

ARCTIC MISSION CONTROL INTERFACE SPECIFICATIONS

ARCTIC MISSION CONTROL INTERFACE SP

Document No.: PDR-AMCIS-2024-001

Version: 3.2

Effective Date: January 15, 2024

Classification: CONFIDENTIAL

1. INTRODUCTION

1 This Arctic Mission Control Interface Specification ("Specification") i

2 This Specification is protected under U.S. and international intellectual property laws.

2. DEFINITIONS

1 "AMR" means autonomous mobile robot units incorporating PDR's Embedded Control System.

2 "Control Interface" means the software and hardware components enabling the AMR to communicate with the Control System.

3 "Mission Parameters" means the operational instructions, navigation data, and other information used by the AMR to perform its mission.

4 "Sub-Zero Environment" means any operational area maintained at temperatures below 32°F (0°C).

3. TECHNICAL REQUIREMENTS

1 Hardware Specifications

a) Display units must maintain functionality at temperatures down to -40°F (-40°C).

- b) Touch interface must operate with Class 3 insulated glove interaction
- c) Minimum screen resolution: 1920x1080 pixels
- d) IP65 rated enclosure for moisture protection
- e) Integrated emergency stop functionality

2 Software Architecture

- a) Real-time monitoring of BlueCore(TM) system parameters
- b) Redundant command validation protocols
- c) Automated thermal compensation algorithms
- d) Multi-layer security authentication
- e) Local cache backup for network interruption scenarios

4. OPERATIONAL PROTOCOLS

1 System Initialization

- a) Mandatory pre-operation checklist verification
- b) Environmental condition confirmation
- c) Network connectivity validation
- d) Sensor calibration sequence
- e) Safety system activation

2 Mission Control Functions

- a) Real-time trajectory modification
- b) Dynamic obstacle avoidance parameters
- c) Power management optimization
- d) Temperature-adjusted performance metrics
- e) Emergency protocol activation

5. SAFETY REQUIREMENTS

1 All Control Interfaces must incorporate:

- a) Redundant emergency stop mechanisms
- b) Visual and auditory warning systems
- c) Automatic fault detection
- d) System status monitoring
- e) Operator authentication protocols

2 Safety Override Protocols

- a) Manual override capability
- b) Remote shutdown functionality
- c) Automatic safety zone enforcement
- d) Collision prevention systems

- e) Environmental hazard detection

6. COMPLIANCE AND CERTIFICATION

1 Control Interfaces must maintain compliance with:

- a) ISO/TS 15066:2016 for collaborative robotics
- b) IEC 61508 for functional safety
- c) UL 1740 for robot safety
- d) PDR's Internal Safety Standards (ISS-2024)
- e) Applicable regional safety regulations

7. MAINTENANCE AND UPDATES

1 Regular maintenance requirements:

- a) Monthly software updates
- b) Quarterly hardware inspections
- c) Biannual safety system verification
- d) Annual certification renewal
- e) Continuous performance monitoring

8. PROPRIETARY RIGHTS

1 All specifications, designs, and protocols contained herein are the e

9. WARRANTY AND DISCLAIMER

1 PDR warrants that Control Interfaces meeting these specifications v

2 PDR EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, EXPR

10. EXECUTION

IN WITNESS WHEREOF, this Specification has been approved and is
authorized representatives of PDR.

POLAR DYNAMICS ROBOTICS, INC.

By:

Name: Dr. James Barrett

Title: Chief Robotics Officer

Date: January 15, 2024

By:

Name: Marcus Chen

Title: Chief Technology Officer

Date: January 15, 2024

