PDR-2023-667 ARCTIC MOBILITY TEST RESULTS

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Test Protocol Documentation and Performance Analysis

Polar Dynamics Robotics, Inc.

1. EXECUTIVE SUMMARY

This document presents the comprehensive test results and performa
of the BlueCore(TM)-enabled AMR Platform (Model BC-3000) conduc
October 15, 2023, and December 30, 2023, at the Arctic Testing Facil

Fairbanks, Alaska. These tests were performed in accordance with IS
15066:2016 and internal PDR Testing Protocol PDR-TP-2023-12.

2. TEST PARAMETERS

2.1 Environmental Conditions

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Temperature Range: -40 C to -5 C

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Humidity: 15% to 85% RH

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Surface Conditions: Ice-covered concrete, packed snow, steel grating

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Visibility: Clear to whiteout conditions (0-50m visibility)

2.2 Test Units

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Serial Numbers: BC3K-2310-001 through BC3K-2310-005

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Firmware Version: v4.2.1

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BlueCore(TM) Navigation System: v2.1.3

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Power System: Arctic-Grade Lithium Iron Phosphate (LiFePO4)

3. PERFORMANCE METRICS

3.1 Navigation Accuracy

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Mean Deviation from Programmed Path: 2.3cm

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Maximum Recorded Deviation: 4.1cm

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Success Rate in Path Following: 99.7%

3.2 Battery Performance

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Operating Time at -40 C: 12.4 hours

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Charge Retention: 92% after 72 hours at -35 C

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Charging Time at -30 C: 2.8 hours

3.3 Payload Handling

Maximum Tested Load: 750kg

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Load Stability Rating: 99.9%

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Emergency Stop Distance (Full Load): 0.8m at 2m/s

4. SYSTEM RELIABILITY ANALYSIS

4.1 Critical Systems Performance

The BlueCore(TM) navigation system demonstrated consistent perfor
all temperature ranges, with no recorded failures during the 1,000-hou
cumulative test period. Sensor arrays maintained calibration within 0.1
baseline specifications.

4.2 Mechanical Systems

- Joint reliability: 99.99% (zero failures)
- Chassis integrity: No structural deformation observed
- Drive system efficiency: 94.3% at -40 C

4.3 Software Performance

- System boot time: <30 seconds at all temperatures
- Navigation algorithm response: 12ms average
- Error recovery success rate: 99.8%

5. COMPLIANCE VERIFICATION

5.1 Safety Standards

All units demonstrated compliance with:

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ANSI/RIA R15.06-2012

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EN ISO 13849-1:2015

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IEC 61496-1:2020

5.2 Environmental Standards

Verified compliance with:

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IP65 rating maintained at all temperatures

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EMC Directive 2014/30/EU

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Low Voltage Directive 2014/35/EU

6. TEST CONCLUSIONS

The BC-3000 platform has successfully met or exceeded all designate
criteria for Arctic mobility operations. The system demonstrates robus
performance in extreme cold conditions with minimal degradation of c
functionalities.

7. CERTIFICATION

The undersigned hereby certify that these test results accurately reflect the performance of the BC-3000 platform under the specified conditions.

Dated: December 30, 2023

/s/ Dr. James Barrett

Dr. James Barrett

Chief Robotics Officer

Polar Dynamics Robotics, Inc.

/s/ Dr. Elena Frost

Dr. Elena Frost

Chief Executive Officer

Polar Dynamics Robotics, Inc.

8. LEGAL DISCLAIMER

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