OPERATIONS DOCUMENT 402

STANDARD OPERATING PROCEDURES FOR AUTONOMOUS MOBILE ROBOT DEPLOYMENT AND MAINTENANCE

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1. PURPOSE AND SCOPE

1. This Operations Document 402 ("Document") establishes the binding operational procedures and protocols for the deployment, maintenance, and decommissioning of Polar Dynamics Robotics, Inc. ("Company") autonomous mobile robots ("AMRs") in temperature-controlled environments.

2. This Document applies to all Company personnel involved in AMR operations, including but not limited to field technicians, deployment specialists, maintenance engineers, and operational supervisors.

2. DEFINITIONS

1. "IceNav System" means the Company's proprietary cold-environment navigation and operation platform.

2. "Critical Operating Temperature" means any ambient temperature below -30 C (-22 F).

3. "Deployment Zone" means any customer facility where Company AMRs are installed and operational.

4. "Maintenance Protocol" means the prescribed series of inspection, service, and repair procedures detailed in Section 4.

3. DEPLOYMENT PROCEDURES

1. Pre-Deployment Assessment

a) Conduct comprehensive site survey of Deployment Zone

b) Document temperature mapping of operational areas

c) Verify IceNav System compatibility with facility layout

d) Assess RF interference patterns and signal strength

e) Validate emergency stop system placement

2. Installation Requirements

a) AMR units must undergo 24-hour cold-soak testing

b) Calibrate thermal management systems to facility specifications

c) Install and test redundant navigation beacons

d) Configure facility-specific operational parameters

e) Verify fail-safe protocols

4. MAINTENANCE PROTOCOLS

1. Scheduled Maintenance

a) Weekly inspection of thermal management systems

b) Bi-weekly actuator performance validation

c) Monthly calibration of IceNav sensors

d) Quarterly full-system diagnostic review

e) Semi-annual firmware updates

2. Emergency Maintenance

a) 24-hour response time requirement

b) Remote diagnostic capabilities must be maintained

c) Replacement parts inventory requirements

d) Documentation of all emergency interventions

5. SAFETY AND COMPLIANCE

1. Safety Requirements

a) Maintain minimum 2-meter separation from personnel

b) Maximum operating speed of 2.0 meters per second

c) Automatic shutdown at temperatures below -40 C

d) Emergency stop system testing every 72 hours

2. Regulatory Compliance

a) Adherence to ANSI/RIA R15.08 standards

b) Compliance with FDA 21 CFR Part 11 where applicable

c) Maintenance of ISO 9001:2015 procedures

d) Documentation retention for 7 years minimum

6. PERFORMANCE MONITORING

1. Key Performance Indicators

a) Uptime percentage (minimum 98%)

b) Navigation accuracy (5cm tolerance)

c) Battery performance in cold conditions

d) Thermal management efficiency

2. Reporting Requirements

a) Daily operational status reports

b) Weekly performance metrics

c) Monthly trend analysis

d) Quarterly compliance review

7. DECOMMISSIONING PROCEDURES

1. AMR units shall be decommissioned according to the following protocol:

a) Secure all operational data

b) Remove proprietary software

c) Disconnect from facility systems

d) Physical removal and transportation

e) Documentation of decommissioning process

8. CONFIDENTIALITY AND PROPRIETARY INFORMATION

1. All information contained within this Document is confidential and proprietary to the Company.

2. Disclosure of any portion of this Document to third parties is strictly prohibited without prior written authorization from the Company's Legal Department.

9. AMENDMENTS AND UPDATES

1. This Document may be amended or updated by the Company at any time, with notice to relevant personnel.

2. All amendments must be approved by the Chief Operations Officer and Chief Technology Officer.

AUTHORIZATION

IN WITNESS WHEREOF, this Operations Document 402 has been duly authorized and approved by the undersigned officers of Polar Dynamics Robotics, Inc.

Sarah Nordstrom

Chief Operations Officer

Date: December 15, 2023

Marcus Chen

Chief Technology Officer

Date: December 15, 2023