

It's all inside

An avionics and entertainment cornucopia

BY STEVEN W. ELLS



The airplane—and propeller—paint colors have been selected. The interior will be tones of light brown. The instrument panel will be painted tan and the copilot's side will look like the Mojave Desert—miles and miles of empty space.

The AOPA 2005 sweepstakes team, along with Robin Howard, Brian Peoples, and the other experts at Howard Aviation, considered installing copilot flight instruments but in the end realized two things: First, that additions would take time—and the work list for the first quarter of 2005 was already running off the edge of the page; second, there would be no real point to installing copilot instru-

ments—the airplane already had flight-instrument redundancy with the Chelton electronic flight information system and the three backup analog gauges installed on the pilot's instrument panel.

Why is there so much extra space? Part of the reason is because the 1974 Rockwell Commander 112A, which is the star of the 2005 AOPA Commander Countdown Sweepstakes, has a very

large instrument panel and cabin. But the real reason is because today's panel equipment—by Garmin, Chelton, PS Engineering, J.P. Instruments, and Aero Trim—incorporates so much value and utility while using so little panel space that there's just naturally lots of room leftover after the installation of a very complete and comprehensive avionics suite.

Garmin's top-notch center stack

The Chelton FlightLogic EFIS has many fine features. Yet some AOPA members questioned the decision to install it—they wanted to know why AOPA hadn't selected the Garmin G1000 EFIS instead. This question is a natural, especially since the G1000 is being installed in many new airplanes

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these days. The simple answer: The Garmin G1000 is not yet approved for aftermarket installations. When AOPA started the 2005 sweepstakes project there was no way to legally install a G1000 system in the Commander.

On the other hand, the Chelton EFIS is STCed for more than 600 airplanes—and Howard Aviation has experience installing the Chelton system. That doesn't mean Garmin was ignored when it came time to plan the Commander Countdown panel.

It's hard to believe that there could be anything new in nav/coms, but the two Garmin SL30s installed in the Commander have many thoughtful

and convenient features. First off, each is a 760-channel com radio with active and standby (flip-flop) frequencies and a transmit status indicator; that's pretty standard, but the SL30 also includes a two-place voice-operated intercom, an audio amplifier, and a memory that remembers the last eight frequencies used. These radios can also tune to National Weather Service broadcasts and have an emergency channel selector.

The nav side of the SL30 has its own set of great features. There's a VOR/localizer and glideslope receiver as well as a built-in VOR/localizer converter—there's also a display on the face that provides a to/from indication and the radial that the airplane is crossing. This feature is super handy

when flying toward a waypoint or fix that's defined by a radial—again this is pretty standard stuff in modern nav/coms. What isn't standard are features such as a display of the station ID (this feature works for VOR and ILS frequencies), a second com frequency-monitoring feature, and a user-selectable back-course approach mode that provides "chase the needle" indications instead of the normal reverse sensing for back-course approaches. Oh yeah, there's also a built-in course-deviation indicator. It's hard to see why a VFR pilot would need anything more than one SL30 to fill all his nav/com and intercom needs. AOPA is fortunate to have two of these little powerhouses installed in the Commander.

And the winner is...Roy Wilbanks!

BY THOMAS A. HORNE

On February 10, 2005, two plans unfolded during the annual South Carolina Aviation Association conference in Myrtle Beach, South Carolina. One involved the induction of honorees into SCAA's hall of fame. The other gave Roy Wilbanks, AOPA 1148863, a fully restored and modernized 1965 Piper Twin Comanche—2004 AOPA Win-A-Twin sweepstakes airplane.

AOPA's strategy in awarding sweepstakes airplanes is to surprise the winner. This requires an elaborate ruse to keep the winner in the dark, and guarantee his or her presence at the award location. This time was no different. First, several meetings were held to concoct a ruse. We finally decided on a phony awards ceremony, in which our unsuspecting winner—Wilbanks—would accept a Bose headset and a Garmin GPSMap 296 handheld GPS at the hall of fame banquet. As part of his usual speaking schedule, AOPA President Phil Boyer was scheduled to address the SCAA conference anyway, so the Myrtle Beach venue made sense.

