

3. SYSTEM TO PREDICT UAV FAILURES

PROBLEM:

An issue exists with determining the reliability in real-time of unmanned aerial vehicles as used by the Airforce, Army, and Navy. Most vehicles today use rotors, electric, gas, and turbine engines for propulsion as well as electromechanical and airframe components for operation. Unfortunately, predicting imminent or dormant failures of mechanical systems often occurs with little to no warning placing the platform at risk of failure in the field like during critical missions.

CONTEXT:

As the Australian Defence Force expands its unmanned systems, the need for operations crew interaction and predictive maintenance prior to catastrophic failure of subsystems is critical to platform availability and reliability to mission success. As these platforms are autonomous onboard sensors need to be sufficiently trained to listen to the platform heartbeat and determine imminent failures.

QUESTIONS:

What type of system is required to predict imminent failures in the field before they become catastrophic?

Consideration could be given to the following issues, but proposals need not be limited by these considerations.

- What type of sensors are required and how can they be easily adapted?
- What type of software algorithms are required?
- How can the data be processed in Realtime so that operators and maintenance personal know how to action it?
- Can the system be adaptable across multiple platform types, such as fixed wing or rotary wing?

Bear in mind some restrictions in place on uncrewed systems. These include:

- Requirements for small size, light weight, and low power consumption environments.
- Limited ability to transmit data (being cognisant, therefore, of data selection for transmission), some onboard processing ability but not necessarily high-power processing.