



It's all ready for you

BY THOMAS B. HAINES

OVER THE GRAND CANYON-Soaking up the scenery from 11,500 feet msl, I find it tough to focus on the task at hand-determining if N172B, our Better Than New 172 project airplane, really meets the goals we outlined at the beginning of the endeavor. The landscape with its watercolor-hued canyon walls, soaring plateaus, and cobalt sky crowds out thoughts of power settings, fuel burns, and climb rates. Unrestricted visibility,

smooth air all around, and a few towering white cumulus clouds add to the vista's drama. Even the engine noise and vibration seem to get lost in the great expanse. For a few moments, we're just there. Deadlines and distractions don't exist. There is no purpose other than to assimilate the view. Soon, though, optical overload sets in and the ears are assaulted by the radio chatter from the sightseeing de Havilland Twin Otters flying below us. Piloting the airplane becomes primary once again. Thank goodness for autopilots.

Indeed, the S-Tec 50 gets a workout on this 2,000 nautical-mile trip from Palm Springs, California, back home to Frederick, Maryland. With the GPS slaved to the HSI and "Nav" selected on the autopilot, flying becomes about as effortless as operating a rocking chair.

Beside me on the near coast-tocoast sojourn home from AOPA Expo '94 is Roger Grinnell, my brother-inlaw and an enthusiastic passenger and navigator. This is his first general aviation cross-country excursion. The weather deities must want him to have a good time—we make the entire trip without ever seeing any clouds except those over the canyon.

We're on an expedition, actually. A mission to shake the squawks out of the 1978 Cessna 172N after its extensive upgrades. The AOPA member who wins the airplane in mid-January will appreciate us taking care of the dozen glitches—all minor—before delivering it. Further, the trip is a chance to evaluate how well we did in our plan to increase the Skyhawk's safety, performance, and comfort. I think we did well.

As it turns out, many of the improvements cut across more than one goal. The engine upgrade from the stock 160-horsepower Lycoming O-320 engine to a 180-hp O-360 obviously improves cruise performance, but it also boosts safety by decreasing takeoff distances and elevating climb rates. Likewise, the Horton STOL kit improves slow-speed handling characteristics and allows takeoffs and landings at lower speeds—a safety en-hancement. On the performance side, Horton flap and aileron gap seals boost cruise speeds slightly.

The RMD wingtips with built-in recognition/landing lights make the airplane easier to see in flight, especially if the Pulse mode is selected. But the vastly improved illumination also increases the pilot's nighttime comfort factor.

As part of the upgrades, we increased the thickness of the windshield by one-eighth inch, offering better bird strike protection. That along with thicker door windows provides for a much quieter cabin, improving comfort. The new windows, combined with extra insulation on the firewall and the forward cockpit, really do make for a







A comparison of before and after images provides the most drama and shows how far N172B, née N373QN, has come in the last year. The new center stack occupies less space than the old, yet offers nav/com redundancy and satellite navigation and approach capability.



quieter airplane inside. I was skeptical that either would make much difference, but now, sans headsets, the front seaters can communicate without resorting to hand signals—a marked improvement over the stock airplane.

Fortunately, we did not have the need to try out many of the safety improvements, subtle as some may be. A lack of clouds meant we needn't worry about using the backup vacuum system or the WX-900 Stormscope. Four-point inertia-reel shoulder harnesses on the front seats improve safety in the event of a crash, but also allow more freedom of movement in flight. The stock airplane had no aft shoulder harnesses, a shortcoming we fixed as part of the project.

The comfort of the interior is unmatched in this class of airplane. After 17.3 hours along a somewhat circuitous route from Palm Springs to Frederick, I was quite willing to swing the airplane around and head back west. The custom leather interior with its rebuilt and improved seats provided plenty of support and comfort.

Our longest leg was about 4.5 hours from Palm Springs to Farmington, New Mexico. The segment included some sightseeing zigzags across the Grand Canyon to Lake Powell, around Navajo Mountain, and then eastward to Monument Valley before stopping at Farmington's Four Corners Regional Airport for fuel and an overnight. Even after such a long sally the fatigue factor was minimal and we would have continued on except darkness was only an hour away and night flying over the mountains is not for me.