Key SCAA officials were a central part of the plan. Kip Pratt, former SCAA president and board member, and SCAA's Katie English did all of the contact work with Wilbanks—an essential element in hiding AOPA's involvement in the awards ruse. They were informed of the plan, and sworn to secrecy. So were personnel at the Myrtle Beach airport, where N204WT would spend the night before the award ceremony. AOPA's executive vice president of communications, Jeff Myers, coordinated the whole event, which included six AOPA staffers, a four-man video crew and photographer to record the goings-on, and Sporty's Pilot Shop founder and Chairman Hal Shevers.

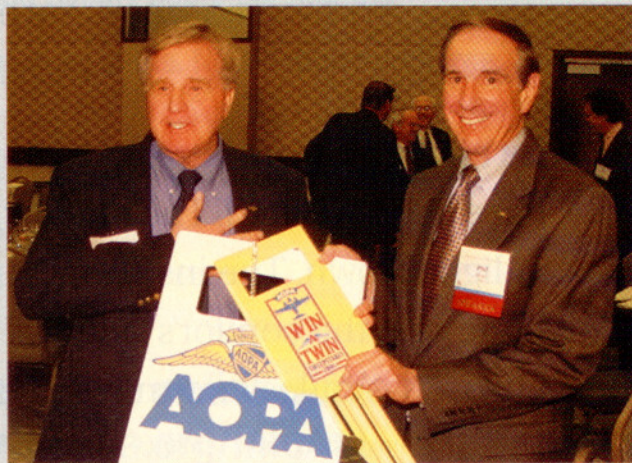
Shevers' role? He was part of the guarantee to get Wilbanks to Myrtle Beach. The plan was for Shevers to pick up Wilbanks at the Greenwood County Airport in South Carolina, then fly him to Myrtle Beach International Airport in his Cessna Citation II.

From the start, there was doubt among the conspirators.



Wilbanks flew a Piper J-3 Cub, that much—and more—we knew from our research. The airplane has no electrical system, so the Bose headset would be useless. Why should Wilbanks want to go all the way to Myrtle Beach to accept something he couldn't use? All the more reason to make the trip easy by using Shevers' jet. But was that overkill? Would Wilbanks wonder about all the fuss of a jet pickup? The Garmin handheld, though, made a tempting prize.

But by the time the SCAA's awards dinner began, Wilbanks showed no sign of suspicion. After the inductees into the hall of fame were announced, Boyer was introduced. His presentation began with a discussion of the state of general aviation, then he



Roy Wilbanks (left) registers disbelief just after receiving the Win-A-Twin's symbolic keys from AOPA President Phil Boyer.

talked about GPS and the Wide Area Augmentation System (WAAS), and wound up with a talk about AOPA's legislative initiatives. Then, somewhat abruptly, he said he had some awards for "general aviation enthusiasts from the four corners of South Carolina."

Traffic advisory systems

AOPA chose to install a Garmin GTX 327 solid-state transponder. This 200-watt unit requires no warmup time, nor is there an expensive cavity tube to fail. The yellow-on-black face displays the code in large numbers as well as the airplane's pressure altitude as decoded by the transponder. There's a dedicated VFR button—one push and the assigned code switches to 1200. There are also count-up and countdown timers.

Members have asked why the Garmin GTX 330 transponder wasn't chosen since it also adds traffic detection to its other duties through its traffic information system (TIS). It's a good question. TIS provides a graphical display (on a multifunction dis-

play or Garmin GNS 430/530) of nearby transponder-equipped traffic. The traffic information is provided via a datalink with approach control radar. Right now there are about 120 of these sites in the United States, and most are used in high-traffic areas such as Class B and Class C airspace. Mode S coverage (TIS services) is very good east of the Mississippi but there are some very large gaps west of the Rockies. Because we don't know who will win the aircraft and where they'll fly, AOPA felt that a full-time traffic-alert and advisory system provided more safety.

Therefore, the GTX 327 transponder will take care of the transponder duties while traffic spotting and alerts will be handled by a Ryan Interna-

tional 9900BX traffic advisory system (TAS). The 9900BX is an active system (meaning it doesn't rely on datalink information from ATC and it interrogates nearby aircraft transponders) that detects the altitude and position of all transponder-operative aircraft from takeoff to landing in all airspace. This system can be used as a stand-alone system—displaying traffic (as well as terrain and thunderstorms) on Ryan's 3ATI format TSOed display—or its traffic data can be exported to MFDs such as the Garmin MX20 and the Chelton navigation display (ND) such as that in the Commander Countdown aircraft.

