



TECHNOLOGY

Spanwise Slotted Rotor Tip

OVERVIEW

During the descent of rotorcraft at low speed, typically upon approach to a landing site, the noise generated by rotor blade vortex interactions (BVI) becomes very loud.

The impulsive nature of BVI noise is extremely fatiguing to passengers and crews, as well as being annoying to the population near the landing areas. Another implication of BVI noise is that this form of rotor noise can be easily detected electronically at large distances, thus increasing the vulnerability of military rotorcraft.

During the last twenty years, a great deal of resources has been committed to eliminate/reduce BVI noise levels from rotorcraft. The work has mainly concentrated on two strategies: (1) reducing the strength of the tip vortex from the blade, and (2) moving the vortex further away from the blade. These two strategies have been explored by using both passive and active means.

Researchers at the University of Maryland, College Park have developed a passive technology that efficiently alleviates the formation of a concentrated blade tip vortex using a special slotted tip rotor blade. This technology allows for a much faster diffusion of the tip vortex and a significant reduction in flow velocities, which can result in a very substantial reduction of BVI noise.

The advantages of this technology are:

- Drastic alleviation of the flow velocities in the tip vortex (as much as 20-60% of the swirl velocity peak, see Fig.1 also the early stage diffusion of tip vortex, Fig.2).
- Less than 3% penalty loss in power (see Fig.3) as compared with other reported solutions (20-80%).
- The solution is robust, relatively simple, and requires low resources for implantation on every type of conventional rotor blades.

See US Patent No: 6,948,906

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Aerospace

EXTERNAL RESOURCES

- [US Patent 6,948,906](#)

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