

Lighter, Faster, Darker: Tuning Dimmable Windows

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Development of Gentex's Gen 3 product, which will be 10 times darker and twice as fast as its predecessor, is underway. Image: Gentex

APEX Insight: Gentex Corporation became an overnight success in the aviation industry when Boeing approached the supplier of dimming rearview car mirrors to provide its Dreamliner aircraft with button-controlled dimmable windows. The latest generation of the windows fixes any initial flaws, and development of a Gen 3 product is underway.

From the first aircraft delivery, the Dreamliner's cabins have featured button-controlled dimmable windows, with technology from Gentex Corporation and PPG Aerospace giving the Boeing model a much talked-about wow factor. However, some early customer comments suggested that the windows didn't darken enough and were slow – issues the company has addressed in the latest generation of the technology.

"Now, we deliver the Gen 2 device that's 10 times darker and faster than the original system," says Mike Behm, director of Sales for Gentex. "Once it's been fully darkened, then the amount of transmission that's coming through is less than 0.01 percent." The Gen 2 technology is available on all 787-9 aircraft.

For customers who want it even darker and faster, development is underway on a Gen 3 product, which will be another 10 times darker and twice as fast as its predecessor. According to Behm, Gen 3 will likely be quick enough: "The windows darken fast enough that your eyes have time to adjust to the new darkness level. If we made them faster, it might put a little strain on your eyes." The company plans for Gen 3 to be available in less than two years.

Gentex is an aviation sector overnight success story that's been in the making for more than 40 years. In 1974, the company began making smoke and fire detection equipment, and in 1987, it introduced the first electrochromatic auto-dimming rearview mirror for cars. With millions of mirrors produced and years of technological experience, Gentex was approached by Boeing for the Dreamliner.

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"We were really the only ones who could actually create a dimmable window that had a high enough dynamic range," David Driscoll, Gentex's aerospace program manager, explains. At higher altitudes, getting light transmission low enough in range for a dark state can be challenging, but even Gen 1 was ahead of the curve in that regard. "That was the primary reason we were picked."

Since then, Gentex has received interest from other aerospace juggernauts, including Bombardier. "We have a definite desire internally and interest externally to expand our products beyond the Dreamliner," Behm says.

Vision Systems opts for Suspended Particle Device technology for its electronically dimmable windows. The France-based company recently established a new division dedicated to smart-window technology and has expanded its aviation-first enterprise to include rail, marine and automotive markets. At Aircraft Interiors Expo in Hamburg this year, Vision Systems expanded its dimmable window application to cockpits.