Nonhazardous traffic (defined as all traffic outside a two-mile radius centered on the airplane) is displayed as a



Roy and his wife, Lee, pose with N204WT at the Greenwood, South Carolina, airport.

The first (and only) winner was called to the podium. "It's Roy Wilbanks!" said Boyer.

Wilbanks made his way to the stage as the crowd applauded. The Bose and Garmin awards were made, and then Boyer engaged Wilbanks in a staccato conversation.

Boyer: "We have another present for you. It's a Garmin GNS 480 GPS Com...."

Wilbanks: "Oh, my. Thank you so much."

Boyer: "And how about \$5,000 for gas money?"

Wilbanks: "Oh, this is so generous. Thank you." (By this time, Wilbanks is showing early signs of overload, but holding up very well.)

Boyer: "Well, wait a minute. Your Cub has no electrical system, so I don't think the GNS 480 will work. Ever thought about getting a bigger airplane?"

Wilbanks: "Yes, I'm thinking about a Cessna 172."

At this point someone from the audience shouted out, "Why don't you give him a bigger airplane?" and without flinching at the unprompted request, Boyer dropped the bomb: "Well, how about a fully restored Twin Comanche!" A slide popped up on

the giant screen: "Congratulations, Roy," it said. "You won the sweepstakes!"

Wilbanks' stunned reaction said it all. The ruse worked, and if he suspected anything, he didn't show it.

"I was just happy to get the headsets—and now this! I must be dreaming," Wilbanks said over and over. Then he phoned his wife with the news: "Honey, I won it! I don't need the Cub anymore."

The next day, yours truly flew Wilbanks back home to Greenwood in his new airplane. An enthusiastic crowd awaited, as did local television and print media. Before I took my leave, I asked Wilbanks if he would keep the airplane or sell it, as so many previous sweepstakes winners have done. "No, I'm going to keep it for a few years at least," he said.

A week later, after the dust had settled, I phoned Wilbanks to check up. "Well, I'm back on the ground again," he said, referring to his euphoric spike at the dinner. He had been in contact with American Flyers, which will give him multiengine training; the International Comanche Society's Comanche Flyer Foundation, which will give him type-specific training in N204WT; and Avionics Training Unlimited Inc., which will give him avionics training.

How had things been going, I wondered. "Well, the phone hasn't stopped ringing," he said. "People wanting to buy, from New York to California, have been calling. But I'm not selling."

Wilbanks said he'd been reading all the avionics and pilot manuals, and had spent a few hours just sitting in the airplane familiarizing himself with the airplane's systems and layout. He'd logged an hour in a friend's twin-engine Beechcraft Baron. "Everything's coming together so beautifully," he said. His training was set to begin after a trip to Daytona Beach, Florida, for Race Week.

And so closes another chapter in the ongoing AOPA sweepstakes saga—an event that has taken place since 1993. And

i Links to additional information about AOPA Sweepstakes aircraft may be found on AOPA Online (www.aopa.org/pilot/links.shtml).

will happen again in 2006, when today's Commander Countdown sweepstakes will

put a totally upgraded Rockwell Commander 112A in the hands of yet another lucky member. So if you didn't win the Win-A-Twin, don't despair. Next year could bring your lucky day! E-mail the author at tom.horne@aopa.org.

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blue rhomboid. When traffic penetrates the two-mile circle the rhomboid changes to a yellow circle. Each traffic target is accompanied by numbers and arrows to supplement the targets—these symbols indicate the



The Chelton FlightLogic EFIS primary flight display (PFD) (above and right) features 3D synthetic vision, which shows terrain, obstructions, and runways in front of the airplane. The white symbol (with short wings) is the flight-path marker, which depicts the flight path of the airplane. The navigation display (ND) is shown below.



traffic relative altitude and whether it's level, climbing, or descending in relation to the pilot's airplane. The 9900BX also can be configured to annunciate altitudes such as top-of-climb with a feature Ryan calls the *integral altitude alerter* (IAA).

