ANTI AIR COLUMN INTERACTION MOUNTING FOR MULTIROTOR AERIAL VEHICLES

IITM Technology Available for Licensing

Problem Statement

- Increasing payload capacity by enlarging propellers results in undesirable size, weight, and stability issues.
- While VOOPS allows larger propellers without increasing footprint, it introduces thrust loss and system vibrations due to rotor overlap.
- Further, vibrations affect performance and stability, particularly in the accelerometer-dependent control systems used for flight stabilization and navigation.

Intellectual Property

- IITM IDF Ref. **1383**
- **IN 509585 - Patent Granted**

Technology

Tilted Rotor Axes for Minimal Air Interaction: The quadcopter's frame design includes longitudinal members with motor mounts that tilt the rotor axes toward the central axis, reducing air column interaction and improving stability.

Wedge-shaped or Inclined Motor Mounts: The motor mounts, which can be wedge-shaped or inclined plane devices, are set at a predetermined angle (5°-25°) to achieve minimal air column overlap and maintain low vibration amplitude (0.1 g or less).

Configurable and Modular Design: The quadcopter can feature four, six, or eight longitudinal members, with overlapping rotors (0-35%) to optimize space and performance, and includes components like ESC units, communication units, and landing gear for comprehensive functionality.

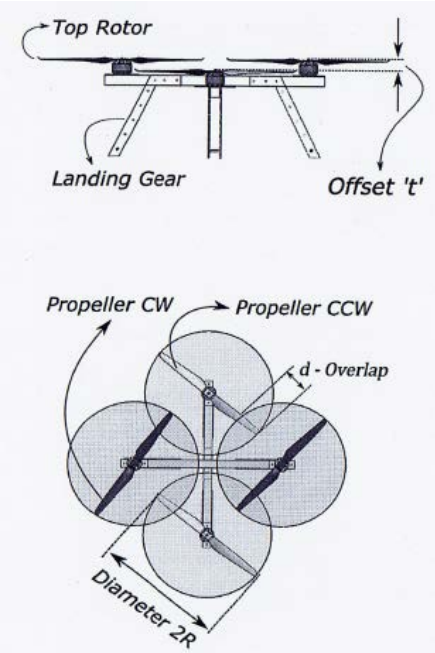

Fig 1. VOOPS

Technology Category/ Market

Category - UAV (Unmanned Aerial Vehicle), Aerospace & Defense Technologies

Applications - Aerial Photography, Agricultural Monitoring and Crop Management

Industry - Aerospace and Defense, E-commerce

Market - Global multirotor drone market is projected to grow at a CAGR of 13.1% during the forecast period of 2024-2031.

TRL (Technology Readiness Level)

TRL - 5: Technology validated in relevant environment.

Research Lab

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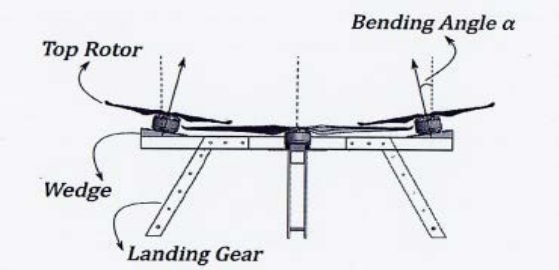


Fig 2. VOOPS with AACIM

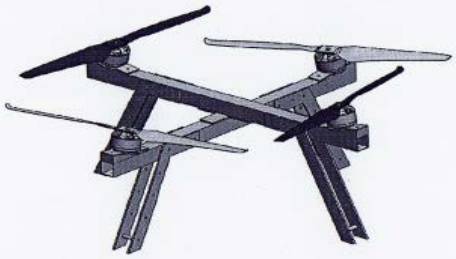
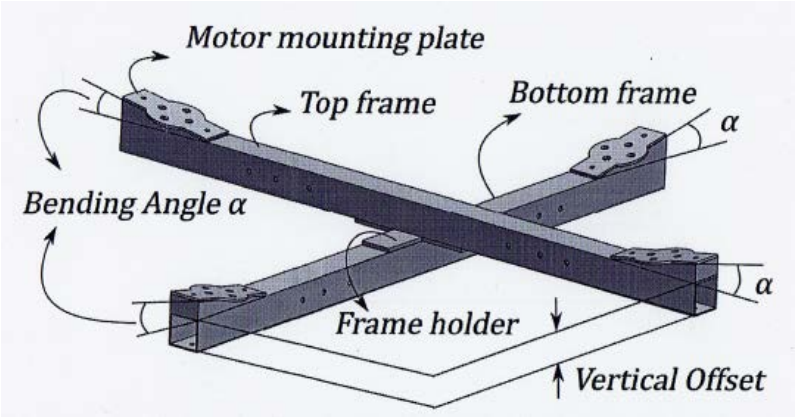


Fig 3. VOOPS with inclined mounted motors



VOOPS with AACIM Frame isometric view

Key Features / Value Proposition

- Innovative design allows larger propellers without increasing the quadcopter's footprint, boosting payload capabilities.

1. Enhanced Payload Capacity

- Tilted rotor axes minimize downwash interference, ensuring smoother and more stable flight performance.

2. Reduced Air Column Interaction

- Optimized rotor overlap and tilt angles achieve vibration amplitudes of 0.1 g or less, enhancing the reliability of

3. Low Vibration Levels:

- Configurable with four, six, or eight longitudinal members, offering flexibility and space efficiency for various applications.

4. Compact and Modular Design:

- Wedge-shaped or inclined **motor mounts set at angles between 5°-25°** improve rotor efficiency and flight stability

5. Advanced Motor Mounts:

- Equipped with ESC units and communication modules for precise speed control and robust data transmission.

6. Integrated Communication and Control Systems

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