

business

The wonder of winglets

Upturned wingtips that decrease drag are increasingly being used by airlines to economize on costly jet fuel.

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Before the jump in energy prices sent airlines to seek tax relief on Capitol Hill and helped push two more of them into bankruptcy court, they for months had relied on an array of old tricks to cut their use of fuel.

Some began taxiing on one engine, climbing more steeply, flying higher over turbulence and filling tanks with just what's needed so as not to weigh down the plane. But convinced the fuel squeeze wouldn't end soon, and with a collective thirst for about 19 billion gallons of it a year, many airlines have begun altering not just how their planes fly, but how they look.

An increasing number of carriers are following the lead of business jets and European carriers by adding "winglets," curvy flippers that extend about 8 feet skyward from the end of a wing to make them more aerodynamic. Of the many changes airplane operators and designers have made over the years, this may be one of the most fuel-efficient - and among the most conspicuous to the public now that they have been installed on hundreds of the latest jets.

Some passengers, more accustomed to the straight, bird-like sails that give planes their lift, think winglets make the wings look "bent in a way they aren't supposed to be," said Bryan Martin, Southwest Airlines' ramp manager at [Baltimore-Washington International Airport](#). "I think they look sporty."

A NASA engineer developed winglets during the fuel crises of the 1970s. Private firms began manufacturing them by the 1990s, but there wasn't much of a market with the price of jet fuel only 50 cents a gallon. Some private business jets began adding them, and later, the European airplane maker Airbus began installing them on its jets.

Available in 1999

Winglets became available on Boeing airplanes, favored by many U.S. carriers, in 1999, but didn't immediately attract much attention.

They were built by a small private company called Aviation Partners Inc., which teamed with American aviation giant Boeing Co. Their version was a "blended winglet," which they described as improving aerodynamics over its European counterparts by curving up and out about 5 feet from the wings, instead of jutting straight up from the wing's tip.

When jet fuel prices began climbing a couple of years ago, Southwest Airlines and Continental Airlines decided the cost of up to \$750,000 a set plus installation was worth it. With fuel hitting \$2.50 in some areas, more than double the \$1.03 at the beginning of 2004, use of winglets has become more common.

Southwest finished retrofitting its fleet of 169 Boeing 737s in March and has 373 more of the planes on order. Its Boeing 737-700s each use about 2.7 million gallons of fuel a year, the Texas discount airline said. Whitney Eichinger, a spokeswoman, said Southwest has so far saved about 3 percent in fuel costs since the change.

AirTran Airways, one of the latest to order winglets for 15 of its Boeing 737s, said it expects to save about 90,000 gallons of fuel per plane per year - enough for it to recoup its investment in three to five years.

"We absolutely did this because of fuel costs," said Judy Graham-Weaver, an AirTran spokeswoman. "It's amazing the cost savings. I wish they made winglets for my car."

Aviation Partners Boeing said the company has outfitted more than 700 planes for four dozen commercial airlines, mostly retrofits. Hundreds more are ordered directly from the Boeing assembly line on 737-700s and 737-800s, the latest versions of its popular model. About 70 percent of Boeing 737s coming off the assembly line have winglets on them, said Mike Marino, chief executive of Aviation Partners Boeing.

The Federal Aviation Administration has not approved their use for every model of commercial plane. Also, carriers aren't likely to retrofit older ones or short-haul planes that won't see much fuel savings. And some financially strapped airlines don't have the money to buy the parts. Some carriers have installed the winglets themselves to save money and time.

Betting on change

It's not uncommon for airlines to look for their own operations or airplane designs to improve efficiency during periods of higher fuel costs, said George Larson, editor of the Smithsonian Institution's Air & Space Magazine. Often, however, prices drop quickly and the more costly and permanent fixes are dropped even before they're begun in earnest, he said. This time, Larson said, airlines are betting that fuel costs will remain high and are willing to pay for "such an expensive hardware change."

Even predating their invention a century ago, airplanes and their wings have undergone countless design changes to make them more efficient. Wings have been made longer and thinner for speed and efficiency, their upward curve has been modified for more lift and they've been constructed with composite materials that don't corrode and break as metals do. Some military planes are now being constructed with perforations in their wings to reduce air friction.

"Winglets are probably not a huge life-altering thing like the invention of the jet engine," Larson said. "Winglets are the kind of thing to do at a time like this."