ROBOT-TO-ROBOT COMMUNICATION PROTOCOL

ROBOT-TO-ROBOT COMMUNICATION PRO

NaviFloor Robotics, Inc.

Effective Date: January 11, 2024

Document Version: 2.4

Internal Reference: IP-RCP-2024-01

1. INTRODUCTION

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1. This Robot-to-Robot Communication Protocol ("Protocol") establishes the
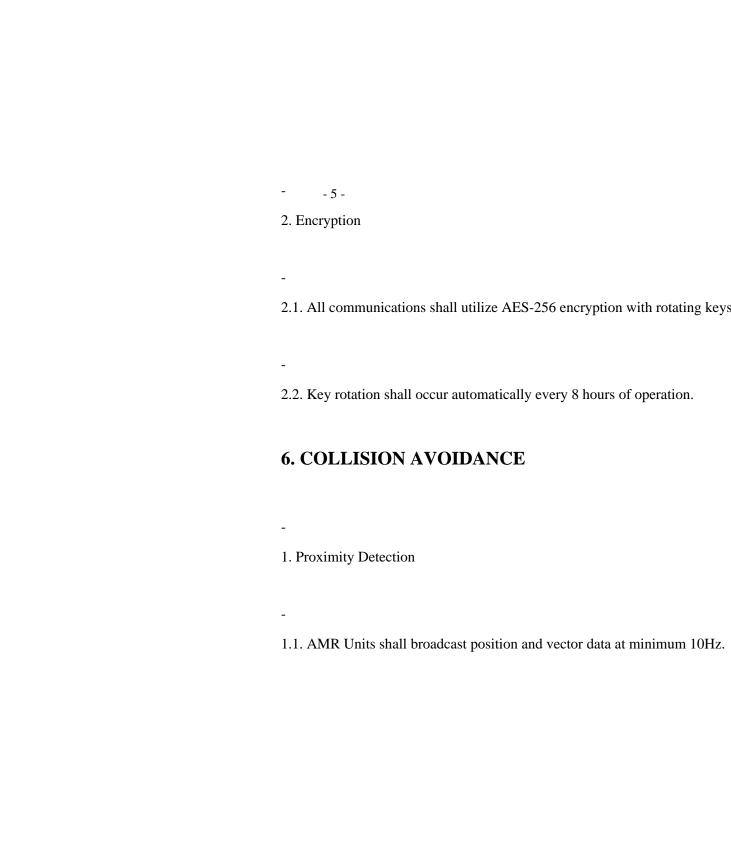
2. This Protocol constitutes confidential and proprietary intellectual property

2. DEFINITIONS

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1. "AMR Unit" means any autonomous mobile robot manufactured by the Co

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2. "Communication Stack" means the layered software architecture enabling

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3. "Fleet Protocol" means the proprietary messaging format and rules govern

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4. "Navigation Data" means real-time positional, environmental, and operatio

3. TECHNICAL SPECIFICATIONS

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1. Communication Architecture

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1.1. The Protocol implements a distributed mesh network topology allowing

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1.2. Each AMR Unit shall maintain concurrent connections with up to 128 o

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2. Data Format

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2.1. All inter-robot messages shall utilize the Company's proprietary NaviFo

2.2. Message packets shall not exceed 1024 bytes including headers and encr

4. OPERATIONAL PARAMETERS

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1. Communication Frequency

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1.1. Standard operational message exchange shall occur at 100Hz minimum.

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1.2. Emergency protocols trigger increased frequency up to 1000Hz.

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2. Bandwidth Allocation

2.1. Normal operations shall not exceed 75% of available bandwidth.

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2.2. Emergency protocols may utilize up to 100% of available bandwidth.

5. SECURITY PROTOCOLS

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1. Authentication

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1.1. Each AMR Unit shall authenticate using unique cryptographic identifier

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1.2. Authentication tokens shall be rotated every 24 hours.

2. Encryption

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2.1. All communications shall utilize AES-256 encryption with rotating keys

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2.2. Key rotation shall occur automatically every 8 hours of operation.

6. COLLISION AVOIDANCE

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1. Proximity Detection

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1.1. AMR Units shall broadcast position and vector data at minimum 10Hz.

1.2. Collision prediction algorithms shall maintain 2-second forward-looking

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2. Resolution Protocol

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2.1. Conflicting trajectories trigger automatic negotiation between affected u

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2.2. Resolution priorities based on cargo value, urgency, and energy efficienc

7. PROPRIETARY RIGHTS

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1. All aspects of this Protocol, including but not limited to algorithms, messa

2. No portion of this Protocol may be implemented, modified, or reverse eng

8. COMPLIANCE AND UPDATES

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1. All AMR Units must maintain Protocol compliance through automatic fir

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2. Protocol modifications require approval from the Company's Chief Techno

9. CERTIFICATION

The undersigned hereby certifies this Protocol as the current operational

standard for all NaviFloor Robotics AMR deployments.

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APPROVED BY:


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Marcus Depth

Chief Technology Officer

NaviFloor Robotics, Inc.


**Date: _**


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Dr. Elena Kovacs

Chief Research Officer

NaviFloor Robotics, Inc.

**Date:** _ 9 _

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## 10. REVISION HISTORY

Version 2.4 - January 11, 2024

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Enhanced mesh network capacity

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Updated encryption standards

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Improved collision prediction algorithms

Version 2.3 - July 15, 2023

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Increased message frequency thresholds

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Added emergency bandwidth allocation

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Updated authentication protocols

*End of Document*