OPERATIONS DOCUMENT 411

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 411 ("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. "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 or operating environment where Company AMRs are installed and operational.

4. "Thermal Management Protocol" or "TMP" means the Company's standardized procedures for maintaining optimal AMR operating temperature in extreme cold environments.

3. PRE-DEPLOYMENT PROCEDURES

1. Environmental Assessment

a) Conduct comprehensive thermal mapping of the Deployment Zone

b) Document all cold spots and temperature variation zones

c) Verify facility compliance with Company's Minimum Infrastructure Requirements (Doc. 203)

2. IceNav System Calibration

a) Execute full system diagnostic sequence

b) Calibrate thermal sensors to deployment environment specifications

c) Validate cold-resistant actuator functionality

d) Configure zone-specific operating parameters

4. OPERATIONAL PROTOCOLS

1. Standard Operating Conditions

a) Maintain continuous monitoring of AMR thermal management systems

b) Execute hourly diagnostic checks during initial 72-hour deployment period

c) Document all system alerts and response actions

d) Maintain operational logs in compliance with ISO 9001:2015 standards

2. Critical Temperature Operations

a) Implement enhanced monitoring protocols when operating at Critical Operating Temperature

b) Activate redundant navigation systems

c) Execute TMP sequence every 4 hours

d) Document all thermal events and system responses

5. MAINTENANCE REQUIREMENTS

1. Scheduled Maintenance

a) Perform weekly inspection of thermal management components

b) Conduct monthly calibration of IceNav sensors

c) Execute quarterly full-system performance validation

d) Update firmware as per Technical Bulletin schedule

2. Emergency Maintenance

a) Response time requirements:

- Priority 1 (System Failure): 2 hours
- Priority 2 (Performance Degradation): 4 hours
- Priority 3 (Non-critical Issues): 24 hours

b) Document all emergency maintenance activities

c) Submit incident reports within 24 hours

6. COMPLIANCE AND REPORTING

1. All operations must comply with:

a) Company's Quality Management System

b) ISO/TS 15066:2016 specifications

c) Customer-specific safety protocols

d) Applicable OSHA regulations

2. Required Documentation

a) Daily operational logs

b) Maintenance records

c) Incident reports

d) Performance metrics

e) Temperature monitoring data

7. SAFETY PROTOCOLS

1. Emergency Shutdown Procedures

a) Immediate shutdown triggers

b) Communication protocols

c) Recovery procedures

2. Safety Zones and Access Control

a) Restricted area definitions

b) Personnel certification requirements

c) Safety equipment specifications

8. PROPRIETARY INFORMATION

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

9. DOCUMENT CONTROL

1. This Document is controlled by the Operations Department and must be reviewed annually.

2. Modifications require approval from:

- Chief Operations Officer
- Chief Technology Officer
- Quality Assurance Director

AUTHORIZATION

APPROVED BY:

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Date: January 1, 2024

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Date: January 1, 2024