

Hurry up and wait

Anticipating the upgrades to
the AOPA Sweepstakes Commander

BY STEVEN W. ELLS



The 2005 AOPA Commander Countdown Sweepstakes started with a long weather delay. A West Coast weather phenomenon called the “Pineapple Express” swept into Southern California immediately after Christmas. This weather

anomaly—which last visited California in 1998—overwhelms the southern part of the state, leaving in its wake damage, death, and destruction from mud slides, raging rivers, and flooding. This storm system stayed for more than 16 days and delayed AOPA’s ambitious refurbishment schedule for more than two weeks.

The first-quarter completion schedule for the 1974 Rockwell Commander 112A is very ambitious. A new instrument panel featuring the latest in avionics from Chelton Flight Systems and Chelton Aviation, Garmin, PS Engineering, Ryan International, CO Guardian, and P2 Aviation Technology;

new windows and windshield from LP Aero Plastics; a fresh factory-built engine from Lycoming; a new Top Prop three-blade propeller from Hartzell; a complete interior featuring leather from Mayfield Aviation Leather; and a professionally applied paint job featuring Sherwin-Williams paint sprayed by the skilled team at Master Aircraft Services—should be complete in time for a cross-country shakedown flight to the Sun ‘n Fun Fly-In, the first big airshow of the season, in mid-April.

AOPA’s plan to kick off the refurbishment process by flying from Paso Robles, California, on a round-robin flight to Wickenburg, Arizona, for a

Removing the interior, windows, and existing instrument panels permits Howard Aviation technicians to create a twenty-first-century avionics suite installation for the Commander Countdown airplane.

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day before returning to Howard Aviation at Brackett Field in La Verne, California, just before the end of 2004 was washed away.

Save for one other aborted attempt to fly east to Kingman, Arizona—where the interior refurbishment shop associated with Master Aircraft Services in Wickenburg was to remove the interior—N1169J did nothing but hold up three tiedown chains for nearly three weeks.

The decision to delay was based on the weather—freezing levels along the IFR routes hovered between 4,000 and 5,000 feet msl (the lowest minimum en route altitude [MEA] is 9,000 feet), and the winds aloft at the 6,000- and 9,000-foot levels were consistent at 30 to 40 knots. Let's see—low freezing levels, moisture-laden air, high MEAs, high winds, and mountains—better to wait by the fire.

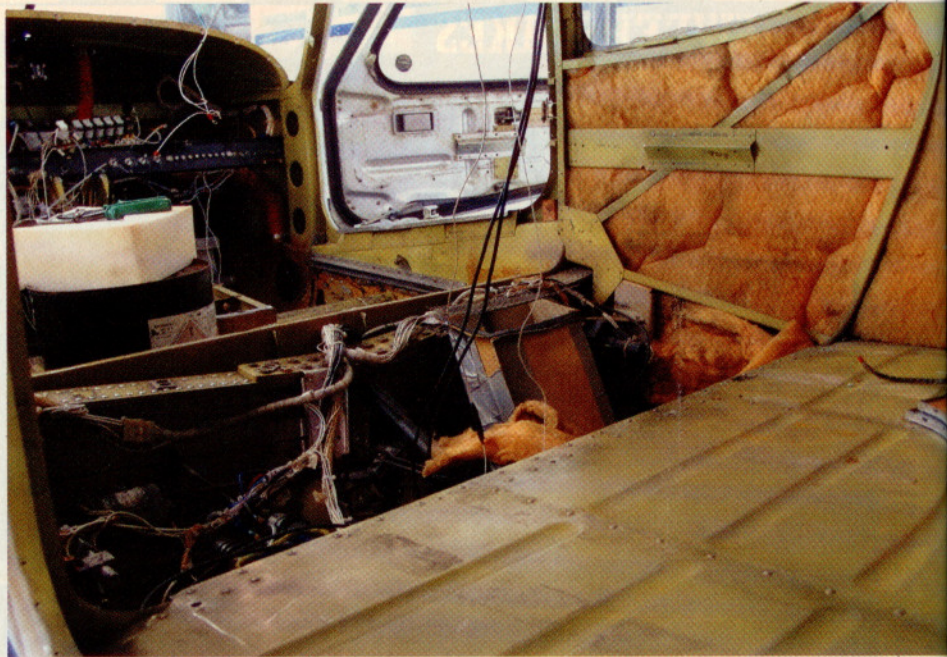
The first day

The weather finally abated enough to fly N1169J the 179-nautical mile trip to Brackett Field, home of Howard Aviation, on Wednesday January 17.

