

# ANSI/RIA R15.06 SAFETY COMPLIANCE REPORT

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NaviFloor Robotics, Inc.

Report Date: January 11, 2024

Document Reference: NFR-ANSI-2024-001

### 1. EXECUTIVE SUMMARY

This report documents NaviFloor Robotics, Inc.'s ("NaviFloor") compliance with ANSI/RIA R15.06-2012 (R2018) Industrial Robots and Robot Systems Safety Requirements ("Standard"). The assessment covers NaviFloor's automated

robot (AMR) systems, specifically the NaviFleet(TM) Series 3000 and platforms, including associated control systems and safety features.

## 2. SCOPE OF ASSESSMENT

### 1. Products Evaluated:

- NaviFleet(TM) Series 3000 AMR Platform (Model NFR-3000)
- NaviFleet(TM) Series 4000 AMR Platform (Model NFR-4000)
- NaviControl(TM) Fleet Management System (Version 2.4.1)
- Associated safety systems and components

2. Assessment Period:

October 15, 2023 - December 31, 2023

3. Testing Facilities:

-

NaviFloor Primary Testing Facility (Dover, DE)

-

T V S D America Testing Laboratory (New Brighton, MN)

### **3. RISK ASSESSMENT METHODOLOGY**

1. The risk assessment was conducted following ISO 12100:2010 principles

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Task-based risk assessment

-

Space/time limits evaluation

-

Hazard identification and classification

-

Risk estimation and evaluation

-

Risk reduction measures implementation

2. Risk Categories Evaluated:

-

Mechanical hazards

-

Electrical hazards

-

Thermal hazards

- - 4 -

Noise-related hazards

-

Vibration hazards

-

Radiation hazards

-

Material/substance hazards

-

Ergonomic hazards

-

Control system failures

-

Software-related hazards

## 4. SAFETY FEATURES AND COMPLIANCE MEASURES

### 1. Physical Safety Features

- 

360° LiDAR scanning system with redundant sensors

- 

Emergency stop buttons (Category 0 and 1 stops)

- 

Protective field monitoring with dynamic adjustment

- 

Mechanical bumpers with pressure-sensitive detection

- 

Speed-monitoring safety controllers

-

Safety-rated encoders for motion monitoring

## 2. Control System Safety Features

-

Safety-rated programmable logic controller (PLC)

-

Dual-channel safety circuits (Performance Level e)

-

Real-time monitoring and fault detection

-

Redundant processing units

-

Safety-rated wireless communication protocols

-

Automatic fault recovery systems

### 3. Software Safety Features

-

Safety-certified operating system (T V certified)

-

Redundant path planning algorithms

-

Real-time obstacle detection and avoidance

-

Fail-safe operational modes

-

Continuous system health monitoring

-

Secure remote shutdown capabilities

## 5. TEST RESULTS AND COMPLIANCE VERIFICATION



## 1. Physical Safety Tests

-

Impact force measurements: PASSED

-

Emergency stop response time: PASSED

-

Protective field activation: PASSED

-

Speed limitation verification: PASSED

-

Stability tests: PASSED

-

Load capacity verification: PASSED

## 2. Control System Tests

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Safety circuit response time: PASSED

-

Fault condition handling: PASSED

-

EMC immunity: PASSED

-

Power failure response: PASSED

-

Communication loss handling: PASSED

### 3. Software Safety Tests

-

Algorithm validation: PASSED

-

Error handling verification: PASSED

-

Safety parameter verification: PASSED

-

System recovery testing: PASSED

-

Security penetration testing: PASSED

## 6. NON-CONFORMITIES AND REMEDIATION

### 1. Identified Non-Conformities

-

Minor: Emergency stop button placement optimization required on NF

-

Minor: Software documentation updates needed for version control pr

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Observation: Recommended enhancement to user training materials

## 2. Remediation Actions

-

Emergency stop button placement modified per ANSI/RIA guidelines

-

Software documentation updated to include version control procedures

-

Training materials enhanced with additional safety protocols (schedule

## 7. CERTIFICATION STATEMENT

Based on comprehensive testing and evaluation, NaviFloor Robotics' demonstrate substantial compliance with ANSI/RIA R15.06-2012 (R2

requirements. All identified non-conformities have been addressed or approved remediation plans in place.

## 8. LIMITATIONS AND DISCLAIMERS

This report represents compliance status as of the assessment date. Modifications to the systems may require re-evaluation. This report should not be considered a guarantee of safety or performance and must be used in conjunction with proper installation, maintenance, and operating procedures.

## 9. AUTHENTICATION

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[SEAL OF INDEPENDENT VERIFICATION]