The 24-gallon auxiliary fuel tanks from Flint Aero benefited us well on that first leg. We took off from PSP with a full 63 gallons of usable fuel. With only the stock 40 gallons, we would not have made Farmington nonstop.

With full fuel and some bags and equipment, we were near the new maximum gross takeoff weight (MGTOW) of 2,550 pounds when departing PSP, where the temperature was near 80 degrees Fahrenheit. With that fuel we could have cruised for 5.5 hours with reserves while traveling at about 130 KTAS, for a no-wind range of 715 nm.

It's this sort of trip where the engine upgrade and its 250-pound MGTOW increase, along with the aux fuel, work together to provide lots of flexibility. (An aside: N172B's empty weight is 1,719 pounds, giving it a payload of 831



pounds. Full-fuel [63 gallons] payload is 453 pounds. When we purchased the airplane, then registered as N737QN, it weighed a trim 1,460 pounds empty, but had a MGTOW of only 2,300 pounds, yielding a payload of 840 and a full-fuel payload of 600. Remember, too, that the avionics panel then consisted of an audio panel, one nav/com, an ADF, and a transponder.)

When departing PSP, we could have left the aux tanks empty, offloaded a few pounds of baggage, put another person on board, and still flown about 3.3 hours with a 30-minute reserve.

In either case, the cruise speeds would have been about 130 KTAS while burning 10.5 gallons an hour, an easy 12 knots over the stock 160-hp airplane.

The stock airplane could have carried the three people and bags for four hours while burning about 9 gph out of its 40-gallon tanks. At a realistic maximum cruise of 118 KTAS, the stock airplane would have covered 470 nautical miles with no wind, 40 more than N172B would have with its 40 gallons. But that's the best the stock airplane could do. It's out of speed, payload, and options. You could slow down and extend the range, but so could N172B. In fact, on 9 gph, N172B runs a little faster than 118 knots, thanks to the aerodynamic cleanups. (And who really flies at half throttle anyway, except when enjoying a comfortable tailwind? If pilots wanted to go slow, they'd drive with all the ground pounders.)

In N172B, we had the option of offloading people for fuel and still cruising a dozen knots faster than New paint aside, exterior improvements such as wingtip recognition lights, STOL kit, and new windows appear subtle, indeed. Inside, though, sidewall detailing, sculpted seats, and inertia-reel shoulder harnesses are instantly recognized as significant upgrades over the stock Skyhawk.





N737QN. After traveling the 4.5 hours to Farmington, we still had 1.5 hours in the tanks.

Climbing over the desert east of PSP that warm October day, the VSI stuck on 600 feet per minute, about what a stock 172 would do at its MGTOW, but N172B was lifting an extra 250 pounds or so. Takeoffs in N172B at a more typical 2,300 pounds yield rates closer to 1,000 fpm. Fly solo and the rate jumps to 1,300 fpm or more.

We leveled at 9,500 feet msl for the first hour or so and then struggled to 11,500 feet to cross the Grand Canyon, per the voluminous requirements of flying in that airspace. The VSI showed just 200 fpm toward the end. Cruising at 2,600 rpm and about 10 gph, though, the true airspeed climbed right back up to 129 knots.

Throughout the trip we saw true airspeeds between 127 and 132 knots, almost always flying at heavy weights. Over the 17.3 flight hours across the country, the airplane burned 189 gallons of fuel, for an average of 10.9 gph. Look for the fuel burn to decrease slightly once time builds on the engine.

Just as the engine upgrade and aux fuel work together to improve the airplane, so do many systems inside.

Some observers have snickered at us using digital instrumentation to measure what's going on in the Skyhawk's rather crude systems. No, you don't necessarily need to know that the oil pressure runs at a nearly constant 73 psi (though it does), the typical oil temperature is 148° F, or that the electrical system puts out 26.3

AOPA thanks the following companies that donated or discounted their products or services for the Better Than New 172 Sweepstakes and refurbishment project.

