

Document: AV-SIM-SRS-V1.2

Title: Avionics Simulation System Requirements Specification

Date: 2025-10-23

1. Scope

This document specifies the functional and non-functional requirements for the Avionics Simulation System (AV-SIM), intended for closed-loop testing of embedded flight control software.

2. Functional Requirements

2.1 Flight Dynamics Model (FDM)

The FDM shall accurately calculate the aircraft state vectors (position, velocity, attitude) based on control surface inputs and atmospheric conditions.

- **REQ-FDM-001:** The FDM shall provide 6-Degrees-of-Freedom (6DOF) modeling fidelity.

2.2 Control Interface Processing

- **REQ-CIP-005:** The Primary Flight Computer (PFC) simulation module shall implement a fault-tolerant mechanism supporting **Triple-Modular Redundancy (TMR)** for all critical actuator commands.

3. Non-Functional Requirements

3.1 Timing and Performance

- **REQ-NFP-101:** The overall simulation update frequency (FDM calculation, sensor integration, and actuator output refresh) shall not fall below **100 Hz** (10 millisecond cycle time) under peak load conditions.

- **REQ-NFP-102:** Jitter for the main simulation loop must be maintained under 500 microseconds.

3.2 Safety and Reliability

- **REQ-NFP-201:** All sensor data acquisition and critical command paths must utilize dedicated, isolated communications channels.