

TIMELESS



Fluperfect panel

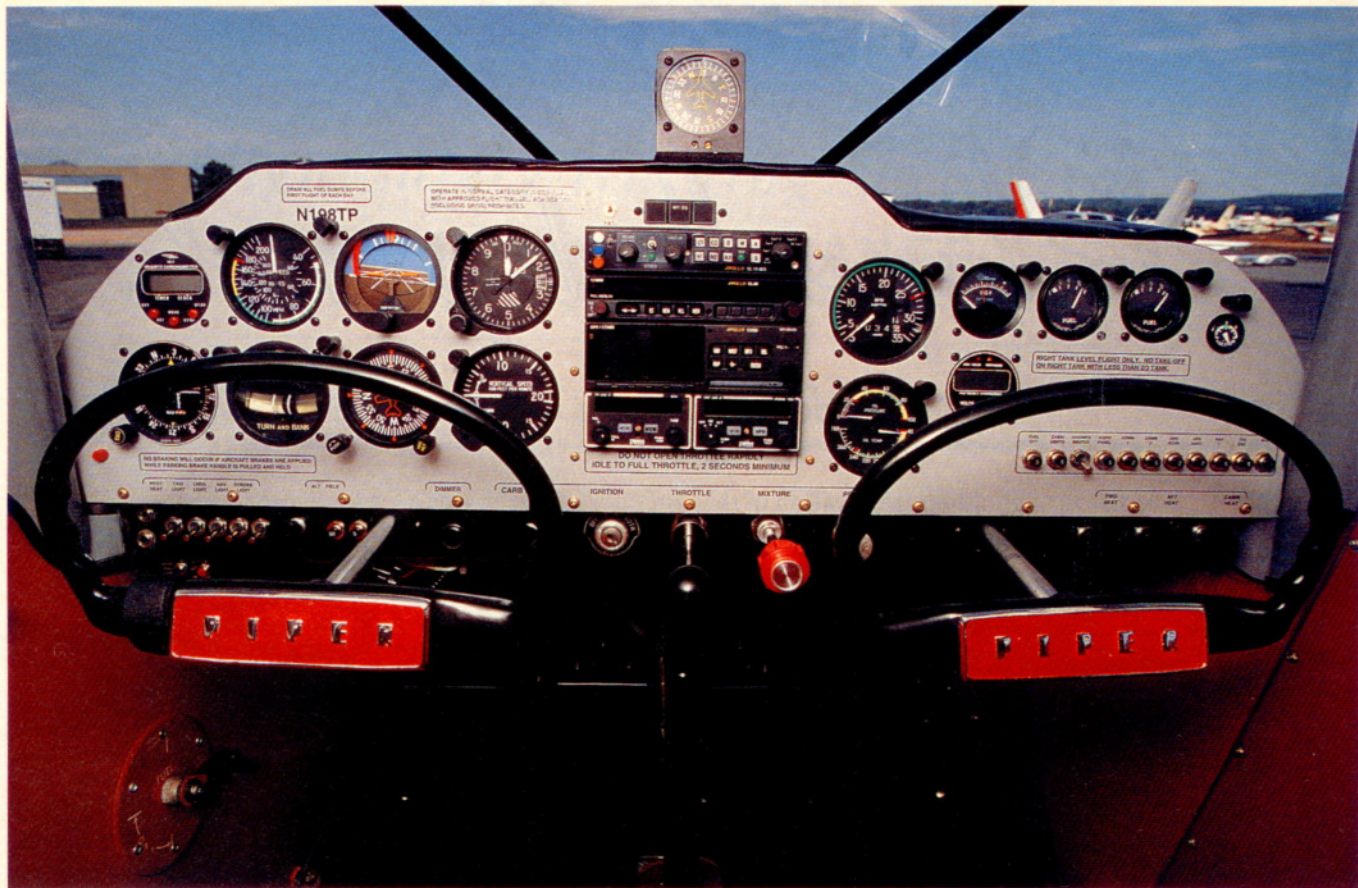
Shedding the bonds of 1950s panel puzzlements

Throughout our restoration of the Timeless Tri-Pacer, we've kept one eye on historical accuracy and another on useful modern improvements that will increase the utility of the airplane. As a result, you'll see few major airframe changes and little in the way of cosmetic alterations. Swing open the front door, though, and you'll see that we've left the standard Tri-Pacer's mishmash instrument panel and vintage avionics in the past. ● When we purchased N198TP—as N8134D—it was equipped for day/night VFR flight only. It had no VOR or ILS equipment, an inoperative marine loran, one com radio, and a transponder. The gyros were at least 20 years old, and the panel showed the effects of four decades of radio roulette. Moreover, the thin instrument panel with quaint overlay that was intended to be light, simple, and

By Marc E. Cook



PHOTOGRAPHY BY MIKE FIZER



The new (above) and the old. Since the photo was taken the vertical compass has been replaced with a more conventional wet compass. The panel has a neater, easier to read appearance. The IFR-certified GPS/com serves as the second radio.

inexpensive to make—by 1958 standards not such a bad arrangement—is hopelessly outdated now. As with our other project sweepstakes airplanes, we wanted the panel to represent the latest thinking in ergonomics and materials.

