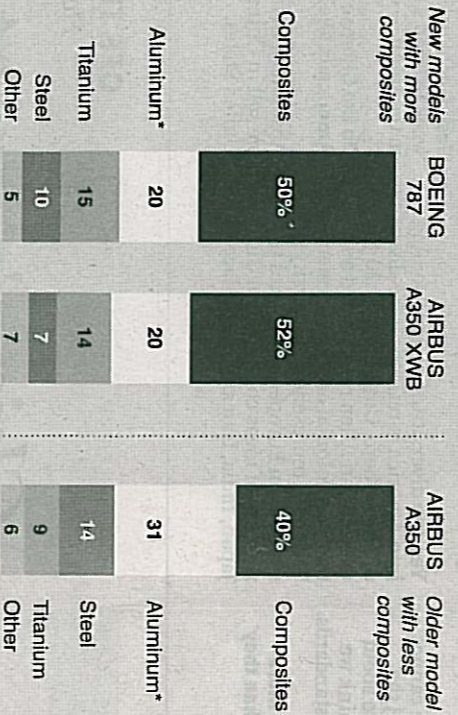


# The future, in a word? Plastics

## Lighter, stiffer, stronger

Both Boeing and Airbus are using more composite materials in their new models, taking advantage of the qualities of composites like light weight, strength and resistance to corrosion.



By Nicola Clark

**PARIS** In the 1999 air traffic-control comedy "Pushing Tin," John Cusack and Billy Bob Thornton portray rival colleagues who spend their workday guiding planes in and out of New York's airports.

If Hollywood were to contemplate a sequel, though, they might have to call it "Pushing Plastic." Facing mounting public pressure to become more fuel efficient and reduce greenhouse gas emissions, the airlines are seeking to replace older jets in their fleets with lighter-weight, less-polluting planes. Increasingly, that means jets that replace traditional aluminum components with plastic-based composites that can significantly reduce the weight of an aircraft.

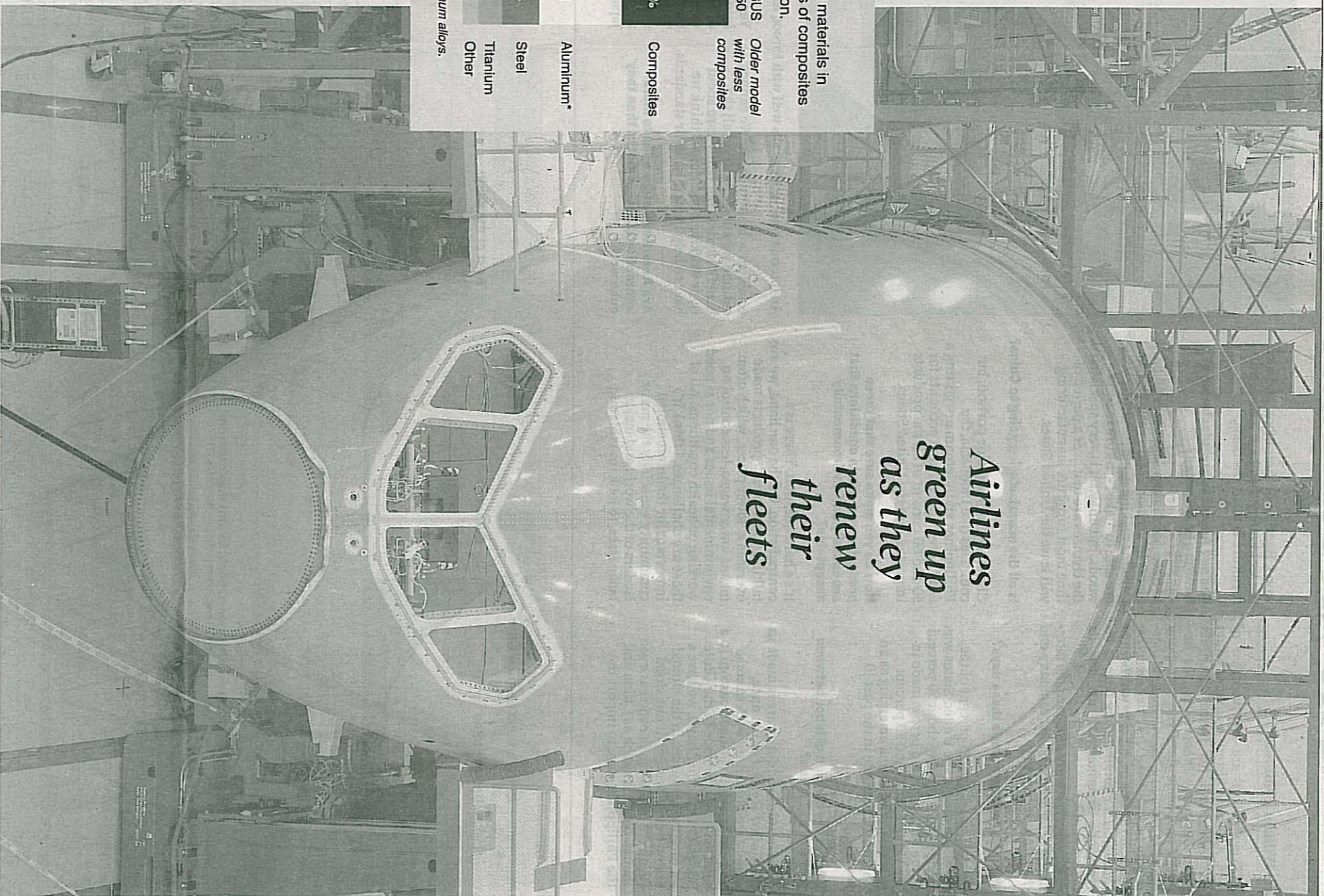
Aircraft makers, eager for orders, are responding with new designs that make more and more use of these composite materials — much as automakers, sporting goods manufacturers and others have profited handsomely from the revolutionary properties of plastics.

