KhanBMS: Comprehensive Blueprint & Tactical Framework

System Paradigm: Decentralized, Edge-Native Multi-Agent Orchestration Software

Target Applications: Collaborative Combat Aircraft (CCAs), Autonomous Swarms, Subterranean Conflict, and Cislunar Logistics

Control Philosophy: Absolute Human Command Authority // Edge-Compute Tactical Survival

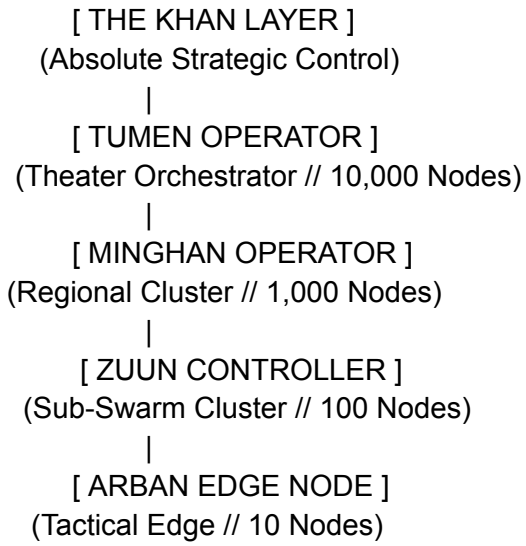
Executive Summary

KhanBMS is a hardware-agnostic software state-manager and decentralized communication protocol engineered to eliminate top-heavy, centralized failure points in modern Command and Control (C2) environments. By translating the mathematical efficiency of the 13th-century Mongolian decimal military hierarchy into modern, edge-computing software nodes, KhanBMS ensures absolute autonomous swarm resilience under severe Electronic Warfare (EW) and communication-severed conditions.

The system operates on an ironclad division of labor: **software handles localized tactical survival, while human command retains absolute strategic authority.** Built natively on open-architecture protocols (ROS2/MAVLink), KhanBMS decouples the control logic from physical airframes, allowing rapid, low-cost deployment across diverse, multi-domain robotic hardware platforms.

I. Core Decimal Architecture & Data Topography

Traditional autonomous frameworks suffer from brittle dependencies on central servers or satellite loops, creating a catastrophic single point of failure under heavy jamming. KhanBMS mitigates this by segregating telemetry, commands, and consensus loops into five strict, self-healing decimal tiers. This design creates localized network boundaries, ensuring that wide-area communications channels are never overloaded by raw data flooding.



1. The Arban Layer (10 Edge Nodes)

Operating at the absolute tactical edge, individual AI agents or drones handle local telemetry arrays and workflows independently. They communicate over a local peer-to-peer ad-hoc mesh network via a dedicated ROS2 topic registry (/arban_[id]/telemetry).

2. The Zuun Layer (100 Nodes / 10 Arbans)

A sub-swarm coordination layer. Instead of all 100 drones broadcasting raw telemetry across the theater, the designated **Arban Leaders** process local data and pass a single, mathematically compressed state envelope upward to the **Zuun Leader** via the /zuun_[id]/compressed_envelope channel, reducing wide-area network traffic requirements by up to 90%.

3. The Minghan Layer (1,000 Nodes / 10 Zuuns)

Serving as Regional Cluster Orchestrators, this layer acts as the vital strategic bridge between local sub-swarms and theater command. By processing and aggregating regional cluster states locally at the edge, the Minghan layer prevents data bottlenecks and ensures that a single network failure cannot blind the upper tiers.

4. The Tumen Layer (10,000 Nodes / 10 Minghans)

The mass-scale theater orchestration layer, designed for infinite modular scalability across global or orbital dimensions. Ten separate Minghan Leaders compile their regional data into a single, unified operational picture broadcasted to the /tumen_[id]/theater_state topic.

5. The Khan Layer (Root Authority)

The absolute strategic command apex and master interface orchestrating the entire multi-agent grid. This root authority injects mission parameters, rules of engagement, and strategic intent into the system via the secure /khan/global_intent topic. Lower-level edge assets never write to this channel; they only ingest its cryptographically signed directives.

II. Operational State Mechanics & Fail-Safes

1. Self-Healing Edge Consensus (The Failover Loop)

If an electronic warfare strike, signal jamming, or physical casualty neutralizes an active *Arban Leader*, the remaining 9 nodes do not lose mission continuity. They instantly execute a localized peer-to-peer consensus routine (modeled after Raft or Paxos protocols) over a dedicated local channel (/arban_[id]/consensus). The node network autonomously re-elects and promotes a new local leader within milliseconds, maintaining the tactical formation without needing to contact a central command server.

2. Predictable Blackout Autonomy (Chain of Command)

When a cluster is completely severed from higher command by an EW strike, assets continue executing the **last objective received from the Khan Layer**. Units are programmatically forbidden from panicking, entering a fail-safe hover, or blindly returning to base. If the last command injected by the Khan was *"Hold Sector Delta,"* the swarm relentlessly holds that sector. Mission updates can only cascade linearly through the decimal pipeline:

{The Khan} —————>{Tumen}----------->Minghan}----------->{Zuun} —————————>{Arban}
This ensures the fleet remains immune to adversary cyber-spoofing or malicious out-of-order field commands.

3. Pre-Initialized Resource Starvation Profiles

To prevent unpredictable "emergent behavior" when units are isolated, the behavior of resource-depleted nodes is defined strictly by the Khan before launch:

- **Attrition Profile (High Risk):** The mission priority is absolute. When an *Arban* node drops to critical battery or exhausts its munitions, it remains on station, executing its task as a kinetic interceptor, EW decoy, or passive sensor relay until structural failure.
- **Cycle & Rotate Profile (Sustained Operation):** When a node hits its resource threshold, it signals its local *Zuun Leader*. The Zuun controller pulls a fresh, fully charged node from a local reserve pool and routes it into the active Arban, while the depleted unit autonomously detaches to fly back to a mobile recharge station.

