PDR-2023-223 ARCTIC VISION SYSTEM SPECIFICATIONS

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Document Reference: PDR-2023-223

Version: 3.1

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Classification: CONFIDENTIAL

1. OVERVIEW AND SCOPE

1. This specification document ("Specification") defines the technical r

2. The AVS is designed for autonomous mobile robot ("AMR") navigat

2. DEFINITIONS

1. "System" means the complete Arctic Vision System assembly, inclu

2. "Operating Environment" refers to temperature-controlled facilities i

3. "Performance Standards" means the minimum operational requiren

3. SYSTEM ARCHITECTURE

1. Hardware Components

a) Dual redundant thermal-hardened optical sensors (Model AVS-OS-

b) Frost-resistant lens assembly with automated defogging system

c) Temperature-stabilized processing unit (BlueCore(TM) TPU-X Seri

d) Reinforced polycarbonate housing rated IP67

e) Heated connector interfaces meeting MIL-STD-810H

2. Software Components

a) Real-time environment mapping algorithm (v4.2.1)

b) Cold-optimized object detection system

c) Thermal compensation protocols

d) Emergency shutdown protection system

e) Data logging and diagnostic suite

4. PERFORMANCE REQUIREMENTS

1. Environmental Operations

Operating Temperature Range: -40 C to +5 C

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Humidity Tolerance: 0-100% RH

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Startup Time: 45 seconds at -40 C

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Continuous Operation: 18 hours minimum

2. Vision System Performance

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Field of View: 270 horizontal, 90 vertical

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Detection Range: 0.1m to 25m

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Accuracy: 2cm at 10m range

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Frame Rate: 60 fps minimum

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Resolution: 1920 x 1080 pixels

3. Navigation Capabilities

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Obstacle Detection: 99.99% reliability

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Path Planning Update: 10Hz minimum

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Position Accuracy: 1cm in defined operating environment

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Speed Range: 0.1 - 2.0 m/s

5. SAFETY AND COMPLIANCE

1. Regulatory Standards

- UL 1998 Safety Standard for Software
- IEC 61508 Functional Safety
- ISO 13849-1 Safety of Machinery
- CE Marking Requirements

2. Emergency Functions

- Automatic fault detection

Redundant emergency stop circuits

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Fail-safe mode activation

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System status monitoring

6. MAINTENANCE AND CALIBRATION

1. Scheduled Maintenance

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Weekly lens cleaning and inspection

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Monthly calibration verification

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Quarterly firmware updates

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Annual hardware inspection

2. Calibration Requirements

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Factory calibration validity: 12 months

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Field calibration interval: 3 months

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Calibration accuracy verification: Monthly

7. WARRANTY AND LIMITATIONS

1. The System is warranted to meet the Performance Standards spec

2. This Specification is subject to change without notice and represent

8. PROPRIETARY INFORMATION

1. This document contains confidential and proprietary information of

2. No part of this Specification may be reproduced, transmitted, or dis

9. APPROVAL AND REVISION

Document Approved By:

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Dr. James Barrett

Chief Robotics Officer

Polar Dynamics Robotics, Inc.

Date: _

Revision History:

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v3.1: January 11, 2024 - Updated performance specifications

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v3.0: October 15, 2023 - Major revision

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v2.1: June 30, 2023 - Minor updates

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v2.0: March 1, 2023 - Initial release