

What's the Story With That Prop?

Jim Nelson's 250 Comanche

BY BUDD DAVISSON



BONNIE KRATZ

If you stood at the end of Row 91 on the EAA Air-Venture Oshkosh grounds, where Jim Nelson had his Comanche parked, you could absolutely count on people's reactions to it. They'd be walking along and casually glance over at Jim's airplane. Maybe they'd smile slightly at its pleasing appearance. They'd be in the process of continuing to the next airplane, when they'd catch a glimpse of the Comanche's prop, do a double-take worthy of a vaudeville comedian, grab the sleeve of the guy next to them, and make a beeline for

the prop card, hoping it would explain what they were seeing. They'd be staring at the unique "flaps" hanging off the back of each of the blades, with a thought balloon over their head that said, "What the . . . ?"

It's a shame that the unusual prop, which we'll explain later, overshadows many of the more subtle details on what is a very subtle airplane. The airplane, a '62 Comanche 250, is also unique in that it has never been restored. At least not in the conventional sense of the word. It hasn't spent years in a hangar, having every single piece of skin and mechanism mas-

saged, straightened, caressed, and painted within an inch of its life. In fact, it is one of those airplanes that midway in its life, its new owner, Jim Nelson, most recently of Spearfish, South Dakota, started on such a long string of continual upgrades that the airplane never reached the point that it actually needed restoring. It has been "in progress" for so long, more than 20 years, that although the years went past, they never caught up with it. Even though it is 47 years old, it never spent a single day abandoned on the back tie-down line being ignored. It is just a good old airplane that was kept flying.



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Jim is retired from several careers, the first being a U.S. Air Force navigator who, among other things, spent much of the Cold War in an RB-47 snuggled up against the borders of countries such as China and Russia.

He said, "I went in the Air Force in '51 and stayed in for over 31 years, almost a third of it as aircrew, first on B-29s in Korea, then KC-97s, RB-47s and finally, AC-47 gunships and C-47, flareships in Vietnam. I was fortunate enough to be involved in the 'engine wars,' where there was a major amount of engine development going on in qualifying the engines that would be powering the F-15, F-16, B-1, and B-2 bombers, to name just a few. What made it really fun was that, as deputy for propulsion, my systems program office (SPO) managed those engine programs for aircraft programs. Plus it was during the Reagan years, when there was plenty of defense budget to go around. When I got out in '84 I almost immediately went to work for General Electric in their aircraft engines group. I also spent some years on the board of Allison Advanced Development Co., as well as doing some consulting work for the USAF on jet engine development and management.

"I started pilot training in the Forbes AFB aero club, gaining my license in 1959. I flew in aero clubs at several other bases, gaining time in a variety of single-engine aircraft. I'd spend eight hours in an RB-47 training for overseas deploy-

ments, then transition the next day into a Cub or an Aeronca. They also had Cessnas, Mooneys, Bonanzas, T-34s, and the Comanches.

"Forbes is where I first flew in, and fell in love with, the Comanche. I'd fly my family all over the place in them and especially liked that it was a fast, efficient hauler that was also pretty hard to load out of CG limits.

"I bought my first airplane a little over 21 years ago, and it was this very same Comanche, serial number 24-3158, built in the last half of 1962. It was sitting in Cincinnati, and it was definitely nothing special. It was just a good, old, very sound airplane, with 1,100 hours on the engine. I bought it knowing that my goal was to update it where needed and make it very much 'my' airplane.

"Much of what I was doing professionally at the time was engineering oriented, and I was constantly solving problems and trying to be more efficient with our propulsion projects. But those were huge projects, and even though I was in management, they weren't 'mine.' The Comanche was going to be mine, pure and simple. I had a whole series of things I wanted to do to it, but I was in no hurry (neither was our budget!). They would get done, when their time came, although in truth, by the time I got to some of the updates, it was time to redo some of the earlier ones. For instance, even though I've owned the airplane over 21 years and



CRAIG VANDERKOLK

Jim Nelson and his wife Ruth.

have been updating it constantly the whole time, I've done the instrument panel three times, as I changed direction or new equipment was introduced.

"The airplane was based at Lunken Airport in Cincinnati, where I was working at GE. At the time, 1987, Dennis Walter, now at Clermont County Airport, Sporty's home base, had his shop at Lunken and installed a new interior for me. At the same time we shaped the seats for more comfort. I did a little panel work at that time, but only to get rid of the old autopilot and add a new DG.

