PATENT SPECIFICATION

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BLUECORE(TM) SYSTEM INTEGRATION METHODS

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ABSTRACT

A system and method for integrating cold-environment robotic control

comprising a temperature-hardened central processing unit, environm
sensors, and proprietary firmware for maintaining operational stability
sub-zero conditions. The system includes novel methods for power m
thermal regulation, and navigation control specifically designed for au
mobile robots operating in extreme cold environments between -40 C

BACKGROUND

[0001] Autonomous mobile robots operating in cold storage and freez
environments face unique challenges related to battery performance,
reliability, and mechanical system operation. Conventional robotic sys
experience significant degradation in extreme cold conditions, limiting
practical application in cold chain logistics and frozen storage facilities

[0002] Prior attempts to address these challenges have focused prima
insulation and heating elements, resulting in inefficient power consum

reduced operational duration. The present invention provides a compr
solution through integrated hardware and software systems specifical
engineered for sustained cold-environment operation.

DETAILED DESCRIPTION

1. System Architecture

[0003] The BlueCore(TM) system comprises:

(a) A thermally-isolated central processing unit maintained within oper
parameters through passive cooling channels;

(b) Temperature-compensated sensor arrays utilizing proprietary calib
algorithms;

(c) Cold-resistant power distribution modules with adaptive voltage re

(d) Firmware systems optimized for sub-zero operation.

2. Power Management System

[0004] The invention includes novel methods for:

(a) Dynamic power allocation based on environmental conditions;

(b) Predictive battery chemistry management;

(c) Thermal load balancing across system components;

(d) Emergency power reservation protocols.

3. Navigation Control

[0005] The system implements:

(a) Temperature-compensated LIDAR processing;

(b) Frost-resistant optical sensor arrays;

(c) Machine learning algorithms adapted for varying thermal condition

(d) Real-time path optimization accounting for cold-zone mapping.

CLAIMS

A method for operating autonomous mobile robots in cold environmen

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Monitoring environmental temperature conditions through distributed s

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Adjusting system parameters based on thermal feedback loops

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Implementing power management protocols specific to cold-environm

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Maintaining navigation accuracy through temperature-compensated s

The method of claim 1, further comprising:

Dynamic allocation of processing resources based on thermal conditi

- Adaptive power distribution to maintain critical system functions
- Real-time adjustment of sensor calibration parameters

A system for cold-environment robotic operation, comprising:

- Temperature-hardened processing units
- Cold-resistant power management modules
- Environmental monitoring sensors
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PRIORITY CLAIM

This application claims priority to U.S. Provisional Application No. 62/X

filed September 15, 2018.

GOVERNMENT RIGHTS

[0006] This invention was made without government support. The ass
all rights to the invention.

FIELD OF INVENTION

[0007] The present invention relates to autonomous mobile robot syst
specifically to methods and systems for maintaining reliable operation
extreme cold environments such as industrial freezers and cold storag
facilities.

TECHNICAL ADVANTAGES

[0008] The present invention provides significant advantages over exi
solutions, including:

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Extended operational duration in sub-zero environments

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Reduced power consumption through efficient thermal management

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Enhanced navigation accuracy in frost-prone conditions

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Improved system reliability through integrated environmental compens

The foregoing description is provided for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention the precise form disclosed.