Avionics West in Santa Maria, California, signed on to handle the design and installation of the new panel. Tom Knoll, acknowledged to be an ace with the metal-cutting tools and a soldering iron, penned a panel that mimicked the general outlines of the stock PA-22 item. (Remember that our airplane is a 1958 model, which had the taller panel with radios located in the center stack. Earlier models will require a bit more work than ours.) By using a solid sheet of 0.063-inch-thick aluminum, Knoll was assured of a strong backing for the instruments and radios.

But the magic of Knoll's design is not so much the shape or thickness of the replacement panel, but in the way it mounts to the airplane. Normally, the Tri-Pacer panel is secured by a series of screws along the upper edge that mate with the boot cowl—the sheet of aluminum that forms the skin between the



firewall and the front door and wraps up under the windshield. The panel is also secured to the airframe through the various push-pull controls—throttle, mixture, carb heat, etc.—along the lower edge. Behind the panel, there's a cabin-width tube with small tabs hanging from it. This construction means that you have to remove all the controls—as well as the yokes—to take the panel out of the airframe. Time consuming, to say the least.

Knoll saw the shortcomings of this design and came up with a Z-shaped rail that runs along the bottom of the panel, in contact with the fuselage cross member. Both yokes and all of the

engine and environmental controls pass through this piece of folded aluminum. The main instrument panel attaches to the Z rail with screws and to the boot cowl in the conventional fashion.

While Knoll was laying out the lower rail, we took the opportunity to consolidate the Tri-Pacer's electricals and make the panel easier to use. All of the airframe switches—for pitot heat, landing and taxi light, nav lights, and strobes—are Potter & Brumfield switch/breakers clustered along the left side of the sub-panel. They are in a logical place, and the combination switch/circuit breaker reduces the amount of wiring. The remaining circuit breakers, as well as



MARCE COOK

the avionics master, are located on the right side of the panel beneath the fuel gauges. Tri-Pacer pilots will note that the master and starter switches remain on the small electrical box beneath the pilot's left knee.

During the restoration, all of the airframe wiring was replaced and high-

quality coaxial cable was strung for the radios. The location of the engine controls was tweaked slightly, mostly so the new vernier mixture control (from Aircraft Spruce and Specialty) could be next to the throttle. In fact, all of the engine and ventilation controls were replaced with Teflon-lined pieces from

The hand-built panel had to be scrapped in favor of one built by Avion Research, which is best known for Cessna panels.

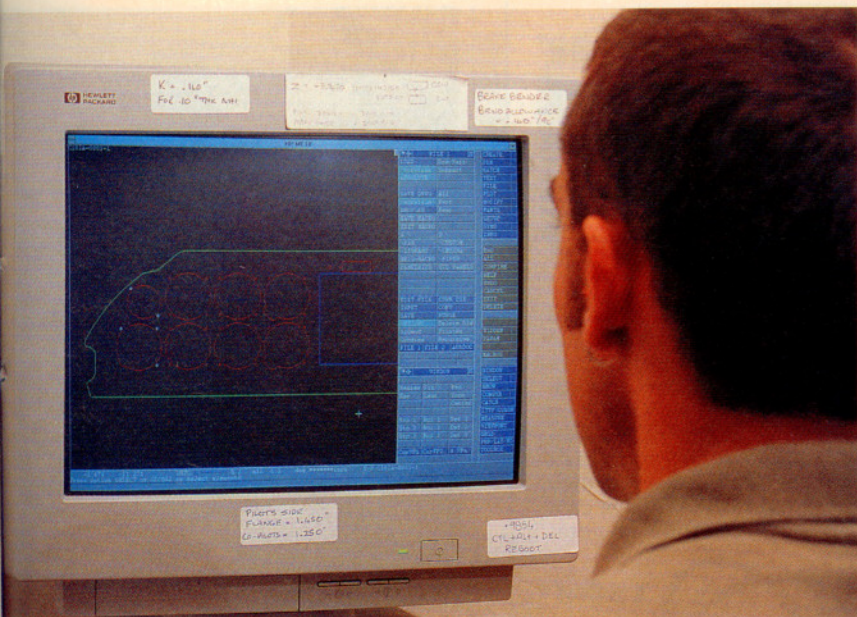
The result was a computer-cut panel with perfect instrument cutouts.

Aircraft Spruce.