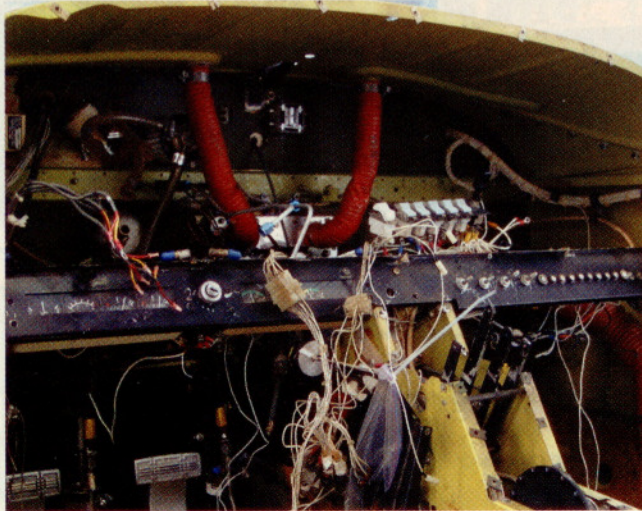
Howard Aviation is owned by Robin Howard, who has been providing aviation services in the Los Angeles Basin for more than 25 years. By a twist of fate, a search of the aircraft records revealed that Howard had seen 69J about 10 years ago when he signed off on the installation of a Magellan SkyNav 5000 GPS. The aircraft was then N804KM and was owned by Michael Strauss, who flew it as a sales demonstration airplane for Commander.

Strauss, who now flies a Gulfstream III for a Part 135 charter operation out of Long Beach, California, flew the sweepstakes Commander for more than three years. He will tell you that the 112 is his favorite airplane.

While the technicians at Howard Aviation are working out the details involving completing the airframe upgrades, installing the avionics, and



The factory-applied zinc chromate corrosion proofing can be seen with the interior removed (above). Every part of the old instrument panel is removed (left).



building the new instrument panel, Anna and Raul Colima of the interior shop—a division of Master Aircraft Services—will be busy creating a new interior featuring leather from Mayfield Aviation Leather, of Hickory, North Carolina.

One aircraft mod that won't need doing is the Commander wing spar reinforcement. In early 1992 the Commander factory completed the reinforcement of the forward wing spar in compliance with Airworthiness Directive 90-04-07 and Commander Service Bulletin 112-71C. This AD note—combined with a factor that is unusual in general aviation airplanes, a life limit on the wing spar—has caused some AOPA members to question AOPA's decision to refurbish a Commander for its 2005 sweepstakes airplane.

Isn't that dangerous?

Most GA airplanes are certified under CAR 3, an old certification standard. In 1964 the FAA implemented a modern standard, Federal Aviation Regulation Part 23. It required manufacturers to establish life limits (expressed in flight hours) for critical aircraft components. The life limits become part of the airworthiness standards for that airplane and are listed in the type certificate data sheet (TCDS). The Commander 112 was one of the first models certified to this new standard.

The service life of the wing and associated structures of the AOPA sweepstakes airplane is 6,945 hours (other Commander models have different wing life limits). Let's put that number into perspective. The sweepstakes 112A, a 1974-model airplane, accumulated its 2,043rd flight hour on January 3, 2005. This airplane has averaged 68 hours a year since the day it was released to ply the skies above America. If this flight-hour-average trend continues, the left and right wings of 69J will have to be retired in the year 2076!

In reality all general aviation airplanes have life-limited wings since it's a known fact that aluminum structures do have a finite fatigue life—only Part 23 airplanes have published numbers. If viewed in a positive way, a life limit is a guarantee rather than a limitation.



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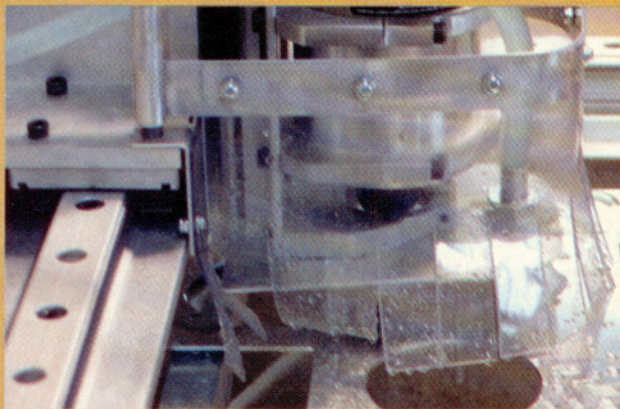
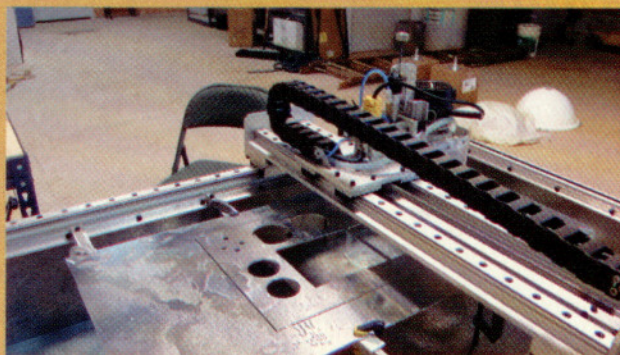
The life limits for the wings of the Commander Countdown airplane were originally arrived at by calculation. Commander owners can rest assured that these limits will be extended. There are companies that are capable of determining the actual stress levels by applying static flight loads—one common method involves using hydraulic cylinders to push and pull on an actual wing that's installed in a test fixture—while strain gauges measure the actual stresses. Computer programs then analyze these stresses to pinpoint less robust areas in the structure. These are called "hot spots." Invariably the computed stresses used to determine the original life limit turn out to be very conservative. The goal of every life-limit extension program is to lower stress levels in critical areas. Companies that conduct these analyses identify the critical areas and use the data to design a reinforcement for the critical area. They then obtain FAA certification of the modifications and market them as supplemental-type-certificate (STC) kits. Often all that's needed for a life-limit extension of up to 50 percent is the installation of a relatively small reinforcement.

