AUTOMATED GUIDED VEHICLE SAFETY CERTIFICATE

Certificate Number: AGV-2024-PDR-0127

Issue Date: January 11, 2024

Expiration Date: January 11, 2025

1. CERTIFICATION STATEMENT

This Automated Guided Vehicle Safety Certificate ("Certificate") certifies that the IceNav(TM) Series 3000 Autonomous Mobile Robot system ("AGV System") manufactured by Polar Dynamics Robotics, Inc., a Delaware corporation ("Manufacturer"), has successfully completed all required safety assessments and meets or exceeds applicable safety standards for autonomous industrial vehicles operating in temperature-controlled environments.

2. CERTIFIED EQUIPMENT

2.1 System Identification

- Model: IceNav(TM) Series 3000
- Serial Number Range: PDR-3000-2024-001 through PDR-3000-2024-500
- Control System Version: IceNav(TM) 4.2.7
- Safety System Version: SafetyCore(TM) 2.1.3

2.2 Operating Parameters

- Temperature Range: -40 C to +45 C
- Maximum Speed: 2.5 meters per second
- Maximum Load Capacity: 1,500 kilograms
- Operating Environment: Indoor industrial facilities
- Floor Condition Requirements: Sealed concrete or equivalent

3. SAFETY COMPLIANCE

3.1 Standards Compliance

The AGV System has been tested and certified to comply with:

- ANSI/ITSDF B56.5-2019 Safety Standard for Driverless, Automatic Guided Industrial Vehicles

- ISO 3691-4:2020 Industrial trucks - Safety requirements and verification
- EN 1525:1997 Safety of industrial trucks - Driverless trucks
- IEC 61496-1:2020 Safety of machinery - Electro-sensitive protective equipment

3.2 Safety Features

The certified AGV System incorporates the following safety features:

- Multi-zone LiDAR safety scanning
- Emergency stop systems (Category 3 per ISO 13849-1)
- Redundant path monitoring
- Anti-collision system with dynamic safety zones
- Thermal monitoring and automatic shutdown protocols
- Fail-safe braking system
- Visual and audible warning systems
- Remote monitoring and emergency override capabilities

4. TESTING AND VERIFICATION

4.1 Test Protocols

Safety certification testing was conducted according to Manufacturer's Test Protocol PDR-TP-3000-2023 and included:

- Environmental chamber testing (-40 C to +45 C)
- Emergency stop performance
- Obstacle detection and avoidance
- Load stability assessment
- Communication system reliability
- Safety system response time
- Battery safety performance

4.2 Test Results

All safety systems performed within specified parameters as documented in Test Report TR-3000-2024-001, available upon request.

5. OPERATIONAL REQUIREMENTS

5.1 Maintenance Requirements

- Quarterly safety system inspection
- Annual firmware updates
- Battery system inspection every 500 operating hours
- Sensor calibration every 2,000 operating hours
- Documentation of all maintenance activities

5.2 Operating Conditions

This certification is valid only when:

- Operating within specified environmental parameters
- Maintained according to Manufacturer's requirements
- Operated by trained personnel
- Used in approved facility types
- Running authorized software versions

6. CERTIFICATION AUTHORITY

This Certificate is issued by Polar Dynamics Robotics, Inc. based on testing conducted by:

T V Rheinland North America

Certificate Number: TR-2024-AGV-8842

Testing Location: Chicago Technical Center

Testing Period: October 15, 2023 - December 20, 2023

7. DISCLAIMER AND LIMITATIONS

This Certificate applies solely to the AGV System as configured and tested. Any modifications, unauthorized repairs, or alterations void this certification. Manufacturer assumes no liability for incidents resulting from improper use, maintenance, or modification of the AGV System.

8. AUTHORIZATION

IN WITNESS WHEREOF, this Certificate has been executed by the duly authorized representative of Polar Dynamics Robotics, Inc.

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POLAR DYNAMICS ROBOTICS, INC.

By: _

Dr. James Barrett

Chief Robotics Officer

Date: January 11, 2024

Corporate Seal

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## 9. REVISION HISTORY

Version 1.0 - Initial Certificate Issuance - January 11, 2024
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