

PATENT SPECIFICATION

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BLUECORE(TM) COMPONENT INTEGRATION SYSTEM

Patent No. 14,285,963

Filing Date: March 15, 2019

Issue Date: September 22, 2020

ABSTRACT

A system and method for integrating cold-resistant robotic components into autonomous mobile robots, comprising a thermally-isolated power distribution system.

network, temperature-hardened sensor arrays, and an adaptive thermal management system. The invention enables consistent operation of robotic systems in sub-zero environments through proprietary component integration techniques and thermal isolation methodologies.

BACKGROUND OF THE INVENTION

[0001] Autonomous mobile robots operating in extreme cold environments face significant challenges related to component reliability, power efficiency, and system integration. Conventional robotic systems experience degraded performance and increased failure rates when operated in sub-zero temperatures due to battery limitations, sensor malfunction, and mechanical stress.

[0002] This invention addresses these challenges through a novel approach to component integration and thermal management, enabling reliable operation in environments ranging from -40 C to +25 C.

SUMMARY OF THE INVENTION

[0003] The present invention provides a system and method for integrating cold-resistant components in autonomous mobile robots, comprising:

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A thermally-isolated power distribution network

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Temperature-hardened sensor arrays with adaptive calibration

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Proprietary thermal management algorithms

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Reinforced chassis design with thermal isolation zones

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Cold-resistant navigation and control systems

DETAILED DESCRIPTION

Component Integration System

[0004] The BlueCore(TM) integration system comprises multiple subsystems operating in concert:

Power Distribution Network

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Thermally-isolated battery compartments

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Temperature-regulated power conditioning

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Adaptive power management system

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Redundant distribution pathways

Sensor Integration

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Multi-modal sensor arrays with thermal compensation

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Self-calibrating positioning systems

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Redundant environmental monitoring

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Cross-validated navigation inputs

Thermal Management

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Active thermal regulation zones

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Passive thermal barriers

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Heat distribution networks

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Temperature monitoring and response system

Method of Operation

[0005] The system operates through the following sequence:

Initial environmental assessment

Thermal zone activation

Component temperature regulation

Power distribution optimization

Sensor calibration and validation

Navigation system engagement

CLAIMS

What is claimed is:

A system for cold-resistant robotic component integration, comprising

- a) A thermally-isolated power distribution network
- b) Temperature-hardened sensor arrays
- c) Adaptive thermal management system
- d) Reinforced chassis with thermal isolation zones

The system of claim 1, wherein the power distribution network includes

- a) Multiple redundant pathways
- b) Temperature-regulated conditioning
- c) Adaptive management algorithms

A method for operating autonomous mobile robots in sub-zero environments

- a) Environmental temperature assessment
- b) Thermal zone activation
- c) Component temperature regulation
- d) Power optimization
- e) Sensor calibration

DRAWINGS

[0006] The accompanying drawings illustrate embodiments of the invention

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Figure 1: System Architecture

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Figure 2: Component Integration Diagram

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Figure 3: Thermal Management Zones

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Figure 4: Power Distribution Network

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Figure 5: Sensor Array Configuration

INVENTORS

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GOVERNMENT RIGHTS

[0007] This invention was made without government support. The government may have certain rights in this invention.

PRIOR ART REFERENCES

US Patent 13,456,789: "Cold Environment Robotics System"

US Patent 12,345,678: "Thermal Management in Mobile Robots"

US Patent 11,234,567: "Autonomous Navigation in Extreme Conditions"

FIELD OF INVENTION

[0008] This invention relates to autonomous mobile robots, specifically to thermal management component integration systems enabling operation in extreme cold environments.

CERTIFICATION

I hereby certify that this patent document accurately represents the
BlueCore(TM) Component Integration System developed by Polar Dy
Inc.

/s/ Victoria Wells

Chief Financial Officer

Polar Dynamics Robotics, Inc.

Date: September 22, 2020

