AUTONOMOUS NAVIGATION IMPLEMENTATION PROTOCOL

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Classification: Confidential & Proprietary

1. PURPOSE AND SCOPE

1. This Autonomous Navigation Implementation Protocol ("Protocol") establishes the technical and operational requirements for implementing Polar Dynamics Robotics, Inc.'s ("Company") proprietary IceNav(TM) autonomous navigation system in cold environment applications.

2. This Protocol applies to all Company autonomous mobile robots (AMRs) operating in controlled temperature environments below 0 C (32 F).

2. DEFINITIONS

1. "IceNav(TM) System" means the Company's proprietary autonomous navigation platform specifically designed for cold environment operations.

2. "Implementation Zone" means any designated area within a facility where AMRs equipped with IceNav(TM) technology operate.

3. "Thermal Management Protocol" means the Company's standardized procedures for maintaining optimal operating temperatures of AMR components.

4. "Navigation Parameters" means the configurable settings that govern AMR movement and pathfinding algorithms.

3. TECHNICAL REQUIREMENTS

1. System Architecture

a) Implementation must utilize IceNav(TM) Version 4.2 or higher

b) Minimum sensor configuration of:

- 2 LiDAR units (primary and redundant)
- 4 depth cameras with thermal shielding

- 8 ultrasonic sensors with ice-resistant coating

c) Local processing unit with minimum specifications per Schedule A

2. Environmental Parameters

a) Operational temperature range: -30 C to +45 C

b) Humidity tolerance: 5% to 95% non-condensing

c) Floor surface conditions: Ice accumulation up to 2mm

d) Air particulate tolerance per ISO 14644-1 Class 8

4. IMPLEMENTATION PROCEDURES

1. Pre-Implementation Requirements

a) Facility assessment and mapping

b) Network infrastructure verification

c) Safety system integration testing

d) Personnel training certification

2. Installation Sequence

a) Hardware deployment per Schedule B

b) Software initialization protocol

c) Calibration procedures

d) Testing and validation requirements

3. Quality Assurance

a) Performance metrics monitoring

b) System redundancy verification

c) Error handling protocols

d) Documentation requirements

5. SAFETY AND COMPLIANCE

1. Safety Standards

a) Compliance with ISO 10218-1:2011

b) Emergency stop system requirements

c) Collision avoidance parameters

d) Human-robot interaction protocols

2. Risk Management

a) Hazard identification procedures

b) Risk assessment methodology

c) Mitigation strategies

d) Incident reporting requirements

6. MAINTENANCE AND SUPPORT

1. Scheduled Maintenance

a) Daily system checks

b) Weekly performance analysis

c) Monthly comprehensive inspection

d) Quarterly software updates

2. Technical Support

a) 24/7 remote monitoring

b) Emergency response procedures

c) Escalation protocols

d) Documentation requirements

7. PROPRIETARY RIGHTS

1. All intellectual property rights in the IceNav(TM) System, including patents, copyrights, trade secrets, and know-how, remain the exclusive property of the Company.

2. Implementation does not transfer any intellectual property rights to the facility operator or any third party.

8. LIABILITY AND INDEMNIFICATION

1. The Company's liability shall be limited as set forth in the Master Services Agreement.

2. Facility operators shall indemnify the Company against claims arising from unauthorized

modifications or misuse of the system.

9. AMENDMENTS AND MODIFICATIONS

1. This Protocol may be amended only by written instrument executed by authorized representatives of the Company.

2. Technical specifications may be updated through official Technical Bulletins issued by the Company's Engineering Department.

EXECUTION

IN WITNESS WHEREOF, this Protocol is executed by the authorized representative of Polar Dynamics Robotics, Inc.

By:

Name: Dr. James Barrett

Title: Chief Robotics Officer

Date: January 15, 2024

SCHEDULES

Schedule A: Processing Unit Specifications

Schedule B: Hardware Installation Requirements

Schedule C: Safety Compliance Checklist

Schedule D: Maintenance Procedures

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