There were problems with the first iteration of the new upper instrument panel, in part because the boot cowl doesn't truly take shape until the windshield is in place. So we had to scrap the hand-built panel and put in a call to Avion Research in Palo Alto, California. The firm is better known to Cessna owners, having produced STC-approved panel modifications for most single-engine Cessnas. Thanks to its use of a computer-driven router, Avion can quickly design and build just about

any panel you can imagine. We trimmed our prototype panel to fit the airplane and sent it off to Avion. Very soon thereafter, our computer-cut piece was ready—powdercoated, engraved, and ready to be installed.

In a word, the Avion-built panel is gorgeous. All of the instrument cutouts



are perfect—more so than can be made by hand—and the alignment of the pieces is beyond reproach. Through lots of hard-won experience, Avion knows how to tweak each dimension so that common instruments fit snugly but not too tightly. In the redesign, we asked Avion to raise the instruments in front of the pilot by three quarters of an inch—causing them to clear a frame

member behind the panel, as well as raising them so that they are no longer blocked by the top of the control yoke. As shown at Oshkosh, the Timeless Tri-Pacer still had the original glareshield pad, but we expect to take the airplane back to Avion late in the year to have a better item made.

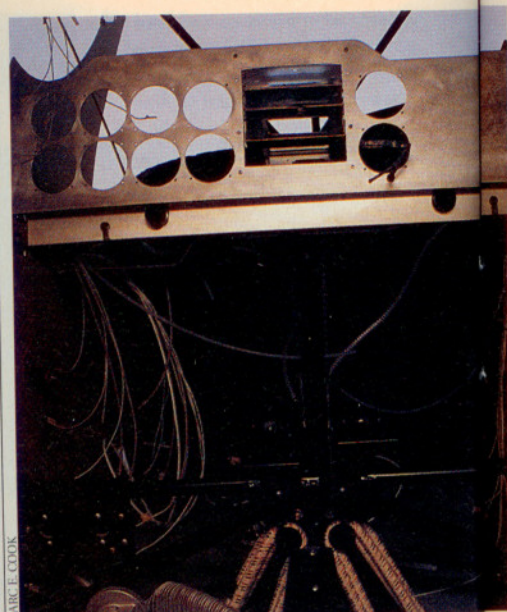
Instrument-panel work had taken place well after our avionics choices



MARC E. COOK

A computer program at Avion Research in Palo Alto, California, generates a panel with perfect dimensions for airplane and instruments. Seats were removed to better allow technicians to deal with a tangle of cables needed for the Tri-Pacer's next life.

were made. We have had comparatively little flight experience with II Morrow's new stack, so in order to learn more about the equipment, we chose it for the Timeless Tri-Pacer. From the top, we have the SL10 MS audio panel/marker beacon/stereo intercom combo—itself a rebadged version of PS Engineering's PMA 6000MS—the SL40 com radio, and GX60 IFR-approved GPS/com with



Pilot work load is greatly reduced by the organized layout of the new panel. However, gutting the aircraft and replacing the wiring is an activity owners may find painful to watch. Landing gear bungee cords are shown at the bottom of the photo (above).

moving map. These radios are II Morrow's current generation and form the backbone of a useful and tidy stack.

(See "Flying the GX60," page 108.) II Morrow's slimline radios are legitimately called feature-packed. The com radio has extensive memory capabilities, as well as provisions for receiving a data connection to the GPS so that frequencies in the database can be put into the standby window with the push of a button. Both the SL40 and the com portion of the GX60 share these features, and one more—a monitor function that allows you to listen to the standby frequency until there's a transmission on the primary. Likewise, the SL10 brims with features, including a six-place stereo intercom, marker beacon, and dual-com capability that lets the pilot and copilot talk on different radios simultaneously.

Although relatively few Tri-Pacers are outfitted for IFR flying, we decided not to squander the utility that IFR approval brings. A heated pitot was added on a field approval based on one used by a Short Wing Piper Club member. To fill out the stack, then, we needed a VHF nav radio (preferably with glideslope) and a transponder. Terra's line of compact radios fit the bill perfectly—so we used the TRT-250D transponder and TN 200D nav receiver with glideslope. To make matters simpler for GPS integration, we ordered up an AlliedSignal Bendix/King KI-209A navigation indicator. It has all the circuitry to provide the II



Morrow GPS with resolver output and allowed a simpler switch panel installation than would otherwise be possible. Although it might seem like a mishmash of manufacturers, our orderly array of radios, with one exception, performed superbly in the Tri-Pacer. (Trimble's Terra subsidiary suffered through a round of quality control problems with the TRT 250D, causing the first unit in our airplane to randomly provide

the wrong squawk codes to ATC and the second's test button to jam.