"The airplane was never down for any long period of time, but we were constantly doing something to it, so it's a little hard to put all of the modifications in order.



CRAIG VANDERKOLK PHOTOS



The late Roy LoPresti spent a lot of time engineering revisions to the Comanche to make it even faster. The changes include a new cowling with full-length nose wheel door and door motor, flap track fairings, flap gap seals, horizontal stabilator mass balance, and counterweights. The modification to the Hartzell propeller with the very noticeable trailing edge extensions, or flaps, is also a LoPresti design, manufactured by Hartzell.

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“Shortly after the interior was installed, copper wiring replaced the aluminum wiring of that era’s Comanches, followed by a full panel of King radios and Johnstone wingtips. Those were specially shaped to flare upwards just enough to let the wingtip vortices spill around the wing in such a way that it improved the tip vortex action and, especially, aileron sensitivity. The tips also had the running lights faired into them. That was the first of many little changes we made with the goal of reducing drag and improving performance.

“Drag reduction was why we changed the gear legs from the double-fork units to the single-fork ones. On the double-fork legs, the



Many pilots see the Piper Comanche as one of the sleekest four-place airplanes ever built in its original form. The design has lent itself well to modifications that enhance the already good performance of the low-wing four-place speedster.



CRAIG VANDERKOLK PHOTOS



The new medium/light blue interior with sculpted seats keeps a vintage '60s feel to the airplane, while a neatly installed suite of modern avionics keeps the airplane up to date in modern airspace.

brake assemblies and part of the fork hang out into the airflow. The 337 for the installation requires some wing rib doublers for the single-fork installation and results in the brake assemblies and fork being completely retracted into the wheel wells, with a much cleaner lower-wing surface resulting. I also took the airplane to Webco in Newton, Kansas, for installation of half-inch glass all around during this period."

Even though he spent a lot of time working on the airplane, it flew more than it sat, and he and his wife and family thought nothing of crossing the country in it.

"It was on one of those trips, when the engine was just about

at TBO, 2,000 hours, when we decided it was time we overhaul it. Living in Prescott, Arizona, at the time and operating often at 11,000-15,000 feet in the Arizona, Colorado, Utah, New Mexico areas, it was taking higher power settings to maintain speed and altitude. We figured since we were going to have to do the engine, we might as well do several other needed improvements, which we had planned to eventually do to the airplane and make it as efficient as possible."

When talking about "efficiency" of an airplane, that is another way of saying it'll be made to go faster without adding any more horsepower so the miles per gallon go up.

More speed, same fuel burn. And with a Piper Comanche that meant the obvious: LoPresti speed mods.

"While completing the engine overhaul at Arizona Air-Craftsman in 1998 and knowing my two-bladed prop was not going to pass the new AD for that series, we installed the LoPresti-designed, Hartzell-built, three-bladed, swept propeller (scimitar shape) and Comanche 260 engine counterweights to allow operation to 2700 rpm versus the Comanche 250 operating limits of 2550 rpm. The prop also has trailing edge 'flaps' to provide some additional ram air into the LoPresti cowl, which had yet to be installed.

"In the spring of 1999, I took the airplane from Prescott to Vero Beach, where Roy LoPresti had his speed mod operation and had him do his cowl modification program on the airplane. That included his cowling with full-length nose wheel door and door motor, flap track fairings, flap gap seals, horizontal stabilator mass balance, and counterweights.

"Everyone comments on the shape of the prop blades," Jim said. "They are scimitar shaped to cut down the local Mach number in the airflow at the tips so they are further from going transonic, which makes them more efficient and quieter. The little trailing edge flaps were developed by LoPresti, and his tests show that besides increasing the manifold pressure by nearly an inch because of the airflow pulses into the induction system, the cowl design evens out the airflow across the cylinders. This provides better cooling and consistent cylinder head temperatures. When we're flying, it warms up quickly, curing the takeoff and climb to just below redline [problem], then, no matter what we're doing—cruising, maneuvering, holding, letting down, whatever—the CHT temperatures stay relatively stable."

