

# IceNav System Integration Guide

## Confidential and Proprietary Information

Polar Dynamics Robotics, Inc.

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## 1. Introduction and Scope

1. This Integration Guide ("Guide") governs the implementation and integration of the IceNav(TM) Navigation System ("IceNav System") developed by Polar Dynamics Robotics, Inc. ("PDR") into authorized third-party autonomous mobile robot platforms ("Host Systems").

2. This document is subject to the Master License Agreement between PDR and the Integrator and contains confidential and proprietary information protected under U.S. and international intellectual property laws.

## 2. Definitions

1. "IceNav Core" means the proprietary software stack that enables cold-environment navigation and thermal management.
2. "Integration Package" means the collection of APIs, SDKs, and documentation provided by PDR.
3. "Thermal Management Protocol" or "TMP" means PDR's proprietary system for maintaining optimal operating conditions in sub-zero environments.
4. "Cold Zone Certification" means the verification process required for Host System deployment.

## 3. Technical Requirements

### 1. Host System Specifications

- Minimum processor: Intel i7 or equivalent
- RAM: 16GB minimum
- Storage: 256GB SSD
- Operating System: Ubuntu 20.04 LTS or later
- Network: Gigabit Ethernet with IPv6 support

### 2. Environmental Requirements

- Operating temperature range: -40 C to +25 C
- Humidity tolerance: 5% to 95% non-condensing
- IP65 rated enclosure minimum

## **4. Integration Process**

### **1. Pre-Integration Phase**

- a) Complete PDR Integration Partner certification
- b) Execute required technical assessment
- c) Obtain necessary API keys and access credentials

### **2. Core Integration Steps**

- a) Install IceNav Core components
- b) Configure TMP settings
- c) Calibrate environmental sensors
- d) Implement safety protocols
- e) Validate communication interfaces

### **3. Testing Requirements**

- a) Complete cold chamber validation
- b) Perform navigation accuracy assessment
- c) Verify thermal management compliance
- d) Execute emergency shutdown procedures
- e) Document performance metrics

## **5. Safety and Compliance**

### **1. The Integrator shall implement all required safety features including:**

- Emergency stop functionality
- Thermal runaway protection
- Collision avoidance systems
- Battery management safeguards
- Environmental monitoring alerts

## 2. Compliance Requirements

- ISO/TS 15066:2016 for collaborative robots
- IEC 61508 for functional safety
- ANSI/RIA R15.06-2012 for industrial robots
- CE marking requirements where applicable

## 6. Intellectual Property Protection

1. All IceNav components, including software, algorithms, and documentation, remain the exclusive property of PDR.

2. Integrators are prohibited from:

- Reverse engineering IceNav components
- Modifying core algorithms
- Sharing or redistributing Integration Package contents
- Creating derivative navigation systems

## 7. Support and Maintenance

1. PDR provides:

- 24/7 emergency technical support
- Quarterly software updates
- Documentation revisions
- Integration troubleshooting
- Performance optimization guidance

2. Integrator Responsibilities:

- Maintaining system logs
- Reporting integration issues
- Implementing security updates
- Monitoring system performance
- Documenting custom configurations

## 8. Warranty and Liability

1. PDR warrants IceNav System functionality under specified conditions for 12 months from deployment.

2. This warranty excludes:

- Unauthorized modifications
- Environmental damage
- Improper integration
- Operation outside specifications
- Third-party component failures

## **9. Certification and Deployment**

1. Final deployment requires:

- Successful completion of Cold Zone Certification
- PDR technical review approval
- Safety compliance verification
- Performance benchmark achievement
- Documentation compliance

## **10. Legal Notices**

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### **Document Control**

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