

ABSTRACT

Modeling a monitoring system for helicopter refueling is a crucial requirement in supporting efficient and safe flight operations. The modern aviation industry faces significant challenges related to fuel usage management, especially in helicopter refueling which demands high precision. One of the biggest potential hazards is over-pressurization of fuel tanks, which can lead to explosions or fires, and current manual monitoring methods have proven inefficient and cannot be digitally logged. This research develops a prototype pressure monitoring system based on modern technology to overcome these problems. The proposed solution involves the integration of a GY-MS5837 digital pressure sensor to provide real-time pressure readings and transmit the data to a web monitoring platform. The system is also designed with relay-based automatic control operated by an ESP32 microcontroller to activate or deactivate the pressure pump and vacuum pump based on predefined pressure thresholds, thereby minimizing human intervention and improving safety, speed, and filling precision. Pressure data processed by ESP32 is sent to Firebase for real-time monitoring and visualization. Prototype testing shows that the system is able to read and display pressure in real-time.