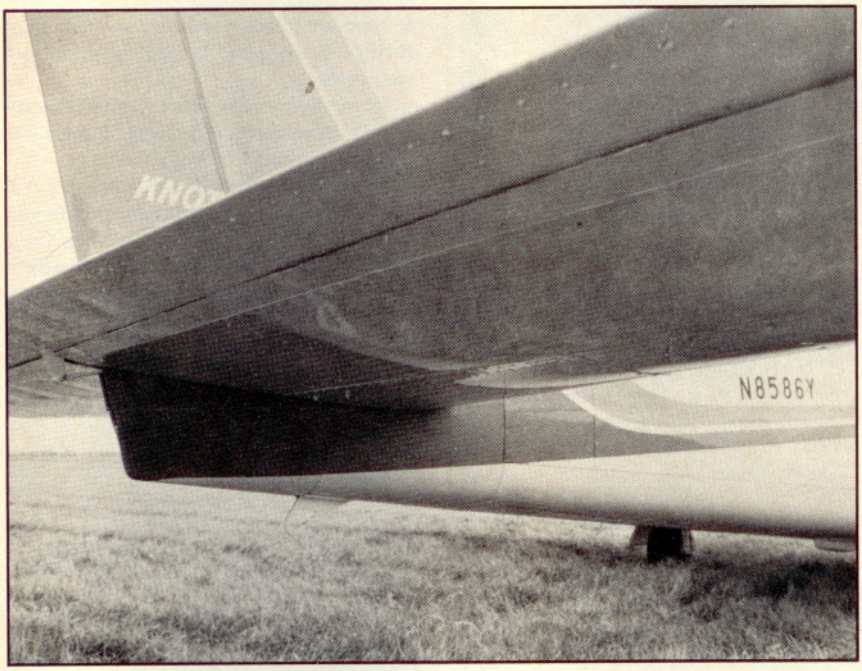
NEW PRODUCTS

Tweaking the Comanches



Significant performance improvements result from installation of Teflon-coated and heat treated aluminum strips over the airflow-disrupting gaps beneath the Comanche's stabilator and wings.

An airplane can leave lasting impressions with a pilot. After enjoying a brief turn at the controls of a friend's Comanche 180 and reading reports on various members of the Comanche tribe, I was left with the impression that Comanches are fast but slippery devils that are rather tricky to land smoothly.

When an obscure company called Knots 2 U, Incorporated, announced a relatively low-cost aerodynamic modification to the Comanche that provides "greater speed" and "softer landings," my curiosity was aroused. When James H. Bradshaw, president of the company, offered to let me test fly a Comanche both before and after the modification was performed on the aircraft, I said, "You're on."

I met Bradshaw, AOPA 357303, at Rock County Airport in Janesville, Wisconsin, where the modification is performed for Knots 2 U by General Aviation Corporation, a fixed-base operator. Our evaluation aircraft was a 1961 Comanche 250, owned by Russell Hammer, AOPA 110314, president of the Radio Ranch in Polo, Illinois.

The modification consists of wing-root fairings and gap seals beneath the leading edges of the flaps, ailerons and stabilator. The gap seals are made of heat-treated, Teflon-coated aluminum and are about 2.5 inches wide. The seals are attached to the airplane with buck rivets sunk into original skin rivet holes. Then they are painted to match the airplane's color scheme.

Knots 2 U has obtained two supplemental type certificates for the modification: SA-516-GL for the Twin Comanche and SA-526-GL for the single-engine Comanches. As of this writing, 60 Comanches had received the $1,395 modification.

As my experience was limited to a quick (and I do mean *quick*) ride in a Comanche 180, I expected my flight in Hammer's 250 to be especially exciting. It was. Beneath rows of nearly illegible numbers in my notebook, there appears a visceral observation: "This airplane climbs like a bat and cruises like a guided missile."

However, the notebook also contains other observations that are not so enthusiastic about the Comanche. As associate editor Tom Horne reported previously ("The Comanche Singles," May 1980 *Pilot*, p. 83, and "Twin Comanche: Run Fast, Run Lean," September 1980 *Pilot*, p. 68), the Comanche's wing was designed for speed, not for maneuvering at low airspeeds. The double-tapered, laminar-flow wing and the stubby gear make the airplane especially prone to float in ground effect.

