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TRANSPORTATION

WRIGHTING AN OLD WRONG:

A wing design overlooked by the Wright brothers makes a comeback

By Kathleen McAuliffe

Despite the ease with which modern aircraft soar through the air, flying remains, at times, unsettling and even dangerous. Thermal currents rising off the ground buffet small planes even on sunny, calm days, and on gusty days, turbulence can send stomachs rolling like tumbleweeds. Stalls and spins have proven to be even more lethal hazards: According to the Federal Aviation Administration, they contribute to the majority of aircraft fatalities in private aviation and to one quarter of all aviation-related disasters.

Are these hazards the price we must pay for defying gravity? Not in the opinion of Octave Chanute, widely credited as the father of aviation. Before their epic flight at Kitty Hawk, he tried to convince the Wright brothers to test a new type of plane that he believed would be far more controllable in the air than their own design. Chanute had attached his aircraft's wings to the fuselage with hinges so that they would yield to the forces of turbulent air without transmitting those loads to the main structure. In theory, the movable or "rocking" wing should have been safer and smoother in flight than the Wrights' fixed wing, which resisted the wind.

Alas, the Wrights, occupied with their historic effort, never got around to testing the rocking wing's performance in the air, eventually abandoning the structure to the elements at Kitty Hawk. Later, George A. Spratt, who closely collaborated with Chanute, revived the idea. His son, George G. Spratt, improved the design even further, introducing a model called a controlwing in the Thirties. But by then, the fixed wing dominated aviation. "Few people were interested in anything new," laments George G., now 88.

What if, at the dawn of aviation, Chanute had prevailed? At that critical fork in the road 90 years ago, would aviation have taken a different path? History, of course, can never be replayed. But a modern plane, called a free-wing, that picks up where Chanute and his protégés left off will no doubt make aviation buffs ponder that question.

To the eye, the free-wing looks like an ordinary aircraft. But touch the wing and you're in for a shock. Actually a single wing mounted on the top of the fuselage, it tilts forward and backward so that its long forward edge can be either higher or lower than its back edge. Hinges, rather than bolts, attach the wing to the fuselage, offering numerous advantages over conventional aircraft, according to Hugh Schmittle, who is marketing the prototype as president of Free-wing Aircraft in College Park, Maryland. In a test sponsored by NASA, the free-wing reduced turbulence by 75 percent because the hinge mechanism enables the wing to instantly adapt to changing air conditions, keeping the rest of the aircraft relatively stable. As a result, the pilot and passengers barely feel sudden gusts of wind. Indeed, the NASA-backed study indicates that the free-wing would have to encounter turbulent shifts of more than 13 feet per second—a freak occurrence outside of hurricanes and thunderstorms—before passengers experience any discomfort. "The free-wing virtually eliminates air sickness," Schmittle says.

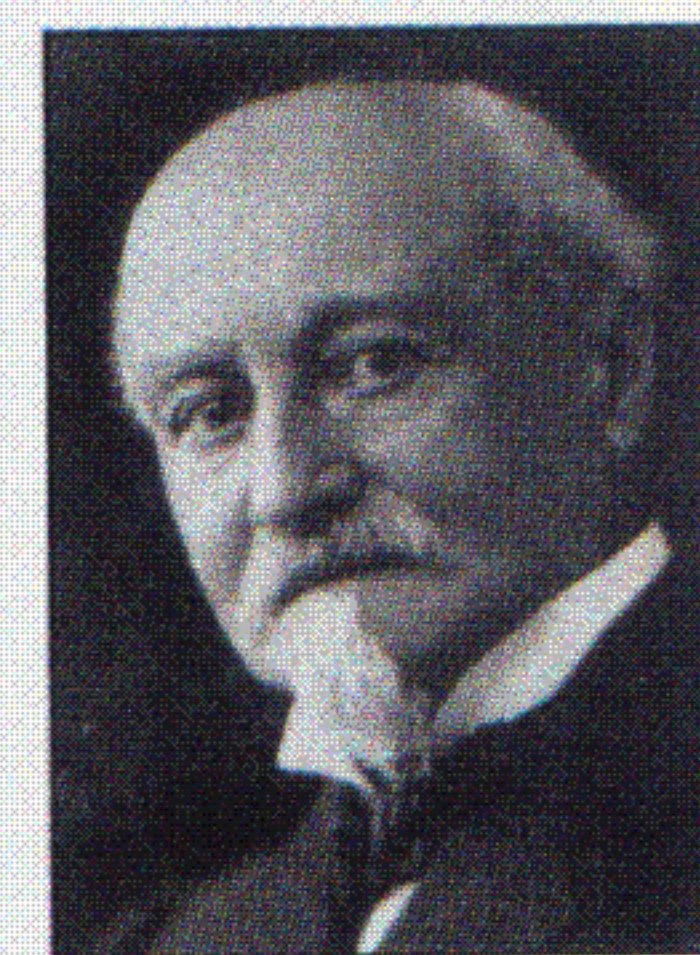
A smoother flight also translates into less wear and tear on the fuselage, reducing the likelihood of structural failures. And since the wing automatically adjusts its angle to the wind without pilot intervention, the chances of the aircraft stalling or spinning de-

crease dramatically.