While updating the electronics, we took the opportunity to invest the PA-22 with new gyros—the attitude indicator and directional gyro are from Sigma-Tek; the DG includes a heading-minder bug that's actually quite useful, even for nonautopilot flying. An overhauled turn and bank joins the other standard instruments. On the right side of the panel, there's a new Mitchell tachome-

ter, and from Univair a reproduction oil temperature and pressure instrument—less expensive, in fact, than having the old instrument overhauled—and two new fuel gauges. An Electronics International volt/ammeter and Alcor EGT gauge round out this basic package. You might notice the lack of an autopilot—none, save for the creaky old Piper models, is approved for the PA-22—and weather-avoidance gear. Let's be realistic—the Tri-Pacer's home in the instrument system is in marginal-VFR conditions, not heavy weather.

ELT and lighting controls are within easy reach of the pilot. Turning on pitot heat illuminates a red light (above left) to prevent its accidental selection during ground operations.

Regardless of the weather, the Timeless Tri-Pacer's modern panel is more functional than the one it replaces, and is far more relaxing to use day to day. Switches are where you'd expect them to be, and there's the peace of mind



that comes from dual navigation and communication systems. We think that the new panel is a success, combining a useful degree of modification to remove the most obvious shortcomings of the original design, without overpowering the airplane from a styling or feature

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Flying the GX60

Without a doubt, the key player in the Timeless Tri-Pacer's avionics stack is the IFR-approved II Morrow GX60 GPS/com with moving map. It is the primary navigator and either the main communicator or—if you prefer the simplicity of the more familiar SL40 com—an able backup.

At the heart of II Morrow's new generation of navigators is an eight-channel parallel GPS engine and a gas-discharge, dot-matrix display. The amber-colored screen is easy to read in most lighting conditions, although the slightly opaque face can wash it out in a very bright cockpit. The map can be configured to show any combination of navaid, intersection, and special-use airspace through front-panel hot keys; there's no need to slog around in the submenus to get the task done. Our main complaint with the map scheme is that all special-use airspace looks the same—you need to punch the NRST button to search for and identify the nearest SUAs.

II Morrow has simplified and cleaned up the 60's operating system compared to that of its predecessor, the 2001. Many of the handy shortcuts remain—such as the unit's returning you to the top of any given menu by pressing the Nav or Map button twice. Most impor-

Help with the process

SL10 audio panel/marker beacon/intercom, SL 40 com, GX60 IFR-approved GPS/com—II Morrow Incorporated, 2345 Turner Rd. S.E., Salem, Oregon 97302; 800/525-6726. Web: www.ii Morrow.com

TRT250D transponder, TN200D VHF nav receiver with glideslope—Terra by Trimble, 2105 Donley Drive, Austin, Texas 77380; 512/432-0400. Web: www.trimble.com/avionics

KI209A navigation indicator—AlliedSignal Bendix/King, 400 North Rogers Road, Olathe, Kansas 66062; 913/782-0400. Web: www.alliedsignal.com

Avionics installation, panel mockups—Avionics West, 3601 Lightning Street, Santa Maria, California 93455; 805/928-3601

Panel fabrication—Avion research, 1022 W. Maude

Avenue, Suite 102, Sunnyvale, California 94086; 408/738-1690. Web: www.avion.com

Attitude indicator and directional gyro—Sigma-Tek Incorporated, 1001 Industrial Road, Augusta, Kansas 67010; 316/775-6373

Engine oil pressure and temperature gauge, fuel gauges—Univair Aircraft Corporation, 2500 Himalaya Road, Aurora, Colorado 80011; 888/433-5433. Web: www.univair.com

standpoint—overall it is, we think, a panel properly befitting a prudently modernized classic. □

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tant for pilots intending to use the 60 for nonprecision approaches is that II Morrow has simplified the IFR features. Now, you can select the approach by punching in the airport, using the direct-to key (or as part of a stored flight plan) and hitting the SEL key. That's not much different from the 2001, but the 60 has a graphical representation of the approaches, including variations based on different initial approach fixes—in all, the 60 is among the easiest GPS to set up for the approach.

New software helps to simplify the sequencing logic, too. Normally, the GX60—and its non-com-equipped twin, the GX50—will hold the waypoint sequencing between the final approach fix and the missed-approach point. But if you are approaching the IAF with more than 70 degrees of intercept angle to the inbound course, the GX60 will assume that you're going to do the procedure turn and suspend waypoint sequencing. There's also a vectors-to-final selection that allows you to set up a specified intercept angle to the inbound course, and something called "arc assist," to make flying DME arcs less thrilling.

In practice, the GX60 is an excellent box—the GPS is solid, and the map functions as a welcome assistant to situational awareness. The com side is also top-notch, with a strong transmitter and worthwhile features such as standby-channel monitoring and direct entry of frequencies from the database. Suggested retail price is \$4,995; the non-com GX50 runs \$3,995. —MEC

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