PATH PLANNING ALGORITHM TECHNICAL REFERENCE

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Classification: CONFIDENTIAL - TRADE SECRET

1. OVERVIEW AND SCOPE

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1. This Technical Reference Document ("Reference") describes the proprieta

2. The Algorithms detailed herein are protected as trade secrets under applica

2. DEFINITIONS

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1. "Dynamic Obstacle Avoidance System" or "DOAS" means the Company's

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2. "Multi-Surface Navigation Protocol" or "MSNP" means the Company's pr

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3. "Path Planning Core" or "PPC" means the central algorithmic framework t

3. TECHNICAL SPECIFICATIONS

1. Core Algorithm Architecture

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1.1. The PPC employs a hierarchical decision-making structure with three pr

a) Strategic Layer: Global path planning and optimization

b) Tactical Layer: Local path refinement and obstacle avoidance

c) Execution Layer: Real-time motion control and emergency response

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1.2. Processing Parameters:

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Update Frequency: 100Hz

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Maximum Concurrent Paths: 64

Optimization Cycles per Update: 8

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2. DOAS Implementation

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2.1. Obstacle Detection:

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Primary LiDAR Range: 30 meters

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Secondary Sensor Array: 8 depth cameras

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Minimum Detection Size: 10cm³

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Maximum Track Objects: 128

2.2. Response Protocols:

- Emergency Stop Threshold: 0.5 meters
- Rerouting Trigger Distance: 2.5 meters
- Maximum Deviation Angle: 45 degrees

4. PROPRIETARY METHODS

- 1. Surface Classification Algorithm
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1.1. The MSNP employs proprietary machine learning models to classify sur

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Concrete (smooth/rough)

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Epoxy coating

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Metal plating

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Expansion joints

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Transitional surfaces

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1.2. Surface adaptation parameters are dynamically adjusted based on classif

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Traction control

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Speed modulation

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Turn radius optimization

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Acceleration/deceleration profiles

5. PERFORMANCE METRICS

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1. Baseline Requirements

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1.1. Path Planning Accuracy:

- Position Error Tolerance: ±5cm
- Heading Error Tolerance: ±2 degrees
- Update Latency: <10ms

- 1.2. Obstacle Response:
- Detection Success Rate: 99.99%
- False Positive Rate: <0.01%
- Response Time: <50ms

6. INTEGRATION REQUIREMENTS

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1. Hardware Dependencies

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1.1. Minimum Sensor Configuration:

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Primary LiDAR: NaviFloor NS-200 or equivalent

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Depth Cameras: 8x NaviFloor DC-50 or equivalent

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IMU: NaviFloor IMU-300 or equivalent

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1.2. Processing Requirements:

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CPU: 4 cores @ 2.5GHz minimum

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RAM: 16GB minimum

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Storage: 128GB SSD minimum

7. CONFIDENTIALITY AND USAGE

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1. All information contained in this Reference is strictly confidential and con

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2. Access to this Reference is restricted to authorized personnel who have ex

3. No portion of the Algorithms may be reproduced, reverse engineered, or i

8. DISCLAIMER

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1. This Reference is provided "as is" without warranty of any kind, either exp

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2. The Company reserves the right to modify the Algorithms and this Refere

9. DOCUMENT CONTROL

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