

OPERATIONS DOCUMENT 393

STANDARD OPERATING PROCEDURES FOR AUTONOMOUS MOBILE ROBOT DEPLOYMENT AND MAINTENANCE

Effective Date: January 1, 2024

Document Version: 2.4

Last Updated: December 15, 2023

1. PURPOSE AND SCOPE

1. This Operations Document ("Document") establishes 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. "Thermal Management Protocol" or "TMP" means the Company's standardized procedures for maintaining optimal AMR operating temperatures.

3. DEPLOYMENT PROCEDURES

1. Pre-Deployment Assessment
 - a) Conduct comprehensive site survey of Deployment Zone
 - b) Document all thermal zones and transition areas
 - c) Map facility layout using IceNav mapping protocols

d) Verify facility compliance with Company's Technical Specification 276-B

2. Installation Requirements

- a) Calibrate IceNav sensors for specific facility conditions
- b) Install thermal monitoring beacons at prescribed intervals
- c) Configure emergency shutdown protocols
- d) Validate wireless communication coverage throughout Deployment Zone

4. MAINTENANCE PROTOCOLS

1. Scheduled Maintenance

- a) Perform weekly diagnostic scans of IceNav System
- b) Conduct monthly thermal management system inspections
- c) Execute quarterly actuator performance assessments
- d) Complete bi-annual full system calibration

2. Emergency Maintenance

- a) Response time requirements:
 - Critical failures: 2 hours
 - Major disruptions: 4 hours
 - Minor issues: 24 hours
- b) Document all emergency interventions in Company's maintenance log
- c) Submit incident reports within 24 hours of resolution

5. SAFETY AND COMPLIANCE

1. Temperature Monitoring

- a) Maintain continuous monitoring of AMR internal temperatures
- b) Log all thermal events exceeding specified thresholds
- c) Implement automatic shutdown procedures when safety parameters are exceeded

2. Regulatory Compliance

- a) Adhere to all applicable OSHA regulations
- b) Maintain compliance with ISO 10218-1 and ISO 10218-2

- c) Follow ANSI/RIA R15.06 safety requirements
- d) Document all safety incidents and near-misses

6. QUALITY CONTROL

1. Performance Metrics

a) Monitor and record:

- Navigation accuracy in sub-zero environments
- Battery performance at Critical Operating Temperatures
- Actuator response times
- System uptime percentage

2. Quality Assurance

- a) Conduct monthly performance reviews
- b) Maintain calibration records
- c) Verify compliance with Company Quality Standard 451-C

7. DECOMMISSIONING PROCEDURES

1. AMR Removal

- a) Execute systematic shutdown sequence
- b) Remove all Company-owned equipment
- c) Conduct final performance data download
- d) Document equipment condition

2. Site Restoration

- a) Remove all installation-specific modifications
- b) Verify facility returned to original condition
- c) Obtain customer sign-off

8. CONFIDENTIALITY AND PROPRIETARY INFORMATION

- 1. All procedures, specifications, and protocols contained herein are confidential and proprietary to Polar Dynamics Robotics, Inc.
- 2. Unauthorized disclosure or use is strictly prohibited and may result in legal action.

9. AMENDMENTS AND UPDATES

1. This Document may be amended or updated by the Company at any time.
2. All amendments shall be communicated to relevant personnel and documented in the version control log.

APPROVAL AND AUTHORIZATION

APPROVED BY:

Dr. Elena Frost
Chief Executive Officer
Polar Dynamics Robotics, Inc.

Sarah Nordstrom
Chief Operating Officer
Polar Dynamics Robotics, Inc.

Date: January 1, 2024

Document Control Number: OPS-393-2024-V2.4

Classification: CONFIDENTIAL