

# Project Darter Bird

## Aviation H2 Feasibility Study Summary



An outline of how Aviation H2 plans to have Australia's first hydrogen-powered plane in the sky by 2023.

### Three Month Feasibility Study



After three months of research, Aviation H2 found that modifying a Falcon 50 jet plane using liquid Ammonia to turbofan Combustion energy path offers the most commercially viable and efficient avenue to carbon-free flight.\*

### The results are in



The results showed "Liquid Ammonia to Turbofan Combustion" was the best avenue to carbon-free flight as it outperformed the others in fuel selection/storage, power generation, thrust generation and weight capacity.

### Advantages of converting a plane

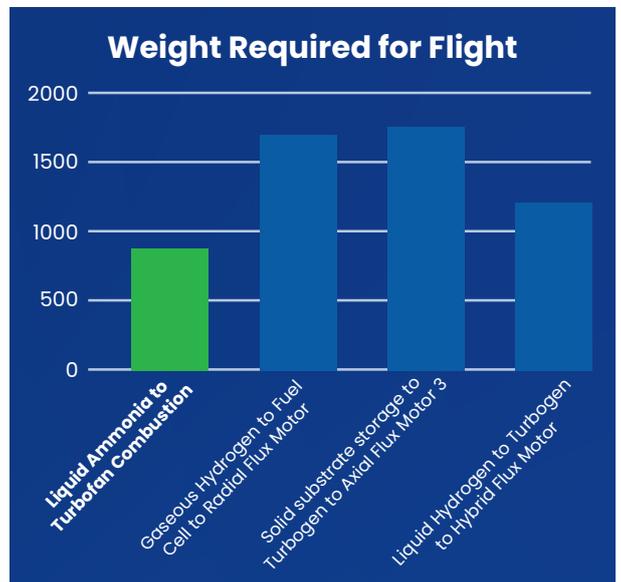
➤ Making use of current technologies and infrastructure will be important to future customers because it allows them to modify the aircraft they have already invested in, rather than buy a whole new fleet.

- Using existing systems the industry is already familiar with.
- Retains a majority of the base certification, meaning it will be a simpler approval process from aviation authorities.

### Advantages of The Falcon 50



- It has three engines and can be ferried with two engines, meaning the third engine spot could be used to first test a smaller engine, such as the PW610F-A, before modifying the Falcon's own engines.
- A larger aircraft with a greater pay weight capacity of 1000 kilograms, which reduces the risk posed by the weight challenges.
- Almost identical costs to smaller jets that have a lower weight capacity.
- The aircraft is well established in Australia, unlike any of the very light jets, meaning there is a time-saving in getting the aircraft ready for testing.



\*Compared to Gaseous Hydrogen to Fuel Cell to Radial Flux Motor, Solid substrate storage to Turbogenerator to Axial Flux Motor, Liquid Hydrogen to Turbogenerator to Hybrid Flux Motor.



## Advantages of Liquid Ammonia to Turbofan Combustion

- Fly using hydrogen fuel, which weighs significantly less than alternatives, with the same amount of power. Thus, it is the most commercially viable and efficient option to achieve carbon-free flight.
- Storage and transport infrastructure for ammonia already exists and enjoys a substantial market in Australia and overseas.

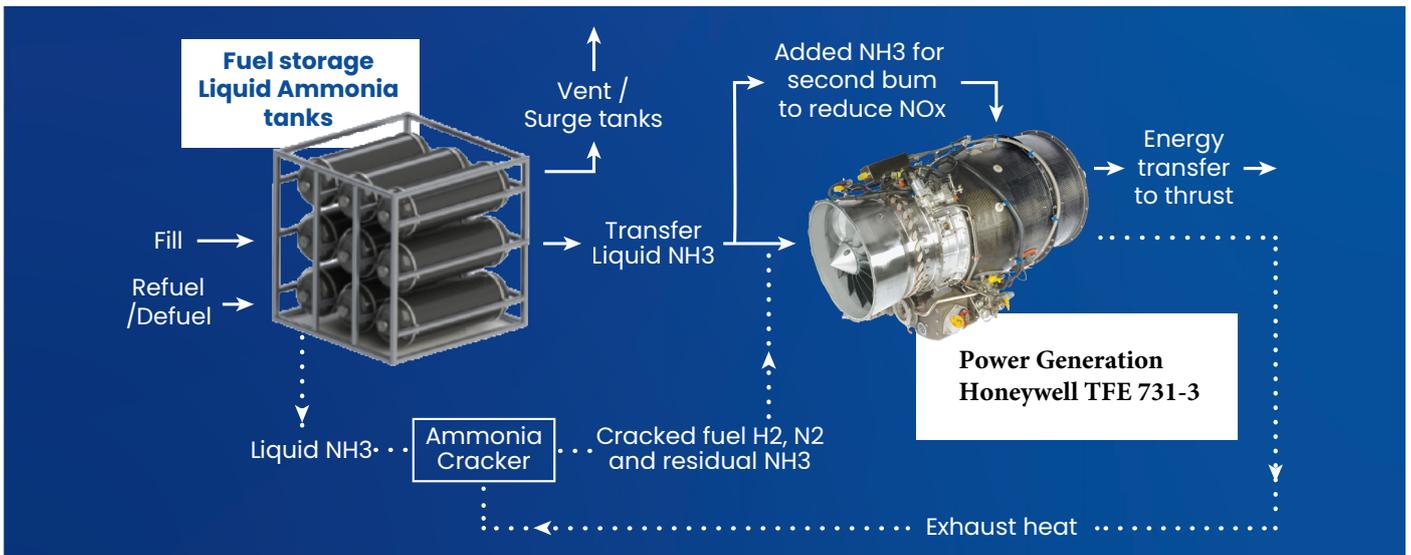
- The pressures required for ammonia are low, so the weight of onboard tanks are a fraction of gaseous hydrogen to store the same amount of chemical energy.
- Compared with ammonia, the infrastructure required for liquid hydrogen is similar in weight, but much more complex because of the need for cryogenic technologies.
- When liquid ammonia is used in the Combustion chamber, a turbofan can produce the same amount of thrust as traditional fuel sources.

## FALCONAIR Strategic Partnership With FalconAir

Aviation H2 has an agreement with FalconAir, giving them access to their hangar, facilities and operating licenses in Bankstown Airport, so they can begin building Australia's first hydrogen-powered plane.

- FalconAir has a long history in the maintenance, operation and management of Falcon Aircraft.
- FalconAir will leverage its global network of relationships to acquire the test engines and aircraft that will be used to deliver the project.
- Will provide specialist and licensed aircraft maintenance engineering, piloting and hangarage.
- FalconAir will use their proven expertise to help communicate with aviation authorities and accelerate the certification process.

Figure 4: Path to Anhydrous Liquid Ammonia to Turbofan Combustion



## Timeline