Coast-to-coast traffic warning is an excellent feature. What else do the masters of twenty-first-century avionics systems have up their sleeve for the AOPA sweeps Commander? How about weather in the cockpit?

WSI—all the real-time weather a pilot needs

Because of systems such as the WSI InFlight, the lucky winner of the Commander will be able to access real-time weather information in the cockpit on one of the MFDs. That takes almost all of the guesswork out of deciphering in-flight weather. The WSI InFlight system is pretty simple—there's a computer-mouse-size antenna and a receiver decoder box that can be mounted anywhere in the airplane. Signals are relayed to the airplane, where they are decoded to show graphical and textual METARs and WSI-encoded Nexrad weather images (WSI calls its version NOWrad). These images will be familiar to anyone who has ever seen the green, yellow, and red colors marking rain-intensity (techni-



cally this is termed the 2-km Doppler Radar Mosaic) images in the evening news or on The Weather Channel.

One new feature that WSI has added—and that will surely be worth the extra cost—is the graphical depiction of temporary flight restrictions (TFRs). WSI provides a menu of services that are available either by yearly subscription or by pay-as-you-fly daily rates.

The 2004 AOPA sweepstakes airplane—a Piper Twin Comanche—was equipped with a WSI system, and AOPA Pilot Editor at Large (and weather guru) Tom Horne was very enthusiastic about a feature WSI calls EchoTops. This feature displays the altitude of the cloud tops along with wind direction and speed.

Now you know how modern avionics systems will keep the winner out of traffic and weather trouble. Is that all the modern avionics suite has to offer? Not at all—everyone aboard can enjoy

continuous noncommercial stereo hi-fi music as well as news, talk radio, and sports.

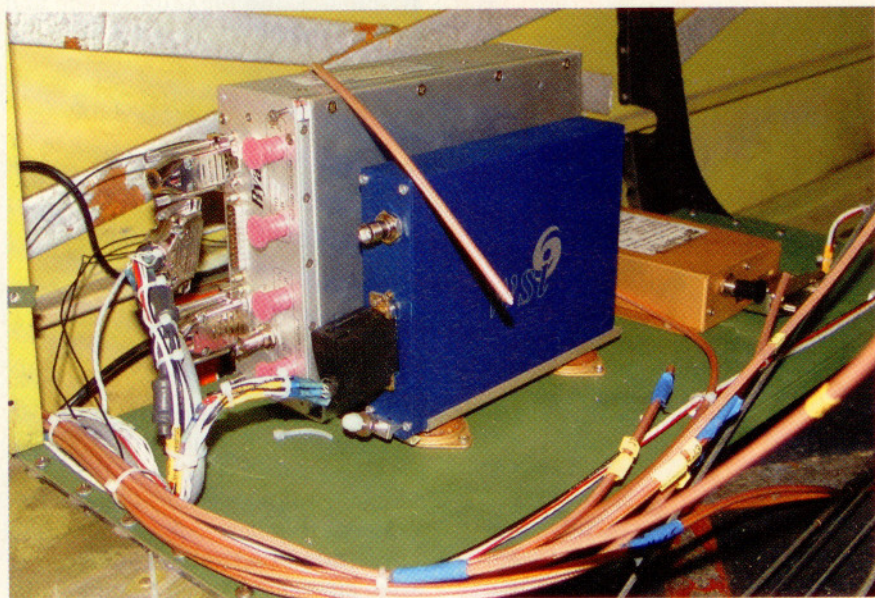
Sirius Satellite radio and the PS Engineering PMA8000-SR

General aviation airplanes used to need three or four boxes to complete all the tasks the PMA8000-SR does with one. Instead of a separate intercom, a separate marker beacon receiver and lights, a separate audio switch panel, and a separate ADF for entertainment, the newest offering from Mark Scheuer and the others at PS Engineering somehow rolls all those tasks into a single slim (1.3 inches high) slide-in box.

Unsung (and unseen) components

Nestled in small spaces here and there around the airframe of the Commander are small solid-state components that play big roles in modern avionics. Three of these—the Crossbow solid-state AHRS (attitude and heading reference system), the Shadin air data computer, and the FreeFlight GPS antenna and receiver, which is enabled with WAAS (Wide Area Augmentation System)—round out the Chelton EFIS installation.