180-hp engine conversion installation and STC—Air Plains Services, Post Office Box 541, Wellington, Kansas 67152; 800/752-8481.

Aircraft paint—Jet-Glo—Pratt & Lambert, Post Office Box 2153, Wichita, Kansas 67201; 316/733-1361.

(Alpha Coatings—800/875-3903)

Aircraft painting—Perfect Finish, 2800 Bob Meyer Road, Hamilton, Ohio 45015; 513/867-0303.

Alternator—Aero Electric, Incorporated, 3414 West 29th Street South, Wichita, Kansas 67201-3807; 316/943-6100.

Autopilot and HSI with slaved compass system—S-Tec Corporation, Route 4 Building 946, Wolters Industrial Park, Mineral Wells, Texas 76067; 800/USA-STEC.

Auxiliary fuel tanks—Flint Aero, Incorporated, 1935 North Marshall Avenue, El Cajon, California 92020; 619/448-1551.

Avionics—Terra Corporation, 3520 Pan American Freeway NE, Albuquerque, New Mexico 87107-4796; 800/328-1995.

Avionics installation—Avionics, Incorporated, Hangar 3, Lunken Airport, Cincinnati, Ohio 45226; 513/871-6222.

Cowl plugs—Ground Tech, Route 11, Post Office Box 740, Salisbury, Maryland 21801; 800/825-1245.

Digital clock/clearance recorder—PCR System, Colorado Computer Associates, Incorporated, 6851 Highway 73, Evergreen, Colorado 80439; 303/674-2379.

Electronic engine gauges—Electronics International, 5289 N.E. Elam Young Parkway #G200, Hillsboro, Oregon 97124; 503/640-9797.

Engine—factory rebuilt 180-hp O-360-A4M—Textron Lycoming, 652 Oliver Street, Williamsport, Pennsylvania 17701; 717/327-7041.

Engine heater—Tanis Aircraft Services, Municipal Airport, Post Office Box 117, Glenwood, Minnesota 56334; 612/634-4772.

Engine preoiler—Oilamatic Preoiler, Post Office Box 5284, Englewood, Colorado 80155-5284; 303/770-0175.

Fiberglass fairings—Stene Aviation, Incorporated, Post Office Box 539, Polson, Montana 59860-0559; 800/597-1911.

Filter assembly—Brackett Aircraft Company, Incorporated, 7045 Flightline Drive, Kingman, Arizona 86401; 602/757-1948.

Flight instruments—IVSI, altimeter— Aerosonics Corporation, 1212 North Hercules Avenue, Clearwater, Florida 34625; 813/461-3000.

GPS annunciators/switches—MSI Avionics, Post Office Box 86418, Phoenix, Arizona 85080-6418; 602/942-7170.

GPS receiver-Garmin International,

9875 Widmer, Lenexa, Kansas 66215; 913/599-1515.

Headsets—stereo, active noise canceling—Pilot Avionics, 24212 Solonica Street, Mission Viejo, California 92691; 800/874-1140.

Intercom—Sigtronics Corporation, 822 North Dodsworth Avenue, Covina, California 91724; 818/915-1993.

Interior and metal avionics panel—Air Mod, Incorporated, 2025 Sporty's Drive, Batavia, Ohio 45103; 513/732-6688.

Moving map—Eventide, Incorporated, 1 Alsan Way, Little Ferry, New Jersey 07643; 201/641-1200.

Muffler—Wall Colmonoy Corporation, 4700 S.E. 59th Street, Oklahoma City, Oklahoma 73135; 405/672-1361.

Paint protection—The Leading Edge, Hallmark Aviation, 1408 Powder Drive, Dallas, Georgia 30132; 404/443-9825.

Propeller—Sensenich Propeller Company, 519 East Airport Road, Lititz, Pennsylvania 17543; 717/560-3711.

