

OBSTACLE AVOIDANCE SUBSYSTEM TECHNICAL MANUAL

OBSTACLE AVOIDANCE SUBSYSTEM TECH

NaviFloor Robotics, Inc.

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1. PROPRIETARY NOTICE AND CONFIDENTIALITY

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protected under applicable intellectual property laws and may not be disclosed, distributed, or reproduced without the express written permission of NaviFlo Robotics, Inc.

2. SYSTEM OVERVIEW

2.1 Purpose

The Obstacle Avoidance Subsystem ("OAS") is an integral component of NaviFlo's Autonomous Mobile Robot ("AMR") platform, providing real-time detection and avoidance capabilities for dynamic obstacles in industrial environments.

2.2 System Architecture

The OAS comprises three primary components:

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Multi-sensor fusion array (Model: NF-MSF-2024)

- - 2 -

Real-time processing unit (Model: NF-RPU-V5)

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Predictive trajectory planning module (Model: NF-PTP-3.0)

3. TECHNICAL SPECIFICATIONS

3.1 Sensor Array Specifications

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LiDAR Range: 0.1m - 30m

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Depth Sensor Resolution: 1920 x 1080 pixels

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Scanning Frequency: 40Hz

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Field of View: 270° horizontal, 90° vertical

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Operating Temperature: -10°C to 50°C

3.2 Processing Capabilities

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Latency: <15ms

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Object Recognition Speed: 8ms

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Maximum Tracked Objects: 64

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Update Rate: 60Hz

4. OPERATIONAL PARAMETERS

4.1 Safety Classifications

The OAS is certified under:

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ISO 13849-1:2015 Performance Level D

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IEC 61508 SIL 2

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CE Marking (EU Machine Directive 2006/42/EC)

4.2 Operating Limitations

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Maximum Robot Speed: 2.0 m/s

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Minimum Detection Distance: 0.1m

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Maximum Operating Gradient: 15°

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Maximum Payload Impact: 1500kg

5. INTEGRATION REQUIREMENTS

5.1 Hardware Integration

Integration must comply with NaviFloor's Hardware Integration Protocol (HIP-2024):

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Power Supply: 24V DC \pm 10%

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Communication Interface: EtherCAT or ProfiNET

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Mounting Requirements: M8 bolts, torque $25\text{Nm} \pm 2\text{Nm}$

5.2 Software Integration

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Compatible with NaviFloor Control System v4.2 or higher

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Required SDK: NF-SDK-2024.1

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Minimum System Requirements:

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Processing: Intel i7 or equivalent

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RAM: 16GB

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Storage: 256GB SSD

6. MAINTENANCE AND CALIBRATION

6.1 Scheduled Maintenance

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Daily: Visual inspection of sensor surfaces

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Weekly: Diagnostic system check

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Monthly: Full calibration sequence

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Quarterly: Firmware updates and performance validation

6.2 Calibration Procedures

Calibration must be performed using NaviFloor Calibration Kit (NCK-2024)

following procedure NF-CAL-2024-01.

7. COMPLIANCE AND CERTIFICATION

7.1 Regulatory Compliance

The OAS complies with:

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ANSI/RIA R15.06-2012

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EN ISO 10218-1:2011

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IEC 61496-1:2020

7.2 Quality Assurance

Each unit undergoes testing per NaviFloor Quality Protocol NF-QP-2024-01.

8. WARRANTY AND LIABILITY

8.1 Limited Warranty

NaviFloor warrants the OAS against defects in materials and workmanship for a period of twelve (12) months from the date of installation, subject to the terms and conditions specified in document NF-WAR-2024-01.

8.2 Liability Limitations

NaviFloor's liability shall be limited to repair or replacement of defective components. NaviFloor shall not be liable for consequential damages or losses arising from system failure or malfunction.

9. DOCUMENT CONTROL

9.1 Revision History

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v3.2.1 (2024-01-11): Updated safety certifications

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v3.2.0 (2023-12-15): Added ProfiNET support

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v3.1.2 (2023-11-01): Updated maintenance procedures

9.2 Document Authorization

Approved by:

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Technical Review Board

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Safety Compliance Committee

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Quality Assurance Department

End of Document

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