ECE 412 - 1 Minute TED Talk #4

TEAM-03 - COATL-AIRCRAFT

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Remind Us What Your Capstone is

Particles in the atmosphere, such as volcanic ash, mineral dust, and wildfire smoke, pose risks to aviation by damaging engines, eroding components, and potentially causing engine failure. A good example of this is seen in the 1982 Jakarta incident, where British Airways flight 009 flew through volcanic ash from Mount Galunggung (in Indonesia), causing all four engines to fail. Additionally, aircraft in dusty environments, like the Middle East, experience accelerated wear and tear compared to those in cleaner air.

This capstone project aims to construct an electrostatic dust analyzer (EDA) to detect particle clouds and volcanic ash during flight by measuring currents induced by electrostatically charged particles. The EDA will provide real-time particle data, aiding pilots in identifying hazards like volcanic ash and wildfire smoke. Beyond emergencies, widespread deployment of EDAs could offer helpful information about atmospheric dust trends.

Update Us on What Changed About Your Capstone

Our faculty advisor/sponsor Josh Mendez has been very straightforward with their requirements for the project. All of our “Must” requirements of the device being able to detect particles and being sensitive to electrostatic charge, as well as the “Shoulds” of having low power consumption, being small in size, and being able to determine the size of particles remain the same. Nothing of note has changed and we are still going along as planned

Meaningful Technical Progress

Currently we have been debugging and testing our PCB. Our main challenges have been getting code to work on the ESP32 and finding shorts on our PCB. We’re very close to fully porting our breadboard-tested circuit to PCB.