On takeoff, the Comanche seems to want to fly long before it really is ready to fly. The common practices are to hold the airplane on the runway, which can lead to some nervous skittering and wheel-

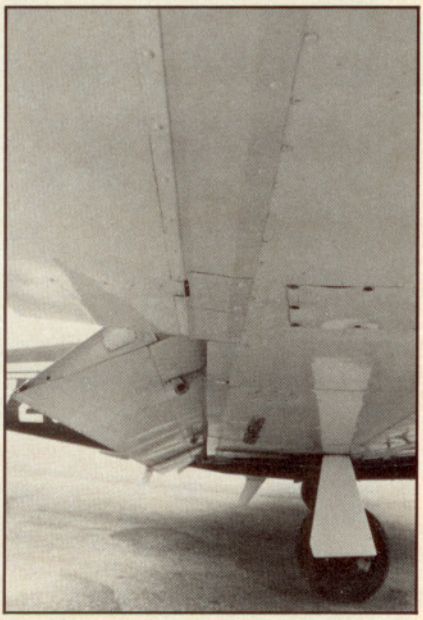
PHOTOGRAPHY BY MARK M. LACAGNINA

barrowing in gusty wind conditions, or to fly it in ground effect until it accelerates to proper flying speed.

The Comanche also tends to float during the landing flare, then drop with a disconcerting *kerplunk* when the wing sheds all of its lift, all at once. The stabilator seems to have limited authority during the flare. A common practice is to raise the flaps during the flare to pin the airplane onto the runway.

All in all, my experience in the unmodified 250 reinforced my initial impressions of the Comanche: fast but tricky.

I returned to Rock County Airport two days later (the modification requires two to three days of downtime) to put Knots 2 U's claims of greater speed and softer landings



The Knots 2 U gap seals and wing-root fairings are attached with buck rivets and then painted to match the Comanche's external color scheme.

to the test. The 250's fairings and gap seals were in place, and the workmanship appeared to be of very good quality.

Weather conditions and aircraft loading were nearly identical during my flights in the Comanche before and after the modification. Unfortunately, low ceilings on both days foiled my plans to sample the airplane's stall characteristics.

On the first takeoff in the modified airplane, I cautiously complied with Bradshaw's suggestion to rotate the airplane at 52 knots, which is *below* the white arc on the airspeed indicator. To my surprise, the Comanche flew off the runway with nary a burble and proceeded to climb—yes, like a bat. At best-rate-of-climb speed, 83 knots, the airplane ascended at 1,500 fpm, which was about 400 fpm quicker than it had climbed before it was modified.

The Comanche also had picked up about eight more knots of cruise speed. At 75-percent power and at a density altitude of 1,500 feet, true airspeed fluctuated between 155 knots and 157 knots. Previously, the airplane had cruised between 147 and 150 knots at the same altitude.

Landings *were* much softer in the modified airplane. I found that I could make consistently smooth landings using a variety of approach speeds and flap settings. The modified Comanche still tended to float, but not as much as before. And it was quite gratifying to have the main wheels touch down first and the nosewheel follow, gently. There was no more of that skedaddle, *kerplunk* business.

The Knots 2 U modification allows the Comanche to fly faster than before on the same power settings. This translates to savings in fuel and, hence, in money. For an owner who flies his Comanche regularly, the modification could pay for itself within a few years. The boost in pilot confidence and passenger comfort that results from smoother landings is a bonus.

Bradshaw plans to apply the modification to other airplanes. He said that during initial test flights of a Cherokee 140 equipped with fairings and gap seals, cruise speeds increased by eight knots.

He also has submitted for the FAA's approval an expanded modification for the Twin Comanche. Bradshaw used his own airplane as a test-bed for this modification. In addition to the wing-root fairings and gap seals on the flaps, ailerons and stabilator, Bradshaw's Twin Comanche has gap seals on its rudder, and it has a dorsal fin that doubles as a housing for communications antennas. It also has an STCed, fiberglass nosecone that houses a weather radar system. This product currently is available from Knots 2 U for $1,400.

Bradshaw let me fly his airplane to preview the expanded modification. With only two pilots and 135 pounds of fuel aboard, the Twin Comanche was well below its certificated gross weight. At 75-percent power and at a density altitude of 5,500 feet, it cruised at 184 knots true.

The published Vmc (minimum control speed with the critical engine inoperative) for the Twin Comanche is 78 knots. However, during a Vmc demonstration with the left propeller windmilling, I did not start to lose directional control of Bradshaw's airplane until the airspeed had decayed to about 65 knots indicated.

At Bradshaw's suggestion, I established an airspeed of 85 knots (six knots below the best single-engine rate of climb speed) with the left propeller feathered, and I was startled to find that we were *climbing* at about 300 fpm.

Bradshaw saw the expression on my face and chuckled. "We are only doing the little things that should have been done when the airplanes were built," he said.

More information on the modifications can be obtained by contacting James Bradshaw at Knots 2 U, Incorporated, 1941 Highland Avenue, Wilmette, Illinois 60091. Telephone: 312/256-4807. —*MML*