III. Human-Machine Interface (HMI) & The War Room

The primary interface for the platform is deployed on a rugged, military-grade laptop featuring an isolated white Mongolian fireball emblem. The software presents a hyper-clean, high-contrast, black-and-white tactical map utilizing a strict color-coded visual hierarchy for instant triage:

1. Color-Coded Triage & Telemetry Interactivity

- **Arban (Green):** Individual tactical edge assets and fighter nodes.
- **Zuun (Blue):** Geometric bounding lines outlining sub-swarm perimeters.
- **Minghan (Red):** Grid lines defining regional theater boundaries.
- **Tumen (Silver):** Macro deployment rings mapping the theater scale.
- **Khan (Gold):** Bounding vectors marking root command assets and absolute strategic intent.

Every individual operator dot on the display is interactive. A single cursor hover or click brings up a minimalist sidebar displaying real-time fuel/battery metrics, remaining ammunition counts, and structural hardware health.

2. Predictive Dead Reckoning & Intelligence Hover

When an enemy jamming strike completely drops a sector off the grid, the laptop display does not go blind. The interface slightly dims the compromised region by 30%. The assets automatically transition into hollow **"ghost nodes"** that continue moving smoothly across the screen. This motion is driven by a localized prediction engine simulating their flight paths based on the last objective they received from the Khan. Concurrently, a clean, amber warning box pops up next to the sector boundary detailing the autonomous status:

> [!] COMMUNICATIONS SILENCE // MINGHAN_04
>
> STATUS: AUTONOMOUS DECIMAL CONSENSUS ACTIVE
>
> BEHAVIOR: EXECUTING LAST KHAN INJECT (OBJECTIVE_ALPHA)

To maximize situational awareness, when an asset's onboard AI sensors detect an enemy unit, it populates onto the map as a sharp **white dot**. Hovering over this white dot pulls a live wireframe or blueprint image directly from an integrated weapons database, exposing the enemy platform's maximum engagement ranges, radar blind spots, and vulnerabilities.

IV. Moral & Command Philosophy

The core ethos of KhanBMS explicitly rejects fully automated warfare allocations. The platform enforces a strict **Human-in-the-Loop Command Architecture**, ensuring a perfect division of labor where machines handle tactical execution and humans handle the war.

1. The Manual Intervention Execution

To eliminate the risk of unsupervised strategic decision-making, all strategic asset re-balancing is strictly manual. If a massive combat engagement severs or neutralizes 70% of the assets in **Minghan 01**, the software will not automatically shuffle units from other zones. Instead, the supreme commander makes a deliberate executive decision on the master console:

1. The Khan clicks on a vibrant **Blue Zuun** cluster (100 drones) currently sitting idle under a quiet, un-engaged **Red Minghan 02** sector.

2. With a single click-and-drag action on the user interface, the Khan assigns that entire 100-node cluster to the overwhelmed **Red Minghan 01** sector.
3. The moment the command is finalized, the **Gold Khan Layer** signs the new operational orders with root cryptographic keys.
4. The command instantly trickles down through the **Silver Tumen** theater layer to the respective Minghans. In milliseconds, 100 fresh, fully-charged drones peel away from their quiet patrol vectors and reroute dynamically into the active combat zone.

2. The War Room Advisory Circle

The operational layout is tailored for physical, verbal collaboration. The Khan sits at the head of the table with the master laptop—the only device with **Root Injection Privileges** authorized to execute theater-wide shifts.

The Khan's advisors (Intelligence, Logistics, Electronic Warfare) sit around the table with their own laptops running synchronized, read-only variants of the tactical map. Each advisor utilizes role-specific software lenses (e.g., threat-maps, resource overlays, or weapons database blueprints). They interpret the data streams on their individual screens, collaborate verbally across the table, and present refined intelligence vectors directly to the Khan, ensuring rapid human alignment behind a single, definitive execution point.

The Ask

The architecture, data topography, and human-machine interface logic are 100% complete. The core architectural framework, command topology, and operational logic have been defined. Current funding is intended to accelerate simulation validation, resilience testing, and integration into ROS2/MAVLink sandbox environments suitable for defense evaluation . I am raising a tight $100,000 pre-seed round strictly to containerize this logic into a ROS2/MAVLink simulation sandbox and prove the math to the Department of Defense. The blueprint is ready; I am just selecting the right capital partner to execute the build.

Phase I

ROS2 simulation with 100-node mesh swarm.

Phase II

EW degradation testing and decentralized leader election validation.

Phase III

Multi-domain interoperability demonstrations with MAVLink-compatible drones.


KHANBMS - THEATER OVERVIEW
GLOBAL INTENT
Philippines
Koseuras
Market
TYPE-07 AA SYSTEM
OPERATIONAL STATE:
Active
Nominal
14.59°N
120.98°E
AA S400
EW JAM
CLASSIFIED
TYPE-07 AA SYSTEM
TARGET SPEC
TARGET: 2200
ENGAGEMENT: 70m
ENGAGEMENT RINGS
DECIMAL HIERARCHY
PHILIPPINES
Arhan
MINGHAN_01
MINGHAN_02
MINGHAN_05
MINGHAN_04
MINGHAN_05
MINGHAN_06
MINGHAN_03
MINGHAN_07
Tumen
Minghan
EW JAM
AMBER WARNING
COMMUNICATIONS SILENCE // MINGHAN_05 (Visayas)
Ghost nodes moving based on // MINGHAN_03
ghost nodes, ghost nodes moving based on
predicted trajectory.
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