

# **CORRECTIVE ACTION PREVENTIVE ACTION (CAPA) LOG**

## **CORRECTIVE ACTION PREVENTIVE ACTION**

**Polar Dynamics Robotics, Inc.**

*Period: January 1, 2023 - December 31, 2023*

Document ID: CAPA-2023-LOG-001

Version: 1.4

Last Updated: December 31, 2023

### **1. DOCUMENT PURPOSE AND SCOPE**

This Corrective Action Preventive Action (CAPA) Log documents all q

events, investigations, root cause analyses, and remediation actions related to the performance of Polar Dynamics Robotics' autonomous mobile robot systems and BlueCore technology platform. This log is maintained pursuant to ISO 9001:2015 requirements and the company's Quality Management System (QMS).

## 2. CAPA TRACKING MATRIX

### 2.1 Critical Events (Priority 1)

CAPA-2023-001

-

Issue Date: 02/15/2023

-

Description: Temperature sensor calibration drift detected in BlueCore

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Root Cause: Firmware version 3.2.1 timing loop error

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Corrective Action: Emergency firmware patch 3.2.2 deployed

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Preventive Action: Implementation of automated sensor drift detection

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Status: CLOSED (03/30/2023)

-

Verification: 90-day performance monitoring completed

CAPA-2023-004

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Issue Date: 07/12/2023

-

Description: Battery performance degradation in sub-zero environment

- - 3 -

Root Cause: Thermal management system optimization required

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Corrective Action: Engineering redesign of battery enclosure

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Preventive Action: Enhanced cold-weather testing protocols

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Status: CLOSED (09/25/2023)

-

Verification: Field testing completed across 12 customer sites

## **2.2 Major Events (Priority 2)**

CAPA-2023-002

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Issue Date: 04/03/2023

-

Description: Navigation accuracy deviation in high-traffic zones

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Root Cause: LIDAR sensor interference from reflective surfaces

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Corrective Action: Algorithm optimization for multi-surface environments

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Preventive Action: Updated site survey requirements

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Status: CLOSED (05/15/2023)

-

Verification: Performance validation completed

CAPA-2023-005

- - 5 -

Issue Date: 08/22/2023

-

Description: Communication latency in multi-robot deployments

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Root Cause: Network bandwidth optimization needed

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Corrective Action: Protocol optimization and bandwidth allocation

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Preventive Action: Network capacity planning guidelines

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Status: OPEN

-

Target Completion: 01/15/2024

### 2.3 Minor Events (Priority 3)

CAPA-2023-003

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Issue Date: 06/01/2023

-

Description: User interface responsiveness in mobile app

-

Root Cause: Cache management inefficiency

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Corrective Action: Mobile app optimization

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Preventive Action: Performance testing requirements updated

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Status: CLOSED (06/30/2023)

- - 7 -

Verification: User acceptance testing completed

### **3. TREND ANALYSIS**

#### **3.1 Root Cause Categories**

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Software/Firmware: 40%

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Hardware/Mechanical: 30%

-

Environmental Factors: 20%

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User Interface/Experience: 10%



### **3.2 Resolution Metrics**

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Average Time to Resolution (Critical): 32 days

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Average Time to Resolution (Major): 45 days

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Average Time to Resolution (Minor): 21 days

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First-Time Resolution Rate: 85%

## **4. QUALITY SYSTEM IMPACT**

### **4.1 Documentation Updates**

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QMS-2023-V3 Updated (04/15/2023)

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Testing Protocols Revised (07/01/2023)

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Design Control Procedures Enhanced (09/15/2023)

## **4.2 Training Requirements**

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Technical Staff: Updated firmware deployment procedures

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Field Service: Enhanced troubleshooting protocols

-

Quality Team: Root cause analysis methodology refresh

## **5. VERIFICATION AND VALIDATION**

## **5.1 Effectiveness Review**

All closed CAPAs undergo 90-day effectiveness monitoring with the following criteria:

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No recurrence of original issue

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Implementation of preventive measures verified

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Performance metrics within specified thresholds

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Customer satisfaction maintained

## **5.2 Documentation Requirements**

Each CAPA record maintains:

- - 11 -

Investigation documentation

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Root cause analysis reports

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Implementation evidence

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Verification data

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Management review signatures

## **6. APPROVAL AND AUTHORIZATION**

This CAPA Log is maintained and reviewed quarterly by the Quality M  
Team and approved by:

/s/ Dr. Elena Frost

Dr. Elena Frost

CEO & Co-founder

Date: December 31, 2023

/s/ Sarah Nordstrom

Sarah Nordstrom

Chief Operating Officer

Date: December 31, 2023

/s/ Marcus Chen

Marcus Chen

Chief Technology Officer

Date: December 31, 2023

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