

# DISTRIBUTED COMPUTING ARCHITECTURE FOR ROBOT CONTROL

## DISTRIBUTED COMPUTING ARCHITECTURE

PROPRIETARY AND CONFIDENTIAL

*NaviFloor Robotics, Inc.*

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### 1. OVERVIEW AND SCOPE

1. This document describes the proprietary distributed computing arch

2. The Architecture encompasses the complete technical framework,

## **2. ARCHITECTURAL COMPONENTS**

### **1. \*\*Core Processing Units\*\***

-

Central Fleet Controller (CFC-2000)

-

Edge Processing Nodes (EPN-Series)

-

Individual Robot Control Units (RCU-X)

-

Distributed Sensor Network (DSN)

### **2. \*\*Communication Infrastructure\*\***

- - 2 -

Proprietary low-latency mesh network protocol (NaviMesh(TM))

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Redundant wireless communication channels

-

Secure data transmission architecture

-

Real-time synchronization mechanisms

### **3. TECHNICAL SPECIFICATIONS**

#### **1. \*\*Processing Architecture\*\***

-

Distributed microservices architecture

-

Load-balanced computation across edge nodes

-

Real-time task allocation and scheduling

-

Fault-tolerant operation with N+1 redundancy

## 2. **\*\*Data Management\*\***

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Distributed ledger for operational data

-

Real-time terrain mapping database

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Dynamic path planning algorithms

-

Multi-robot coordination protocols

## **4. PROPRIETARY ELEMENTS**

1. The following elements are deemed proprietary and confidential:

a) TerrainSync(TM) Algorithm Suite

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Surface classification methods

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Dynamic friction coefficient calculation

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Real-time surface adaptation protocols

-

Multi-surface transition handling

b) NaviCore(TM) Control System

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Distributed decision-making framework

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Fleet optimization algorithms

-

Collision avoidance systems

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Emergency response protocols

## **5. IMPLEMENTATION SPECIFICATIONS**

### **1. \*\*Hardware Requirements\*\***

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Minimum processing capacity: 4.5 TFLOPS per node

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Network latency threshold: <5ms

-

Storage capacity: 2TB per edge node

-

Redundant power systems

## 2. **\*\*Software Architecture\*\***

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Containerized microservices

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Real-time operating system (RTOS)

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Custom middleware layer

-

Proprietary API framework

## 6. SECURITY MEASURES

### 1. \*\*Access Control\*\*

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Multi-factor authentication

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Role-based access control

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Encrypted communication channels

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Secure boot mechanisms

### 2. \*\*Data Protection\*\*

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End-to-end encryption



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Secure key management

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Regular security audits

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Intrusion detection systems

## **7. INTELLECTUAL PROPERTY PROTECTION**

1. This Architecture and all its components are protected by:

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U.S. Patent No. 11,234,567 (Filed: 2019)

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U.S. Patent No. 11,345,678 (Filed: 2020)

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Multiple pending patent applications

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Registered trade secrets

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## **8. COMPLIANCE AND CERTIFICATION**

1. The Architecture complies with:

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ISO/IEC 25010:2011

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IEC 61508 (SIL 3)

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ISO/TS 15066:2016

## **9. CONFIDENTIALITY**

1. This document contains confidential and proprietary information of

- a) Maintain strict confidentiality
- b) Not disclose to third parties
- c) Not reverse engineer any components
- d) Return or destroy upon request

## **10. DOCUMENT CONTROL**

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## AUTHORIZATION

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