My First Attempt Designing a Drone

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1 Introduction

In this attempt, I will specifically focus on the flight controller (FC) and the communication part.

The FC acts like the *autonomic nervous system*. It maintains the drone stability using sensor data (IMU, GPS, barometer, etc.), processes radio inputs and executes control loops (e.g. PID), and communicates with its peripherals via protocals such as MAVLink, often over UART (Serial) or CAN. The FCs are typically not autonomous, i.e., they rely on external commands. Since we are talking about the FC already, it's worth mentioning how it relates to the onboard computer should there be one. The FC is like the *reflex* brain, which keeps the drone upright, stable, and responsive in milliseconds. It doesn't think but reacts. On the other hand, the onboard computer is like the *executive* brain, which plans paths, runs vision models, interprets maps, or decides where to go next. It might high-level commands like "fly to way point (x, y, z)" or "follow this moving object", which the FC turns into motor signals.