

OPERATIONS DOCUMENT 408

STANDARD OPERATING PROCEDURES FOR AUTONOMOUS MOBILE ROBOT DEPLOYMENT AND MAINTENANCE

Effective Date: January 1, 2024

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1. PURPOSE AND SCOPE

1. This Operations Document 408 ("Document") establishes the mandatory procedures and protocols for the deployment, operation, and maintenance of Polar Dynamics Robotics, Inc. ("Company") autonomous mobile robots ("AMRs") in temperature-controlled environments.
2. This Document applies to all Company employees, contractors, and authorized third-party service providers involved in the deployment, operation, or maintenance of Company AMRs.

2. DEFINITIONS

1. "Cold Environment Operation" means any deployment of AMRs in environments maintained at or below 0 C (32 F).
2. "IceNav(TM) System" refers to the Company's proprietary navigation and control software platform designed for cold environment operations.
3. "Thermal Management Protocol" or "TMP" means the Company's standardized procedures for maintaining optimal AMR operating temperature in extreme conditions.

3. PRE-DEPLOYMENT PROCEDURES

1. Environmental Assessment
 - a) Conduct full facility thermal mapping
 - b) Document all temperature transition zones
 - c) Verify IceNav(TM) System compatibility
 - d) Assess floor surface conditions
 - e) Map charging station locations

2. Equipment Preparation

- a) Execute full diagnostic sequence
- b) Verify thermal management system calibration
- c) Confirm actuator cold-resistance certification
- d) Install environment-specific firmware version
- e) Document all hardware serial numbers

4. OPERATIONAL PROTOCOLS

1. Cold Start Procedures

- a) Initialize thermal management system
- b) Execute graduated warm-up sequence
- c) Verify actuator temperature readings
- d) Confirm sensor calibration
- e) Test emergency shutdown systems

2. Runtime Monitoring Requirements

- a) Continuous temperature monitoring
- b) Real-time performance metrics logging
- c) Battery thermal management tracking
- d) Navigation system verification
- e) Obstacle avoidance confirmation

5. MAINTENANCE REQUIREMENTS

1. Scheduled Maintenance

- a) Weekly thermal system inspection
- b) Monthly actuator performance testing
- c) Quarterly firmware updates
- d) Semi-annual hardware inspection
- e) Annual certification renewal

2. Emergency Maintenance

- a) Immediate response protocols

- b) Backup unit deployment
- c) Customer notification procedures
- d) Incident documentation requirements
- e) Root cause analysis

6. SAFETY PROTOCOLS

1. The Company shall maintain strict compliance with all applicable safety standards, including:

- a) ANSI/RIA R15.06-2012
- b) ISO 10218-1:2011
- c) ISO 13849-1:2015
- d) UL 3300 certification requirements

2. Emergency Procedures

- a) Immediate shutdown protocols
- b) Emergency response coordination
- c) Evacuation procedures
- d) Incident reporting requirements
- e) Recovery protocols

7. DOCUMENTATION AND REPORTING

1. Required Documentation

- a) Deployment checklists
- b) Maintenance logs
- c) Performance metrics
- d) Incident reports
- e) Certification records

2. Reporting Schedule

- a) Daily performance summaries
- b) Weekly maintenance reports
- c) Monthly compliance reviews
- d) Quarterly performance analyses

- e) Annual certification updates

8. COMPLIANCE AND TRAINING

1. All personnel involved in AMR operations must:

- a) Complete required training modules
- b) Maintain current certifications
- c) Pass quarterly assessments
- d) Document all training activities
- e) Participate in safety reviews

9. PROPRIETARY INFORMATION

1. This Document contains confidential and proprietary information of Polar Dynamics Robotics, Inc. Unauthorized disclosure, reproduction, or use is strictly prohibited.

10. AMENDMENTS AND UPDATES

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

11. EXECUTION

IN WITNESS WHEREOF, this Operations Document 408 has been executed by the duly authorized representatives of Polar Dynamics Robotics, Inc.

APPROVED BY:

Dr. Elena Frost

Chief Executive Officer

Date: January 1, 2024

Sarah Nordstrom

Chief Operating Officer

Date: January 1, 2024

Dr. James Barrett

Chief Robotics Officer

Date: January 1, 2024