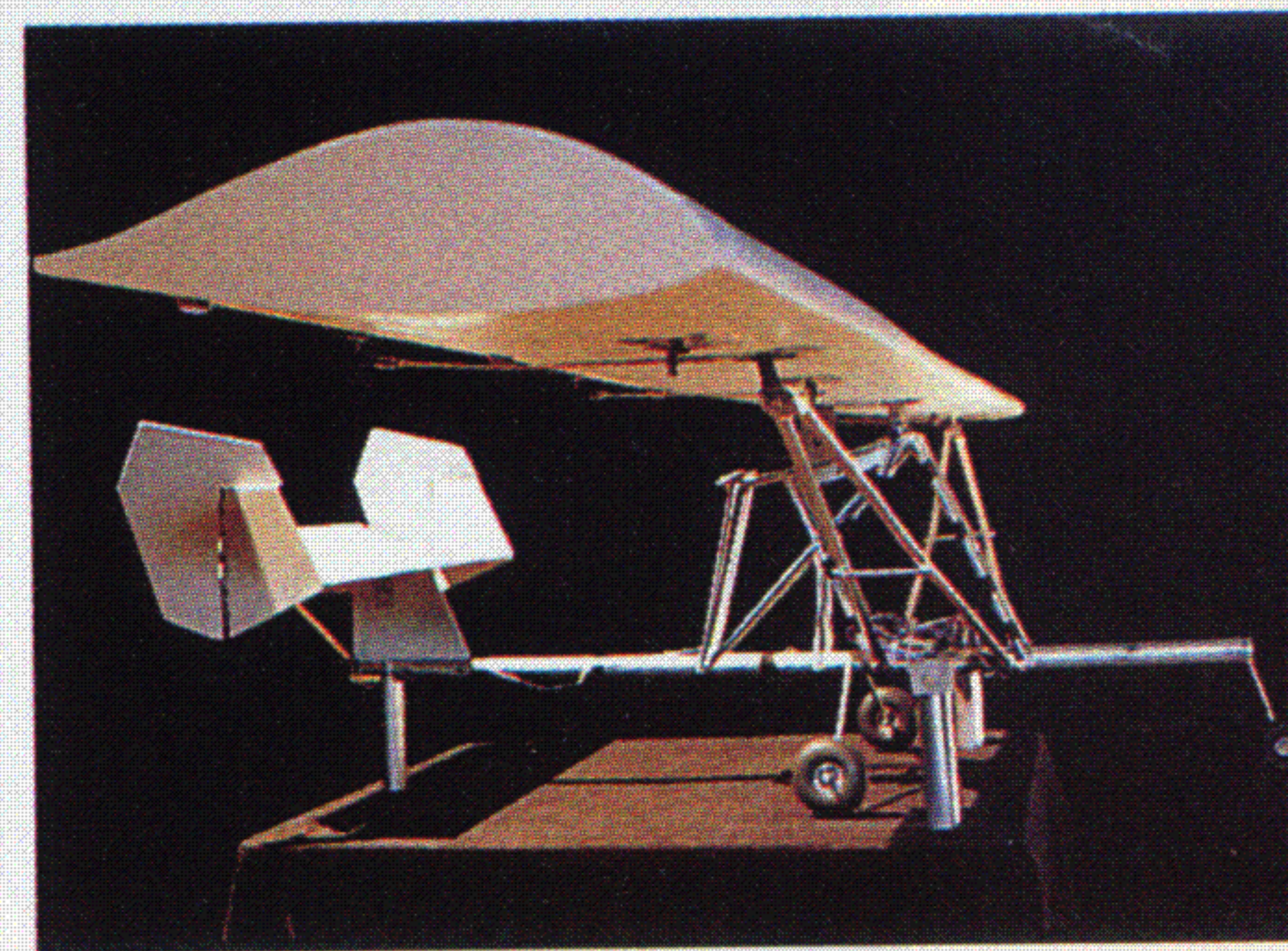
"All in all, the free-wing should be able to fly comfortably under more turbulent conditions than is currently possible for small planes," according to Bruce Holmes, assistant director for aeronautics at NASA's Langley Research Center, located in Hampton, Virginia.

All these advantages could add up to big sales. Aeronautical engineer Jewel Barlow, director of Maryland's Glenn L. Martin Wind Tunnel, believes the free-wing could revolutionize ultralight aircraft within a few years. "The comfort factor," Barlow says, "would make the free-wing an extremely attractive contender in this category."

The military has also expressed interest in using the free-wing as a remote-controlled vehicle to carry cameras and other sensors. Further in the future, the plane's advantage in heavy turbulence should make it ideal for border patrol, disaster relief, and other missions that can't always be scheduled according to the weather. Within a decade or so, the free-wing may even compete in the multibillion dollar market for commuter planes, which fly at low altitudes where they encounter frequent turbulence. "The big unanswered question is how well the free-wing will perform when scaled up from a two-passenger plane to a 30-seat commuter-size aircraft," Holmes says. If the free-wing lives up to its promise, it could be a household name by 2003, assuring its place in aviation history just in time for the hundredth anniversary of powered flight. ☐



The Wright Brothers ignored aviation pioneer Octave Chanute's idea for a plane with a



movable wing, but a Maryland company bets its update of the concept will fly.