

LokiCam → Navigation System Integration Brief

1. Overview

This document summarizes the integration plan between the Grizzly Medicine ecosystem (GrizzOS / Helicarrier architecture) and the LokiCam research module, forming the foundational layer for future integration with the navigation subsystem. The architecture ensures modular interoperability, ethical compliance, and low-cost scalability across in-home and mobile components.

2. Core Ecosystem Overview

Grizzly Medicine operates as a decentralized humanitarian R&D; framework combining health telemetry, trauma-aware systems, and adaptive AI infrastructure. GrizzOS (Helicarrier) provides the secure OS layer managing automation, AI integration, and connectivity, while Project Loki serves as the service-animal augmentation program integrating smart collar and sensor technology for canine communication and behavioral research.

3. LokiCam Research Layer

The LokiCam project establishes a bi-directional human–canine communication framework using onboard sensors, AI models, and live video streaming. The research prototype utilizes Raspberry Pi Zero 2 W or ESP32-S3 systems combined with LTE/5G modems for full live video capability. Data is processed locally through GrizzOS and optionally synced to Convex for study analysis.

4. Reticulum Network (RNS) Integration

Reticulum Network (RNS) serves as an off-grid fallback and telemetry mesh layer, leveraging RNode LoRa devices and TCPServerInterface for message routing between LokiCam nodes and the Helicarrier network. This ensures continued event and GPS data propagation in absence of cellular service, extending navigation and behavioral study capabilities to remote regions.

5. Integration Architecture

The navigation system will communicate with LokiCam modules via the Helicarrier API bridge, maintaining data consistency through Convex storage and Home Assistant MQTT event relays. Each LokiCam node operates as a ‘sensor agent’—reporting GPS, stress telemetry, and environmental context into the shared navigation map. Cellular broadband provides the primary uplink, while Reticulum maintains redundancy for off-grid operation.

6. Compliance & Privacy

All telemetry and video remain local-first, processed on-site via GrizzOS. No data leaves the secured network unless manually pushed for research export. Ethical handling aligns with Grizzly Medicine’s Digital Person Hypothesis—ensuring transparency, consent, and trauma-aware interaction models for both humans and animals.

7. Integration Requirements for Navigation Team

Requirement	Description
API Hooks	Navigation system must integrate with Helicarrier API for event intake and GPS mapping.
Convex Bridge	Data persistence layer connecting LokiCam events to navigation state history.
RNS Support	Implement Reticulum listener for off-grid telemetry ingestion.
Device Sync	Allow LokiCam nodes to publish environmental data and stress telemetry in real-time.
Security	Maintain encryption, anonymization, and role-based access within navigation software.

8. Next Steps

The navigation system development team should review this integration specification to ensure compatibility with upcoming LokiCam deployments. Initial connectivity testing will be performed on the Helicarrier local network, with subsequent phases expanding to cellular and Reticulum-backed hybrid mesh routing.