ROBOT SAFETY FEATURES COMPLIANCE REPORT

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Polar Dynamics Robotics, Inc.

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1. EXECUTIVE SUMMARY

This Robot Safety Features Compliance Report documents Polar Dyn
Inc.'s ("PDR") adherence to applicable safety standards and regulatio
autonomous mobile robots (AMRs) designed for extreme cold environ

report covers all current production models and the proprietary BlueC technology platform.

2. SCOPE OF ASSESSMENT

1. Product Lines Evaluated:

- ColdBot Series 3000 AMRs
- Arctic Navigator Series 500
- BlueCore(TM) Control Systems v4.2
- Polar Transport Units (PTU-2000 Series)

2. Applicable Standards:

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ISO 10218-1:2011 (Robots and robotic devices)

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ISO 13849-1:2015 (Safety of machinery)

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ANSI/RIA R15.06-2012 (Industrial Robots and Robot Systems)

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IEC 61496-1:2020 (Safety of machinery - Electro-sensitive protective

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UL 3300 (Outline of Investigation for Service, Communication, Informa

3. SAFETY FEATURE DOCUMENTATION

1. Emergency Stop Systems

Redundant hardware-based emergency stop circuits

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Multiple emergency stop buttons positioned at 45cm intervals

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Wireless emergency stop capability with 99.99% reliability rating

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Cold-environment certified switches rated to -40 C

2. Collision Avoidance Systems

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Multi-layer LiDAR detection (3 independent units)

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Proprietary IceSense(TM) proximity detection

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Dynamic safety zone adjustment based on speed

- Sub-zero rated ultrasonic sensors with heated housings

3. Speed Control Mechanisms

- Variable speed control with environmental condition monitoring
- Maximum speed limitation of 2.0 m/s in automated mode
- Automatic speed reduction in high-traffic zones
- Anti-slip acceleration control for icy conditions

4. COMPLIANCE TESTING RESULTS

1. Physical Safety Features Testing

- Impact force testing: Compliant with ISO/TS 15066
- Stability testing: Exceeds requirements for 15 incline
- Emergency stop response time: <100ms at -30 C
- Crush prevention force limiting: <150N maximum force

2. Software Safety Features Testing

- Safety PLC response time: <10ms
- Failsafe system validation: 100% success rate

- Redundancy testing: All critical systems
- Error handling verification: Complete

5. RISK ASSESSMENT

1. Identified Risks and Mitigations

- Low-temperature battery performance: Mitigated through heated batte
- Sensor interference from ice/snow: Addressed via heated sensor hou
- Communication reliability: Redundant wireless systems implemented
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Emergency stop accessibility: Additional e-stop positions added

2. Residual Risk Analysis

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All identified risks mitigated to ALARP levels

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No high-level residual risks identified

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Medium-level risks documented with control measures

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Continuous monitoring program implemented

6. CERTIFICATION STATUS

1. Current Certifications

CE Marking (European Union)

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UL Listing (North America)

-

CSA Certification (Canada)

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RCM Mark (Australia)

2. Pending Certifications

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KC Mark (South Korea) - Expected Q2 2024

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INMETRO (Brazil) - In process

7. MAINTENANCE AND INSPECTION REQUIREMEN

1. Regular Inspection Schedule

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Daily: Visual safety system checks

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Weekly: Sensor calibration verification

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Monthly: Complete safety system diagnostic

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Quarterly: Third-party safety audit

2. Documentation Requirements

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Digital inspection logs maintained for 5 years

- Real-time safety system monitoring data

- Maintenance records with digital signatures

- Incident reporting and investigation records

8. COMPLIANCE DECLARATION

The undersigned hereby certifies that all Polar Dynamics Robotics, In autonomous mobile robots and associated control systems described exceed all applicable safety standards and regulations as of the date report. This certification is based on comprehensive testing and valida procedures conducted by qualified personnel.

9. LEGAL DISCLAIMER

This report is confidential and proprietary to Polar Dynamics Robotics
While every effort has been made to ensure the accuracy of the inform
contained herein, PDR makes no warranties, express or implied, rega
completeness or accuracy of this report. Safety compliance status is s
change based on ongoing testing and regulatory updates.

10. SIGNATURES

Executed this 11th day of January, 2024

/s/ Dr. James Barrett

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Dr. James Barrett

Chief Robotics Officer

Polar Dynamics Robotics, Inc.

/s/ Sarah Nordstrom

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Sarah Nordstrom

Chief Operating Officer

Polar Dynamics Robotics, Inc.

/s/ Marcus Chen

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Marcus Chen

Chief Technology Officer

Polar Dynamics Robotics, Inc.