

WAREHOUSE ROBOTICS MARKET SIZE ANALYSIS

CONFIDENTIAL AND PROPRIETARY

Prepared for: Polar Dynamics Robotics, Inc.

Date: January 11, 2024

Reference: PDR-MS-2024-001

1. EXECUTIVE SUMMARY

This market size analysis examines the addressable market opportunity for temperature-hardened autonomous mobile robots (AMRs) in cold chain logistics and industrial freezer environments. The analysis focuses specifically on market segments where Polar Dynamics Robotics, Inc.'s ("PDR") proprietary IceNav(TM) technology and cold-resistant actuator systems provide competitive differentiation.

2. METHODOLOGY AND SOURCES

1. Primary research conducted through:

- Direct surveys of 150 cold chain logistics operators
- Interviews with 45 warehouse automation directors
- Analysis of 12 months of customer deployment data
- Consultation with 3 independent robotics industry analysts

2. Secondary research incorporating:

- Industry reports from verified sources
- Public financial filings of comparable companies
- Government cold chain infrastructure data
- Trade association market forecasts

3. TOTAL ADDRESSABLE MARKET (TAM)

1. Global Cold Chain Market Size

- Total cold storage capacity: 719 million cubic meters
- Annual growth rate: 8.2% CAGR (2024-2028)
- Automation adoption rate: 31% (2023)

- Projected automation rate: 52% (2028)

2. Market Segmentation

- Industrial freezer facilities: 42%
- Pharmaceutical cold storage: 18%
- Food processing facilities: 27%
- Other temperature-controlled environments: 13%

4. SERVICEABLE ADDRESSABLE MARKET (SAM)

1. Qualifying Criteria

- Facilities operating below 0 C
- Minimum 50,000 sq ft facility size
- Annual throughput >\$10M
- Existing automation infrastructure

2. Market Opportunity

- North America: \$4.2B
- Europe: \$3.8B
- Asia-Pacific: \$5.1B
- Rest of World: \$1.9B

Total SAM: \$15.0B

5. SERVICEABLE OBTAINABLE MARKET (SOM)

1. Competitive Position

- Market share of temperature-hardened AMR segment: 12%
- Current customer penetration: 8%
- Win rate in competitive bids: 64%

2. Five-Year Projection

- Year 1: \$89M
- Year 2: \$156M
- Year 3: \$247M

- Year 4: \$358M
- Year 5: \$512M

6. COMPETITIVE ANALYSIS

1. Direct Competitors

- ColdBot Technologies (Market Share: 18%)
- FrostLine Automation (Market Share: 15%)
- Arctic Robotics Solutions (Market Share: 9%)

2. Competitive Advantages

- Proprietary cold-resistant actuator technology
- IceNav(TM) AI navigation platform
- Proven reliability in sub-zero environments
- Superior battery performance in extreme conditions

7. GROWTH DRIVERS

1. Industry Trends

- Increasing cold chain complexity
- Labor shortages in harsh environments
- Rising energy costs
- Regulatory compliance requirements

2. Technology Adoption

- Industry 4.0 initiatives
- IoT integration requirements
- Sustainability mandates
- Safety regulations

8. LEGAL DISCLAIMERS

This analysis contains forward-looking statements and projections based on current market conditions and reasonable assumptions about future events. Actual results may differ materially from these projections. This document is provided for informational purposes only and does not constitute

investment advice or an offer to sell securities.

All market data and competitive information contained herein has been obtained from sources believed to be reliable, but no representation or warranty, express or implied, is made as to its accuracy or completeness. This document is confidential and proprietary to Polar Dynamics Robotics, Inc.

9. CERTIFICATION

This market size analysis has been prepared by:

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Polar Dynamics Robotics, Inc.

Date: January 11, 2024

10. APPENDIX

[Market size calculation methodologies and detailed segmentation analysis available upon request]