

# **SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) FOR CLEANING ROBOTS**

## **SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) FOR CLEANING ROBOTS**

### **TECHNICAL DOCUMENTATION AND IP RIGHTS DOCUMENT**

**NaviFloor Robotics, Inc.**

**Document Reference: IP-SLAM-2024-001**

**Last Updated: January 11, 2024**

## **1. PROPRIETARY TECHNOLOGY OVERVIEW**

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1. NaviFloor Robotics, Inc. ("Company") hereby declares and documents its

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2. The NaviSLAM Technology encompasses the following core components

- a) Multi-surface terrain mapping algorithms
- b) Real-time environmental perception systems
- c) Dynamic obstacle avoidance protocols
- d) Adaptive navigation matrices
- e) LiDAR-based depth sensing mechanisms

2. TECHNICAL SPECIFICATIONS

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1. Core Algorithm Architecture

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Probabilistic mapping framework utilizing Extended Kalman Filter (EKF)

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Loop closure detection with 99.7% accuracy

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Real-time point cloud processing at 60Hz

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Multi-layer environmental representation

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## 2. Sensor Integration

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Primary LiDAR: NaviFloor Model NF-L350 (proprietary)

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Secondary depth sensors: Dual stereoscopic cameras

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Inertial Measurement Unit (IMU): 9-axis fusion

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Surface texture analysis sensors

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3. Processing Requirements

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Minimum computing power: 2.5 TFLOPS

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Memory allocation: 8GB dedicated VRAM

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Maximum latency tolerance: 16ms

### **3. INTELLECTUAL PROPERTY RIGHTS**

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## 1. Patent Protection

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US Patent No. 11,XXX,XXX: "Method and System for Real-time Environm

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US Patent Application No. 17/XXX,XXX: "Advanced Surface Recognition f

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PCT Application PCT/US2023/XXXXXX: "Multi-terrain Navigation System"

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## 2. Trade Secrets

The following components are maintained as trade secrets:

- a) Surface classification algorithms
- b) Terrain adaptation matrices
- c) Environmental feature extraction methods

d) Path optimization protocols

## **4. IMPLEMENTATION AND USAGE RIGHTS**

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### **1. Licensed Applications**

The NaviSLAM Technology is exclusively licensed for use in:

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NaviFloor AMR Series 3000-5000

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NaviClean Autonomous Cleaning Robots

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NaviMap Enterprise Software Suite

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## 2. Usage Restrictions

This technology shall not be:

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Reverse engineered

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Implemented in non-authorized devices

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Modified without express written consent

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Transferred to third parties

## **5. SECURITY AND CONFIDENTIALITY**

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### 1. Data Protection

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AES-256 encryption for all mapping data

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Secure boot verification

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Encrypted sensor communications

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Blockchain-based audit trail

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## 2. Access Controls

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Role-based authentication system

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Multi-factor authorization for system modifications



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Detailed access logging and monitoring

## **6. COMPLIANCE AND CERTIFICATION**

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1. Regulatory Compliance

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ISO/IEC 27001:2013 Information Security Management

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CE Marking for European Market

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UL Certification for North American Market

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RoHS Compliance

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## 2. Performance Verification

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Third-party validation by TÜV SÜD

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NIST traceable calibration

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Annual security audits

## **7. WARRANTY AND LIMITATION OF LIABILITY**

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1. The Company warrants the NaviSLAM Technology to perform substantially

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2. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR

## 8. CERTIFICATION

This document accurately represents the technical specifications and intellectual property rights of NaviFloor Robotics, Inc.'s SLAM technology as of the date specified above.

EXECUTED this 11th day of January, 2024

**By:**

Dr. Elena Kovacs

Chief Research Officer

NaviFloor Robotics, Inc.

**By:**

Marcus Depth

Chief Technology Officer

NaviFloor Robotics, Inc.

CORPORATE SEAL

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