Louis Gallois, the chief executive of Airbus, pledged Thursday to increase spending by 25 percent to improve aircraft designs and technologies so that by 2020, its aircraft will burn less fuel and emit 50 percent less carbon dioxide.

Boeing, too, is investing heavily in developing green technologies, working together with airlines and makers of jet engines to improve fuel efficiency and slash greenhouse gas emissions.

Much of this investment will be devoted to finding uses for new, lighter materials to increase the fuel efficiency of the planes. Both Boeing and Airbus are planning to use composites in at least half the structural components of their latest wide-body jets, the 787 Dreamliner and the A350-XWB.

A composite, broadly defined, is a combination of two or more industrial materials designed to exhibit the best properties of each plus additional qualities



Airlines  
green up  
as they  
renew  
their  
fleets

Ed Turner/The Boeing Company

that the individual materials do not possess alone.

In the aerospace industry, composites are made of nonmetallic fibers — carbon, fiberglass or aramid — embedded in a resin of plastic or epoxy that is molded and then cured in autoclaves at very high temperatures. A material like carbon fiber, for example, is stronger and stiffer than aluminum, titanium or even steel, but its relative weight per volume is half that of aluminum and one-fifth the weight of steel.

For airlines, the recent advances in composite technology could not come at a better time. "Our carbon footprint is growing, and that is not politically acceptable," Giovanni Bisignani, chief executive officer of the International Air Transport Association, said this month at a meeting of executives representing 260 of the world's airlines. "Climate change will limit our future unless we change our approach."

While the airline industry says it accounts for just 2 percent of global carbon dioxide emissions, steady economic growth and increasing demand for air

travel are expected to raise aviation's contribution to 3 percent of worldwide CO2 emissions by 2050.

Rising oil prices, meanwhile, are cutting into airline profits, pushing carriers to demand better performance and longer range from the new planes they buy. According to IATA, aircraft fuel efficiency has increased by an average of 2.5 percent a year since 2003, saving the industry about \$2 billion a year. But the industry expects its fuel bill to rise to \$119 billion this year, up \$8 billion from 2006, representing 26 percent of operating costs.

"The biggest thing about composites is that it gets fuel costs down," said Howard Wheeldon, an aviation industry strategist at BGC Partners in London.

Boeing's 787, which is to enter commercial service next year, is being built using an all-composite fuselage and wing. Boeing says the plane, which can seat 210 to 330 passengers, will burn about 20 per-

cent less fuel than Boeing's 737, above, is being built using an all-composite fuselage and wing. Airlines are seeking to replace older jets with lighter-weight, less-polluting planes. Increasingly, that means planes that make greater use of plastics and their derivatives.

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