

PDR-NAV-2023 GPS PERFORMANCE IN ARCTIC CONDITIONS

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Technical Performance Documentation and Certification

Document Reference: PDR-NAV-2023-ARC-001

Version: 1.2

Effective Date: December 15, 2023

1. DOCUMENT PURPOSE AND SCOPE

1. This document certifies and details the performance specifications,

2. The specifications and certifications contained herein are considered

2. TECHNICAL SPECIFICATIONS

1. GPS Reception Parameters

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Operating Temperature Range: -40 C to +5 C

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Signal Acquisition Time: 2.5 seconds at -35 C

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Position Accuracy: 1.2 meters at 95% confidence interval

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Refresh Rate: 20Hz nominal

2. Cold Environment Adaptations

- - 2 -

Thermally-insulated receiver housing

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Arctic-grade ceramic antenna substrate

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Proprietary signal processing algorithms for ice/snow interference

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Dual-redundant positioning system with inertial backup

3. PERFORMANCE CERTIFICATIONS

1. The BlueCore(TM) Navigation System has been tested and certified

a) Continuous operation at -40 C for 168 hours

b) Rapid temperature cycling between -40 C and +5 C

- c) Operation during active snowfall up to 2 inches per hour
- d) Performance through ice fog conditions
- e) Signal maintenance during aurora borealis activity

2. Testing Authority

Testing and certification conducted by Arctic Navigation Systems Lab (ANSL), an ISO 17025:2017 accredited facility, under Project Number ANSL-2023-0472.

4. OPERATIONAL PARAMETERS

1. The system maintains specified performance levels within the following
 - a) Maximum operational velocity: 2.5 m/s
 - b) Minimum satellite visibility: 6 satellites

- c) Maximum permissible HDOP: 2.0
- d) Signal reacquisition time: 3.5 seconds
- e) Power consumption: 4.2W at -40 C

2. Environmental Limitations

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Maximum snow depth: 15cm

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Maximum ice accumulation: 2mm

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Minimum visibility: 50 meters

5. COMPLIANCE AND STANDARDS

1. The system meets or exceeds the following standards:

- - 5 -

ISO 18063-1:2017

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IEC 60068-2-1:2007 (Cold conditions testing)

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MIL-STD-810H Method 502.7 (Low temperature operations)

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EN 61000-4-2 (ESD immunity)

2. Regulatory Compliance

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FCC Part 15 Subpart B

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CE Mark (European Union)

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ISED Canada RSS-247

6. WARRANTY AND LIMITATIONS

1. PDR warrants the GPS performance specifications detailed herein

- a) Proper maintenance per PDR Technical Manual TMN-2023-455
- b) Operation within specified parameters
- c) No unauthorized modifications
- d) Compliance with PDR's Standard Operating Procedures

2. Disclaimer

PDR MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, IN
ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS

7. CERTIFICATION

The undersigned hereby certifies that the GPS performance specifications detailed in this document have been verified through appropriate testing protocols and represent accurate performance capabilities of the Blue Navigation System in Arctic conditions.

POLAR DYNAMICS ROBOTICS, INC.

By: _

Name: Dr. James Barrett

Title: Chief Robotics Officer

Date: December 15, 2023

Witnessed:

By: _ - 8 -

Name: Marcus Chen

Title: Chief Technology Officer

Date: December 15, 2023

8. DOCUMENT CONTROL

Document Owner: Technical Documentation Department

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