**🇨🇦 IDEaS Pitch: Hector**

**Modular Autonomy Mesh for Sovereign, Multi-Agent Coordination**

**🔍 Problem Statement**

Modern defense operations require real-time coordination across autonomous agents — drones, ground vehicles, robotic arms, and sensor platforms. Existing solutions are often proprietary, foreign-controlled, and difficult to adapt for Canadian missions. There is a critical need for a **sovereign, modular autonomy platform** that supports **multi-domain coordination**, **human-in-the-loop control**, and **contributor-driven adaptation**.

**💡 Proposed Solution: Hector**

Hector is a **Canadian-built autonomy mesh** designed for expressive, modular coordination across land, air, and mobile agents. It fuses real-time sensor data, AI vision, and contributor input into a decentralized graph engine — enabling dynamic task reassignment, override injection, and sovereign control.

**🧩 Key Capabilities**

| **Capability** | **Description** |
| --- | --- |
| **Multi-Agent Coordination** | Modular agents (drone, arm, dog, car, humanoid) operate in a shared mission graph |
| **Human-in-the-Loop Override** | Contributor dashboard enables tagging, supervision, and mission override |
| **Sensor Fusion & AI Vision** | Agents interpret IMU, GPS, camera, and LiDAR data for adaptive planning |
| **Expressive Routines** | Agents perform teachable routines (e.g. ballet, karate) for simulation and training |
| **Sovereign Interoperability** | Compatible with ROS2, MAVLink, NATO STANAGs, and ZeroMQ mesh protocols |
| **Replayable Logs** | All missions are logged for review, training, and contributor remixing |

**🛠️ Technical Architecture**

* **Agent Layer**: Python/C++ classes with expressive motion libraries and vector state tracking
* **Graph Engine**: DAG-based mission planner with zone targeting and task dependencies
* **Messaging Layer**: ZeroMQ mesh protocol for resilient telemetry and command routing
* **Dashboard Layer**: WebSocket API for contributor UI and override injection

**🎯 Use Cases for DND**

* Arctic patrol coordination with drone + ground agents
* Search and rescue with expressive robotic arms and dogs
* Perimeter defense with overrideable mobile agents
* Training simulations with teachable humanoid routines
* Contributor-led mission planning and review

**🤝 Collaboration Model**

* Open-source SDK for pilot users and contributors
* Modular hardware integration with Canadian robotics platforms
* IDEaS-funded pilot deployment with DND units or academic partners
* Sovereign control with full transparency and remixability

**📎 Contact**

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