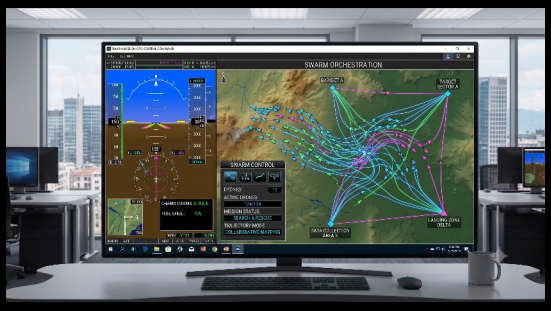
BCAI-ASSS_0001_Spec_Sheet

UAV Swarm Orchestration System

Part Number: BCAI-ASSS

Description



The BCAI-ASSS Product is a Real-Time, Hardware and Software *truly UAV Manufacturer-Agnostic* System which upgrades your drone fleet into a safe and reliable Single Pilot Swarm. Designed for ease of use, it offers an API or a Dashboard to be used by a Single Pilot Flight Manager, via Dual-Tier Command & Control (C2) architecture, guaranteeing swarm cohesion even in total communications blackouts (GNSS-denied / Network-denied environments).

The overall systems features three main aspects:

- **Tactical Edge Mesh (Infrastructure-Less):** Utilizes a local UAV mesh, delivering ultra-low latency node-to-node communication and synchronization. The swarm orchestrates locally; it does not require an active internet connection to maintain formation or avoid collisions.

- **Global Command Link (BVLOS):** A 1km+ Long Range link (or optional cellular/satellite bridge) connects the Ground Control Station (GCS) to the master node for high-level flight plans.

- **True Hardware Agnosticism:** Unlike competitors requiring complex cloud-API integrations, BCAI provides a lightweight Master/Slave expansion PCBA. It physically bridges the Edge AI mesh directly to any commercial flight controller (Pixhawk, STM32, PX4) via standard serial protocols (CPX/MAVLink).

Standard swarm protocols rely on rigid, centralized execution. BCAI-ASSS distributes the intelligence to the edge, allowing the swarm to act as a fluid, elastic entity.

- **Elastic Synchronization & Offset Compensation:** Replaces dangerous "Wait-for-all" halting algorithms. The system continuously calculates *Distance Offset Error* and *Time Offset*. If a node is slowed by environmental factors, the rest of the swarm dynamically adjusts velocity profiles to maintain physical formation or tether tension without abruptly stopping in mid-air.

- **Avian Wake Avoidance (Aerodynamic Z-Offset):** Trailing nodes autonomously detect turbulent downwash (dirty air) from leading drones. The local Edge AI independently micro-adjusts the Z-axis (altitude), finding "clean air" to improve stability and save its battery flight time.

- **Decentralized Fault Tolerance & Self-Healing:** If a node suffers a critical failure, it autonomously ejects from the formation. The remaining nodes instantly recalculate the spatial topology to close the gap, ensuring mission continuity without a central command abort.

The hardware consists of UAV-agnostic, retrofittable expansion PCBA compatible with existing commercial UAV flight controllers. Edge-AI processing computes local sensor data onboard and trigger autonomous, high-speed evasive maneuvers and structural synchronization without cloud latency. It also establishes a localized tactical mesh, ensuring continuous flight safety and swarm cohesion even in network-denied environments. Engineered for dynamic, multi-agent operations can cover the following missions:

- Aerial Firefighting & Payload Delivery
- Search, Rescue, and Safety Operations
- Urban Traffic & Crowd Monitoring
- Precision Agriculture & Spraying
- Multi-Angle Construction & Remote Asset Inspection

Technical Specifications

Box Dimensions	50mm × 50mm × 20 mm (TBC)
Power Supply & Data transfer	<500mW per drone (preliminary), via type-C USB connector
Application Programming Interface	Lightweight API driver and documented library Orchestrator Input: n x FPL, individual or via FPL swarm generator Orchestrator Output: real flight excution coordinates.
Software Dashboard	Emulation mode (FPL validation, configuration pre-flight check, ..) Single Pilot & Real-Time Control Command up to 50 drones at a time
Local Mesh Sync Network	High capability, ultra low-power, standardized interface and API set of functions, ensuring collision avoidance and safe execution of remote controlled or locally enabled decisions versus the initial flight course.
Local Sensor	Edge-AI processing. Optional vision capability.

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blueconnect.ai@proton.me
www.blueconnect.ai