

ABSTRACT

The Air Data Test Set (ADTS) is a crucial device used for testing and calibrating air pressure systems in aircraft, such as the airspeed indicator, altimeter, and vertical speed indicator. This study aims to design and develop an ADTS prototype based on the Internet of Things (IoT) that can simulate the working principle of a pitot-static system. Since the system has not fully implemented static pressure, the simulation utilizes ambient air pressure (ground level) as the static pressure. Through this approach, the system simulates the total pressure from the ADTS and static pressure from the surrounding air to represent the airspeed indicator readings.

The system is built using an ESP32 microcontroller, MS5803 pressure sensor, and the Node-RED platform integrated with the MQTT protocol (Mosquitto Broker) and MySQL database. The airspeed value, in knots, is entered through the dashboard, converted to pressure (mbar), and used as a reference for controlling the pump and solenoid via the ESP32. The pressure data is visually displayed on the dashboard using gauges, charts, and tables, and saved to the MySQL database at two points: when the initial input is received with a “Start” status, and when the target pressure is reached with an “End” status.

Test results show that the system can simulate the airspeed measurement process responsively. Data transmission from the ESP32 to the MQTT broker is set at 100 ms intervals, but the latency for data reception by Node-RED varies between 200 to 500 ms, depending on network conditions and data processing. Although the prototype does not fully replicate a complete pitot-static system, it serves as an educational tool and simulation platform for air pressure testing in aviation instrumentation.

Keywords: Air Data Test Set, pitot-static, ESP32, MS5803, Node-RED, MQTT, MySQL