"This is the entire LoPresti package, and it works. This airplane originally only did 176 mph against the factory-claimed 180 mph at cruise power, which many Comanches did achieve. I caution anyone



that they need to carefully calibrate what their airplane will do in its original form before doing any modifications. I had calibrated the true airspeed annually over the 12 years I had owned it before modification. I have similarly calibrated the true airspeed many times since modification and am confident in the 10-14 mph increase in TAS for my airplane. I have seen, on the occasion of a very calm fall or winter day, with close to standard atmosphere, TAS of 190-plus at 8,000 feet. However, I am typically in the range of 185-190. Recently, for example, I cruised consistently at 188 mph at normal power settings at 7,000-9,000 from Spearfish, South Dakota, to Kansas City, then to Atlanta and return. We went after this as an engineering project and carefully calibrated everything, so we know that the 185-188 mph we're now seeing at cruise is real, as is the flat-out top end of 193-195 mph. So we actually did improve the performance a significant amount with no change in fuel burn per hour."

Since he was doing major things to the airframe, it seemed like a good time to do the panel again.

"The instrument panel was done in bits and pieces going all the way back to the beginning, but the trend was to make it more modern, which, considering that I was brought up on steam gauges, meant working in more glass and an S-TEC 30 autopilot, which required installation of a gyro-stabilized fluxgate heading system, with the autopilot itself done in two stages. We went through a King 135, then a Garmin 300 and a Sandel EFIS. I also replaced the King 155 radio

with an SL30. I have just added a Garmin 496, yoke-mounted, that is tied into the Garmin 300 and replicates the 300 output to the Sandel, but also provides weather and terrain information. This combination now comes close to the capabilities of a Garmin 430.

"When you start playing with avionics, you never actually finish. We did put the Sandel EFIS right in the middle of the instrument 'T' where it's in the center of your scan. But, who knows? I may yet change that again.

"I have also installed an electric horizon as a backup to the vacuum horizon. In the many panel modifications, we also moved the engine instruments to the pilot's side and put the mechanical CDI/glide slope on the right side, because the Sandel provides an electronic CDI/glide slope.

After the stint at LoPresti's, the airframe was definitely beginning to acquire a "work in progress" look as the various panels, including the cowling, were still in primer. Plus, other than the speed mods, nothing had been done to the airplane to improve its cosmetics. It was time for a paint job to replace the 1982 Imron.

"We took the airplane down to Arizona Aeropainting in Eloy, Arizona, in 2000 to have it stripped and painted. After stripping we found some prior repairs under the old paint that we didn't think had been done very well. So, I took the unpainted airplane to Chandler Aviation, in Chandler, Arizona, where we installed some new wing skins and several new wing ribs to provide a virgin surface for the new fasteners. We also replaced some skin on the horizontal stabilator to

assure all structure was sound before painting.

"We also replaced the 'coffee can' air scoop on the top of the fuselage with a Comanche 260 ventral fin and air scoop and removed the rotating beacon on top of the fuselage replacing it with a Whelen three-light system. Finally, we added Knots 2U wing-root fairings and a small nose wheel. We then returned the aircraft to Eloy to finish the painting. The airframe itself was pretty clean, no corrosion, so by replacing the questionable skins, and doing an excellent strip and paint job, we wound up with a really clean airframe.

"We primed it and top-coated with Matterhorn White Jet Glo trimmed with Fighter Blue and Flight Red Acry Glo paints. That was nine years ago, and the paint has held up beautifully, without cracking, chipping, rough spots, etc."

As he stood back and looked at his airplane Jim came to an inescapable conclusion, "From both a performance and an appearance point of view, there's really not much else we can do to it. And when I look at the instrument panel, I can't help but smile: This airplane has avionics capability (GPS, moving map, etc.) that was unknown to us when flying the polar areas in RB-47s to get to the positions needed to gain the electronic reconnaissance data needed to program equipment in our B-47 and B-52 bombers during the Cold War. In fact, in looking back, I'd have to say that we were working with some pretty crude equipment, although it was the most advanced available at that time. Even though we had radar, electro-mechanical navigation computers, and such, we still did a lot of celestial navigation over the polar areas.

"I'd also have to say that I'm really pleased with the way the Comanche has turned out. It's everything I'd hoped it would be. However, I saw the new-generation Garmin at a booth a few minutes ago and...."

After more than 21 years, why should he stop updating now? 🐣