



Image Credit: NASA

TECHNOLOGY SOLUTION

Aerospace

Multicopter Aircraft Noise Reduction

[Phase-locked rotors reduce noise](#)

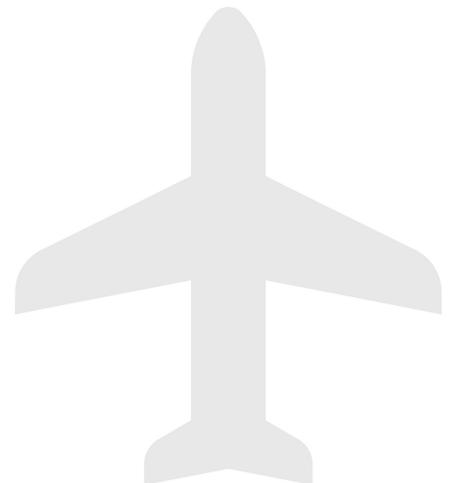
Multicopter aircraft typically create a significant amount of tonal noise from each rotor. Groups of rotors operating at the same rotation rate with an appropriate phase offset can be used to reduce the tonal noise of the aircraft when there are multiple rotors on each side of the aircraft.

Reducing tonal noise, depending on the aircraft design, can effectively reduce the total noise output for a given flight scenario. Aircraft can be designed with this technology to prioritize quieter take-off and landing, or can be designed for decreased noise in cruise. Existing designs may benefit from this technology as well, but what type of benefits can be gained depend on the design of the aircraft.

Using this method, multiple rotors can be significantly quieter than a single rotor, without sacrificing thrust.

BENEFITS

- Quieter aircraft operations

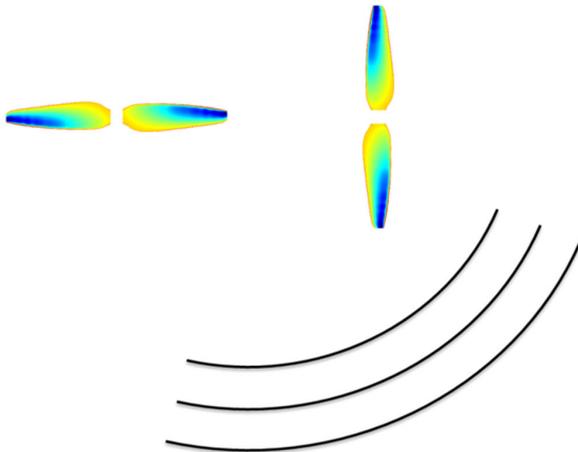


THE TECHNOLOGY

Noise produced by multirotor vehicles may be objectionable to some, especially as industry moves toward drone deliveries and potentially air taxi operations.

However, noise reductions can now be attained by synchronizing the rotation rate and then controlling the phase offset between neighboring rotors. The optimal phase offset is uniquely defined based on the number of blades and the relative location of each rotor and does not depend on the rotation rate, blade geometry, or other aspects of the vehicle design.

This technology is not viable for all multirotor aircraft but is applicable if the rotation rate of neighboring rotors can be synchronized mechanically or electronically.



Rotors that are phase locked reduce tonal noise by spacing out the high disturbance rotor blade tips as seen. Image Credit: NASA

APPLICATIONS

The technology has several potential applications:

- UAV Deliveries
- Air Taxis
- Professional and hobby drone pilots

PUBLICATIONS

Patent No: 11,565,790