

Can LIDAR smooth out the bumps in air travel?

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Here's one for all the white-knuckle flyers out there. Perhaps, like me, you're the type who would stay seated and belted for an entire flight. Air turbulence can be an unsettling experience, but according to some professional pilots I've recently spoken to, is quite predictable given the weather information that's available, and the plane is not in any danger. When turbulence is imminent, everyone is asked to be seated, and the ride gets bumpy for a while. Less predictable is the phenomenon known as clear air turbulence (CAT). Without clouds to provide clues, pilots can't avoid these sudden "waves" in the air which can make the flying experience uncomfortable, scary and perhaps cause injury.

For those who have experienced clear air turbulence, there's some welcome news from Europe. Researchers at the DLR Institute of Atmospheric Physics are using LIDAR (Light Detection and Ranging) technology to analyze clear air turbulence, and data gathered from this project will provide information that will, hopefully, lead to a turbulence detection system that will give an airline pilot enough warning to ask passengers to return to their seats and better still, allow time to route the plane around the turbulent air.

According to the DLR, aircraft are equipped with a LIDAR instrument that "emits short-wave ultraviolet laser radiation along the direction of flight. The density of the air is determined from the backscatter value measured for the air molecules, oxygen, and nitrogen. Fluctuations in this density then provide information about the turbulence there." (http://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10081/151_read-7615/year-all/#gallery/11781) These fluctuations would ultimately be visible to a pilot to provide an advance warning of clear air turbulence.

A clear air turbulence detection system would be a great enhancement for commercial aviation. Sudden jostling of the cabin can cause injuries to passengers who aren't securely seated, and objects can fly loose and also cause injuries. Airlines have to absorb the lawsuits from these injuries and any damage that occurs as a result of clear air turbulence. Further, clear air turbulence can cause even frequent flyers to stop flying altogether and cost airlines revenue.

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Predicting and avoiding clear air turbulence would help airlines' bottom lines in a fierce economic environment while bolstering their already breathtaking safety record compared to other forms of transportation. Any system that can help pilots and passengers expect the unexpected will literally mean clear skies ahead for everyone.

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