

Discussing V-22 Osprey with Google AI (Finally names VRS as main aerodynamic origin of issues.)

Lately, news about the V-22 tiltrotor are coming with more and more detail of its planned upgrade. There is no visible sign of plans to upgrade also with adaptive proprotor blades. Meaning that

- a) aerodynamic root of problems still needs recognition;
- b) practically no steps for saving future lives are being taken;
- c) practically no grounds for lifting present flight restrictions are being created. Unless – see point 7.

In the attachment have been included

- a) a more detailed table of the dialog;
- b) some copies of the search outputs showing the cleanup process of editing (steps of taken to separate relevant parts of answers from the irrelevant ones);
- c) own comments on the irrelevant parts of the Google AI answers;
- d) a better quality copy of the below table snippet.

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(Post originally shared at the Vertical Flight Society's forum on 2nd August 2025)

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Partial table

	Question asked of the Google AI	Google AI Relevant answer	
		Google AI Summary	Details
1.	How much current restrictions on V-22 Osprey flight cost ?	While the exact cost of these restrictions is difficult to quantify precisely, it's clear that they represent a significant operational and financial burden on the military. The limitations on flight range and operational capabilities directly affect mission effectiveness, and the potential for future costs related to safety and upgrades further highlight the financial implications of the current restrictions.	
2.	What is the aerodynamic origin of the V-22 Osprey reliability and safety issues ?	The Osprey is vulnerable to VRS , a dangerous aerodynamic condition where the aircraft descends into its own downwash, causing a loss of lift and control. Rotor Design Limitations	
3.	How to modify design of the V-22 Osprey to reduce susceptibility to VRS ?	Modifications could focus on potentially optimizing rotor design Rotor Blade Twist Optimization	
4.	How can a variable blade twist rotor reduce susceptibility of the v-22 osprey to VRS ?	In essence, the variable blade twist rotor acts as a dynamic control surface , allowing the rotor to adapt to varying flight conditions and maintain a stable and efficient operating state, thus minimizing the chances of entering the dangerous VRS .	
5.	V-22 osprey susceptibility to VRS is connected to rotor blade stall ?	Yes, the V-22 Osprey's susceptibility to Vortex Ring State (VRS) is indeed linked to rotor blade stall. VRS occurs when the rotor blades encounter turbulent, swirling air, causing a loss of lift and potentially leading to a loss of control. The V-22, with its unique tiltrotor design, can be particularly vulnerable to VRS during certain descent maneuvers, especially at high rates of descent and low airspeed.	
6.	How a variable blade twist rotor can reduce vibrations related problems of the v-22 osprey	In essence, variable blade twist technology allows for a more sophisticated control of the rotor's aerodynamic characteristics, enabling it to actively mitigate vibrations rather than relying solely on passive damping methods. A variable blade twist rotor can reduce vibrations on the V-22 Osprey by actively adjusting the blade's angle of attack along its span, optimizing lift distribution and minimizing blade loads. This reduces the intensity and frequency of vibrations caused by blade interactions with the airflow, leading to a smoother, more stable flight.	
7.	Tiltrotor tolerating VRS to achieve higher top speed	... the concept of tolerating VRS to achieve higher top speeds is not a valid or safe operating procedure for tiltrotors. Tiltrotors are designed to operate outside of the VRS regime to ensure safe and efficient flight.	

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