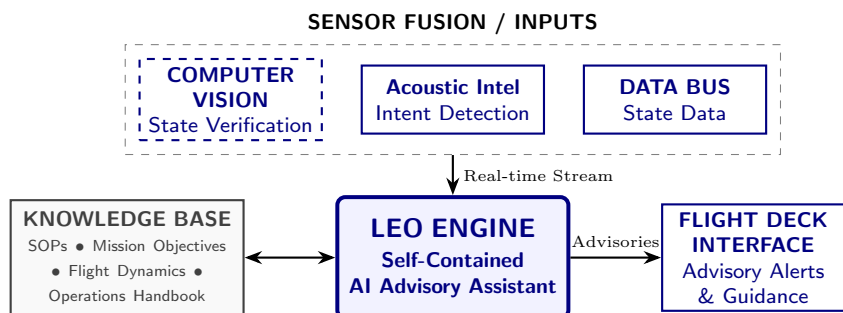


Project Leo: AI Flight Advisor for Crewed Aerospace Operations



Project Leo (Learning Engine for Operations) is an AI advisor providing intelligent decision support for crews in aviation and spaceflight operations.

Core Capabilities

- **Multimodal Sensor Fusion** Leo combines computer vision for configuration verification with acoustic analysis for crew intent and anomaly detection.
- **Transparent & Explainable AI (xAI)** Leo provides context-aware justifications through cross-referencing live data with its Knowledge Base.
- **Self-Contained “Black Box” Architecture** Leo operates as a standalone, advisory-only avionics package with local edge processing and no external connectivity requirements.
- **Adaptive Safety Net** Drawing from historical flight incidents, Leo delivers intelligent, explainable recommendations for emergencies - offering context and reasoning that standard procedures and traditional automated systems cannot provide.
- **Space: Communication Latency Mitigation** During Earth-independent operations, Leo compensates for comm latencies by providing real-time autonomous advice to support crew decisions.
- **Real-Time Crew Advisories** Leo receives read-only data streams, analyzing flight parameters and crew communications for proactive advisories.

Mission Value

- **Autonomous Decision Support** Leo provides explainable reasoning by cross-referencing sensor data against SOPs, addressing the need for transparent AI during isolation and critical operations.
- **Earth-Independent Operations** Leo’s self-contained inference engine provides immediate guidance during communication blackouts, eliminating latency risks for safety-critical decisions.
- **Off-Nominal Detection & Diagnosis** Leo autonomously detects procedural deviations and system anomalies through multimodal sensor fusion in spacecraft and aircraft.
- **Crew Performance Monitoring** Leo identifies crew stress and fatigue indicators through acoustic analytics, enabling proactive mitigation of errors.
- **Enhanced Situational Awareness** Leo reduces cognitive workload during complex operations by providing contextual advisories grounded in operational procedures and real-time conditions.
- **Aviation Safety Enhancement** Leo applies explainable AI to analyze real-time data, offering crew advisories during complex or unexpected situations to improve decision-making and outcomes.

— Roadmap —

Project Leo is at TRL-3, leveraging an existing **self-contained AI architecture** with a multidisciplinary team developing **multimodal audio/data processing** for aerospace applications. Near-term efforts focus on **Mars mission validation** and **commercial aviation partnerships**. Future growth includes autonomous crew health monitoring and integration with next-generation spacecraft systems.

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Leo delivers intelligent, explainable decision support when crews need it most.