The Crossbow AHRS uses a network of solid-state angular velocity sensors to detect changes in attitude and heading



The WSI InFlight weather receiver, the FreeFlight GPS/WAAS receiver (gold-colored box) and Ryan 9900BX TAS receiver are mounted on a shelf aft of the baggage compartment.

In addition to room for all the usual avionics suite inputs, the PMA8000-SR also has a dedicated cell-phone interface, and a six-place (only four places are installed in the Commander) hi-fi stereo intercom system. This system can be switched so that everyone except the pilot is able to listen to music and converse freely without interruption. What music? The PMA8000-SR has a built-in Sirius Satellite radio receiver that provides 120 commercial-free channels of music, sports, talk radio, and news 24 hours a day. Since the signals are broadcast from a geostationary satellite, there's never a need to change channels—if the comedy channel is doing the trick, just tune in and laugh from coast to coast. There's even a remote control for the radio portion that allows the pilot to turn the selection chores over to someone else.

to an accuracy that's on par with the best ring-laser gyro-based inertial navigation systems at a fraction of the cost. The Crossbow AHRS is used with many EFIS installations.

The GPS/WAAS antenna and receiver is from FreeFlight Systems, of Waco, Texas. In addition to the antenna/receiver combination used in the Commander Countdown aircraft, FreeFlight, which bought Trimble four years ago and still repairs all Trimble products, also manufactures a line of radar altimeters that can be integrated with EFISs to provide actual—rather than GPS-signal derived—airplane altitude-above-the-ground numbers.

The Shadin ADC-2000 air data computer links aircraft systems and the Chelton EFIS to provide information on fuel used, true air temperature, outside air temperature (OAT), barometric pres-

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sure correction, density altitude, and winds aloft. In addition, high-resolution altitude management in 10-foot increments is provided to drive the vertical navigation (VNAV) feature during GPS approaches.

Engine monitors, and an aileron trim system

Solid-state large-scale integrated circuitry has also made a huge difference in the detecting and recording of en-

gine operating data. The J.P. Instruments EDM-800 chosen for the Commander takes the place of a bank of engine parameter steam gauges. In addition to the basic engine monitor chores of detecting and displaying—in graphical and numerical formats—accurate values for exhaust gas temperatures, cylinder head temperatures, fuel flow, manifold pressure, rpm, oil temperature, and oil pressure are shown; the EDM-800 shows percent of power if desired. In fact, the EDM-800 can be configured to display up to 29 different functions. But that's not all—every bit of data is stored

in memory and can be downloaded between flights. At the maximum sampling rate—once every six seconds—there's enough memory to maintain the data for the last 25 hours of flight. Downloading—and charting the engine data with J.P. Instruments software—assists pilots in better understanding the interplay between power settings, mixtures, and atmospheric variables such as pressure altitude and OAT.

AOPA first installed the Audio Advisory System 6600 landing gear and overspeed system from P2 Aviation Technology, of Mound, Minnesota, in the panel of the 2001 AOPA sweepstakes Bonanza (see "An Extra Hand," page 154). This system ties into the pitot system and warns the pilot to check the landing-

Every bit of data is stored in memory and can be downloaded between flights.

gear position by generating a voice message and flashing a panel-mounted push-button annunciator switch when the airspeed decays below a set level. In addition, warnings are generated when airspeeds approach redline. There's also a provision to activate a Hobbs meter when airspeeds exceed 50 mph—this feature generates a more accurate flight-time reading than other methods.

Other panel- and cabin-mounted components such as the CO Guardian carbon monoxide detection system, the Aero Trim aileron trim system, and the P2 TimeTrac flight recording system will be featured in the May Commander Countdown report. There also will be a flight report about the flight east to the paint and interior shop at Master Aircraft Services in Wickenburg, Arizona, as well as a complete update on the engine and propeller installation. In the meantime, check AOPA ePilot and AOPA Online for more frequent updates.

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i Links to additional information about the AOPA sweepstakes may be found on AOPA Online (www.aopa.org/pilot/links.shtml).

E-mail the author at steve.ells@aopa.org.

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