Efficient UAV Flight Mechanism with Vertical Take-Off and Landing (VTOL) Capability

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CONTACT

Andrew M. Van Court
amvancourt@ucdavis.edu
tel: .



ABSTRACT

Researchers at the University of California, Davis have developed a new flight mechanism that offers vertical take-off and landing (VTOL) capability and cruising speeds comparable with fixed wing unmanned aerial vehicles (UAV).

FULL DESCRIPTION

Quadcopters lack adequate aerodynamic efficiency to sustain long range flights due to their hover flight oriented design. In addition, they sit close to the ground, decreasing any vertical advantage in grounded mode. A proposed solution to increase quadcopter operating range is to use a fixed wing aircraft. Fixed wing aircrafts, however, are not VTOL capable and are difficult to use where landing space is limited.

Researchers at the University of California, Davis have developed a new flight mechanism offering vertical take-off and landing (VTOL) capability as well as cruising speeds comparable with fixed wing unmanned aerial vehicles. This new mechanism takes advantage of the offset angle between the engine and nacelle to switch into a horizontal flight (cruise) mode when the aircraft is pitched below the offset angle. This also allows for a faster cruising speed as the engines are tilted by the offset angle from vertical. In addition, the aircraft's propeller thrust governing system (PTGS) offers a simple solution to variable pitch propellers and allows the aircraft to maintain a constant rotational speed.

APPLICATIONS

- Long range missions
- VTOL capability

FEATURES/BENEFITS

- Efficient
- Relies solely on engines for keeping itself in the air
- During horizontal flight (cruising operations) the wings generate the lift
- Landing pitched up to allow extended reach for mechanized probe
- Extended operating time
- Ability to deploy the probe in hover flight

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,541,206	02/03/2026	2017-118
United States Of America	Issued Patent	11,635,773	04/25/2023	2017-118

INVENTORS

- Anishchenko, Ilya
- Robinson, Stephen K

OTHER INFORMATION

KEYWORDS

UAV, VTOL, vertical take-off, take off, landing, quadcopter, aerial, fixed wing, PTGS, propeller, thrust

CATEGORIZED AS

- **Security and Defense**
  - Other
- **Transportation**
  - Aerospace
  - Alternative Propulsion
  - Other
- **Engineering**
  - Other

RELATED CASES

2017-118-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Passive Mechanical Exoskeleton to Reduce Hand Fatigue for Astronauts
- Astronaut-Powered Laundry Machine

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1 Shields Avenue, Mrak Hall 4th Floor,
Davis,CA 95616

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