Rudder trim—Aero-Trim, Incorporated, 1130 102nd Street, Bay Harbor Islands, Florida 33154; 305/864-3336.

Seat belts—inertia reel—B.A.S., Incorporated, Post Office Box 190, Eatonville, Washington 98328; 206/832-6566 (effective January 15—360/832-6566).

Standby vacuum system—SVS III and pulse light system—Precise Flight, Incorporated, Post Office Box 7168, Bend, Oregon 97708; 503/382-8684.

Stormscope—WX 900—BF Goodrich FlightSystems, 2001 Polaris Parkway, Columbus, Ohio 43240-2001; 614/825-2001.

STOL kit—Horton, Incorporated, Wellington Airport, Wellington, Kansas 67152; 316/326-2241.

Sun visors—Rosen Product Development, Incorporated, Post Office Box 21636, 1000 Bertelsen Road, Suite #10, Eugene, Oregon 97402; 503/342-3802.

Tachometer—electronic—Horizon Instruments, Incorporated, 556 South State College Boulevard, Fullerton, California 92631; 714/526-1919.

Vacuum pump—Sigma-Tek, 1001 Industrial Road, Augusta, Kansas 67010; 316/775-6373.

Windows—LP Aero Plastics, Incorporated, RD 1 Box 201B, Jeannette, Pennsylvania 15644-9730; 412/744-4448.

Wing tips with lights—RMD Aircraft Lighting, Incorporated, 3648 S.E. Roanoke Court, Hillsboro, Oregon 97123; 503/648-0331.

Yoke refurbishment—Warren Gregoire and Associates, Post Office Box 11562, Oakland, California 94611; 510/420-5701. volts. Need the temperature of each cylinder's head and exhaust gases to one-degree resolution? Just check the Electronics International instruments aboard N172B.

Many from the analog generation argue that the small digital displays are hard to interpret and harder yet to read. The small digits *can* be difficult to read and learning to quickly round the readings to the nearest 10 takes some time. With the EI oil tempera-

ture/pressure gauge, though, the pilot can ignore the digits and instead pay attention to the analog LED displays, themselves a little dimmer than would be optimal.

What the electronics really bring to the cockpit is versatility and safety. The oil temperature/pressure gauge, volt/amp meter, and EGT/CHT gauge, for example, connect easily to an EI annunciator panel located right in front of the pilot. The second any of the systems strays beyond pre-programmed parameters, the instruments light an annunciator. Knowing instantly that a problem exists rather than a few minutes later may make all



the difference in the world.

Likewise, the Horizon electronic tachometer has its own diagnostic and alerting functions. If a mag drops off line, a red LED instantly tells you which one it is. Likewise, an unacceptable speed differential between the two mags is annunciated. During runup, the Horizon digitally displays the actual rpm drop when one mag is selected. No more guesstimating by looking at the analog tach.

Elsewhere in the panel, digital connections also improve safety and make flying easier. The Garmin GPS 155 TSO, for example, does an excellent job of leading N172B from Point A to Point B and it doesn't keep the data all to itself. Instead, the position information is shared with an Argus 5000 moving map that provides a continuous bird'seye view of the route. The map's depiction of special-use airspace allowed Roger and me to efficiently navigate among and between some of the vast military operations areas in the West and Midwest and it kept us from straying into the Kansas City Class B airspace without a clearance. Airport

and VOR depictions allowed us to continually maintain situational awareness. (Well, almost always. There was that point over northeastern New Mexico when....)

As N737QN, the airplane could use just two types of signals to shoot instrument approaches—VOR/ILS and NDB. The Garmin's nonprecision approach capabilities add a third method—GPS. Another indication of the flexibility that electronics bring to the cockpit is the aforementioned ability to link the Garmin to the HSI and autopilot through a switching box.

