



Image credit: NASA

## Aeronautics

# Aerodynamically Activated Thrust Vectoring Device

Allows vertical take-off and landing of personal air vehicles (PAVs) and unmanned aerial vehicles (UAVs)

NASA's Langley Research Center has developed a thrust-actuating device for a Vertical Take-Off and Landing (VTOL) aircraft. The technology is unique because no mechanically driven actuation is required to transition from hover flight to wing born flight. The result is lower empty weight and robust aircraft that has a benign response to wind gusts and shear. In addition, the aircraft fuselage can be designed for exceptional pilot visibility.

## BENEFITS

- ➔ Mechanical stability
- ➔ Increased range
- ➔ Superior ride quality
- ➔ Reduced empty weight
- ➔ Stability and robustness of aerodynamics through transition from VTOL to forward propulsion
- ➔ Benign response to air disturbances

## APPLICATIONS

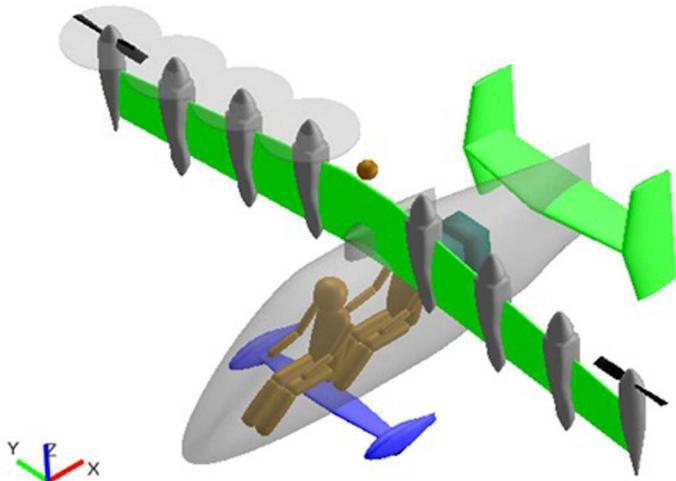
- ➔ Unmanned aerial vehicles
- ➔ Personal Air Vehicles (1-6 seat size aircraft)

technology solution



## THE TECHNOLOGY

The thrust actuating device includes several innovations in the aerodynamically stable tilt actuation of propellers, propeller pylons, jets, wings, and fuselages, collectively called propulsors. The propulsors rotate between hover and forward flight mode for a tilt-wing or tilt-rotor aircraft. A vehicle designed using this technology can transition from a hovering flight condition to a wing born flight condition with no mechanical actuation and can do so without complex control systems. This results in a reduction in system weight and complexity and produces a robust and naturally stable hovering aircraft with efficient forward flight modules.



Thrust Actuating Device for a Vertical Take-off and Landing Aircraft. Image credit: NASA/William J. Fredericks

## PUBLICATIONS

Patent Pending



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