with sharp "eyes"

Breakthrough the limitations of traditional RGBD cameras, delivering environmental perception capabilities with higher precision and broader coverage

- **Ultra-long-range detection:** Maximum ranging distance: 70m (80% reflectivity) / 30m (10% reflectivity), extending detection range
- **Ultra-wide field of view:** 120° × 90° FOV, enabling expanded coverage and reduced blind zones
- **High-density point cloud:** 700,000 points/sec, achieving high-density depth data acquisition
- **High-resolution data capture:** 768 × 576 depth module + 1600 × 1298 RGB with global shutter, delivering clear, high-fidelity 3D reconstruction data

Note 1: Maximum ranging distance under different reflectivity conditions

SPATIAL MEMORY

Persistent Spatial Memory, Building "Hippocampus-like" Navigation & Cognition

Empowering intelligent agents with long-term stable environmental cognition and precise navigation capabilities, enabling them to "remember" and "navigate" in complex environments

- Built-in MindSLAM™ high-performance fused SLAM algorithm, endowing intelligent agents with hippocampus-like spatial memory capabilities
- **Centimeter-level positioning accuracy:** ±5cm global positioning accuracy, meeting demands for high-precision autonomous localization
- **High-frequency pose updates:** Up to 1000Hz, ensuring precise localization in dynamic environments
- **Adaptive environmental perception:**Reliable and stable operation in low-light, glass, or water surface conditions
- **Efficient computational offloading:** Direct output of trajectories and map data, avoiding consumption of vehicle computing resources, significantly reducing task latency, and freeing vehicle computing power for motion control and embodied perception tasks

Note 2: ±5cm +1% refers to global positioning accuracy

Note 3: High-frequency pose output can be configured up to 1000 Hz based on application scenario requirements

SMALL AND MIGHTY

Compact and Lightweight Design, Delivering Open and Compatible "Interfaces"

Seamlessly adapts to multi-platform deployment across robots, drones, and more, supporting secondary development and customization requirements

- **Ultra-lightweight Design:** Total weight of only 300g (minimum 200g), enabling flexible deployment
- **Modular Compatibility & Compact Dimensions:** 100 × 62 × 43mm, seamlessly adapting to robots, drones, robotic arms, delivery vehicles, and other platforms
- **IP67 Industrial-grade Protection:** Waterproof and dustproof, operating reliably in harsh environments to ensure long-term stable performance
- **Open and Compatible Ecosystem:** Provides open SDK & API, outputting complete raw and processed point clouds, images, and IMU data to enhance scalability and development flexibility
- Supports user-deployed open-source or proprietary SLAM algorithms, meeting customized requirements for diverse application scenarios

PRODUCT SPECIFICATIONS

	Parameter Name	Specification / Value
Depth Module	Depth Resolution	240 × 180
	Ranging range (Max)	"30 m @ 10% reflectivity (<500 lux) 70 m @ 90% reflectivity (<500 lux)"
	Ranging range (Min)	0.2 m
	Point frequency	Up to 700,000 pts/s
	Ranging accuracy	±3 cm @ 1σ [1]
	Field of View (FOV, Horizontal × Vertical)	120° × 90°
	Angular resolution	0.5° × 0.5°
	Laser wavelength	940 nm
	Laser safety class	Class 1 Eye-safe
	Frame rate	Up to 15 FPS
RGB Camera Module	Resolution	1600 × 1298
	Exposure mode	Global Shutter
	FOV (H×V)	Approx. 120° × 90°
Full System Parameters	Built-in SLAM Positioning Accuracy	±5cm + 1% [2]
	Pose output frequency	Up to 1000 Hz
	Weight	Approx. 300 g; 200 g (without housing)
	Dimensions (L×W×D)	Approx. 100 × 62 × 43 (main body) / 46 (with aviation connector) Unit:mm
	Power consumption	Max. 15 W
	Protection rating	IP67
	Operating voltage	9-26 V
	Operating temperature	0°C ~ 40°C
	Storage temperature	-10°C ~ 45°C
Data Output	Point cloud	True Color/Intensity/Reflectivity/Elevation Mode Raw Point Cloud
	Photos	Raw RGB Images & Undistorted RGB Images Image Timestamp & Pose Quaternion
	Software interface	Comprehensive SDK & ROS Interfaces, supporting Linux platform deployment of custom SLAM algorithms
MindCloud Platform Capabilities	Global Optimization	
	Dense Deep Fusion	
	Neural Rendering (3D Gaussian)	
	Efficient Image Annotation System	
	Automatic Monomerization	
	Global Coordinate System Fusion (with RTK Module)	
	Result Cropping, Stitching, and Correction	
	Automatic Registration and Fusion of Multi-session Mapping Results	
	Generate Mesh Texture Mapping Files	
	Support mainstream 3D formats (.las, .obj, .e57, .usd) for 3D output	
	Seamless integration with NVIDIA Omniverse	

[1] Indoor testing environment, Std accuracy calculated from 20 consecutive frames on an 80% Lambertian reflector. ±3cm @1σ at 5m; 1σ accuracy <1% for 5-30m.

[2] 1% under laboratory conditions