The Terra avionics bring additional benefits over the old Cessna radios. Two

A FIRST LOOK AT FIRST NEW The next sweepstakes Skyhawk will be factory-fresh

For the past two years, AOPA's membership sweepstakes airplanes have been fantastic successes. AOPA membership has climbed, and staff and members alike shared in the excitement of refurbishing, outfitting, and giving away what must be two of the world's most highly refined examples of Cessna's classic Skyhawk. First was the Good As New 172, a fullblown refurb of a 1974 Cessna 172M; it went to member William E. Teschner, a Florida dentist.

Later this month, fate will smile upon yet another member when AOPA will bid farewell to our latest creation—our Better Than New 172. As anyone who's been reading *AOPA Pilot* should know, this is a higher-powered, longer-legged, extra comfortable, radically upgraded 1978 Cessna 172N, complete with all the latest avionics.

How do you follow up on such a winning program? By offering another lucky new, renewing, or new-member-sponsoring AOPA member still another Skyhawk. This time, the concept behind the giveaway is a little different. Instead of fixing up an older Skyhawk, we'll be giving away the first brand-new Skyhawk to

roll off Cessna's rejuvenated single-engine production line. That's why we're calling our next sweepstakes airplane the First New 172.

The First New 172 sweepstakes will continue through 1995. According to Cessna officials, the airplane's momentous rollout should occur sometime in the last quarter of 1996. The actual giveaway will follow shortly thereafter.

Some may ask, "Why another Skyhawk?" While

it's true that there are other new singles being built, we simply couldn't ignore the synergy between AOPA's and Cessna's efforts in revitalizing general aviation.

After all, AOPA and Cessna were

among the prime movers in effecting the passage of the General Aviation Revitalization Act—the law that ended product liability claims involving aircraft more

than 18 years old. Cessna FIRST NEW Chairman Russ Meyer had long said that if this law were passed, Cessna would once again build piston singles, something it hadn't done since 1986. AOPA has already claimed the first new 172 and its N-number-N172FN. We've got dibs on the first new 182 as well, and will be giving that airplane away in the 1996 sweepstakes. Cessna's commitment to build new airplanes is

matched by AOPA's commitment to recruit more pilots. Our Project Pilot program, which has enlisted more than 8,000 new students into the ranks of the actively flying, will have multiple benefits for general aviation. One of these is an increase in AOPA's ranks, which in Terra navs and coms take up less space than one of the old radios, yet provide redundancy. Linked to the electronic Tri-Nav indicator, the navs display radials from both VOR receivers at once.

An improved heating and ventilation system, better night lighting, and general improvements in ergonomics and quality of materials throughout the interior make flying N172B easier and more comfortable.

Is this more than a 172 wants to be? Probably. Anyone who attempted to duplicate the project at retail prices would spend about \$150,000, including the purchase of the airframe. That's far more than such an airplane would fetch on the open market. Thanks to the help of many vendors, we spent only a fraction of that on the project.

As we set out to show, it is possible to add comfort, safety, and performance to existing airplanes—we just took it to extremes for the purposes of creating a unique airplane for the AOPA membership sweepstakes.

Somehow, I don't think the member who wins the airplane in January will mind if we went a bit overboard. A trip around the pattern will prove to anyone that N172B really is a Better Than New 172.

turn boosts our strength at all levels of government. Another is the creation of a bigger customer base for Cessna's—and other manufacturers'—new airplanes. Together with a revivified and modernized Cessna Pilot Center network, Project Pilot can go a long way to spurring a true general aviation resurgence.

For the first time, AOPA, the largest general aviation advocacy group, is working with one of the strongest manufacturers to bring about the kind of critical, broad-based changes that will be so vital to turning around an ailing lightplane economy. It's an unprecedented union, and a necessary one.

The coming two years promise to be exciting, and *AOPA Pilot* will be there to report on Cessna's rebuilding efforts. In coming months you'll see late-breaking reports on developments within Cessna's boardrooms and single-engine business project teams. We'll follow decision-making processes concerning the 1996 Cessna 172's avionics, interiors, and systems. We'll take you to ground-breaking ceremonies for the new production facility, show you the new assembly lines, and introduce you to all the key players in this historic endeavor.

And when it's all over, N172FN may be yours. —*Thomas A. Horne*