For these reasons AOPA doesn't think the life limit on the wing of the Commander Countdown airplane is a liability. Nor should you.

Airframe modifications and upgrades

Artists like a clean canvas—so do airframe and powerplant (A&P) and avionics technicians. N1169J is that. According to aircraft maintenance record entries, the only upgrades and

Howard Aviation's avionics shop supervisor Brian Peoples is shown overseeing the company's Panel Pro CNC milling machine as it cuts a new instrument panel. Cutouts for the Sigma-Tek artificial horizon, the altimeter, the tachometer, and one of the 6.25-by-5-inch integrated display units have already been cut.



TOP: CHRIS SØRENSEN

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was removed for inspection and, ultimately, a top overhaul. A new bottom cowl was installed and the propeller was repaired. AOPA Aircraft Title Services confirmed this in less than a day by combing through the FAA records.

This record search also turned up a major repair and alteration form—known throughout the industry as a 337—that illuminated a modification that Edmondo had walked through the field approval process after the gear collapse. This mod involved upgrading the landing-gear actuating system to a later-model configuration to eliminate the possibility of future inadvertent gear retractions. To put it simply, N1169J is a 30-year-old airframe with no major airframe damage and just more than 2,000 hours' total time—these days that constitutes a clean canvas that will be easy to turn into a twenty-first-century Commander.

This clean-slate airplane plus one other factor should help Howard Aviation and Master Aircraft Services and its interior shop maintain the rigorous schedule that AOPA has laid out for the

first quarter of 2005. That other factor is that every modification and upgrade that has been selected for installation is already FAA approved.

Since 99 percent of the upgrades and modifications on AOPA's Commander Countdown sweepstakes wish list are readily available from the aftermarket, the announcement concerning Commander Aircraft Company's continuing financial woes shouldn't hurt the project. After all, the Waco featured in the 2002-2003 sweepstakes was rebuilt to as-new condition without factory support as was our 1998 Timeless Tri-Pacer and, for all but the new yokes, our 2004 Win-A-Twin Comanche. On the plus side, the resolution of the bankruptcy and the sale of the assets may provide parts and engineering data.

The windshield and windows that will be installed on the Commander are good examples of why the project can be completed without factory support.

LP Aero Plastics, of Jeannette, Pennsylvania, is providing a new windshield and side windows for the Commander Countdown sweepstakes airplane. LP Aero Plastics has been providing general aviation products for more than 50 years and holds parts manufacturing

approval for more than 1,600 products for more than 500 different aircraft. LP has won many awards for its quality and delivery performance—the windows and windshield installed in the AOPA Win-A-Twin Sweepstakes airplane were also from LP and were distortion free as well as good looking—the only combination that works for windows and windshields.

Airframe modification and updates

One of the best resources for information on Commander aircraft is the Commander Owners Group. Although COG is not very large as owners groups go, the enthusiastic members make up for it with their loyalty to their airplanes, and their willingness to help keep these underappreciated airplanes flying. With their help AOPA developed a wish list for the Commander project.

This list involved two goals—maximizing utility and safety while maintaining doability. AOPA has learned that there just isn't enough time in a yearlong sweepstakes to comply with overly ambitious plans. For this reason we've selected improvements that are

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already approved through the STC process.

Safety upgrades to the airframe include main landing-gear-mounted landing lights, new wing tips equipped with recognition lights, and a new dorsal fin fairing from Globe Fiberglass in Lakeland, Florida. The recognition lights will be pulsed by Precise Flight's Pulselite system. Additional safety mods include a portable four-place oxygen system, also from Precise Flight, of Bend, Oregon, a landing-gear warning system and TimeTrac system from P2 Aviation Technology, of Mound, Minnesota, a Comet Flash strobe light system from Whelen Engineering, of Chester, Connecticut, and a couple of sturdy control wheels from Cygnet Aerospace, of Los Osos, California.

Performance upgrades include a turbo-normalizer system from RCM Normalizing, of Big Piney, Wyoming; an EDM-800 engine-monitor system from J.P. Instruments, of Huntington Beach, California; and a set of GAMInjectors from General Aviation Modifications, of Ada, Oklahoma.

No, it's not a video game

Avionics have changed the face of general aviation in the past 15 years. An electronic flight information system (EFIS)—often called a “glass panel”—was first installed in an AOPA sweepstakes airplane in 2001. At that time getting approval for the installation of an EFIS in a single-engine airplane was a little more complex than it is today. Today, only four years later, almost all new-airplane manufacturers offer EFIS.

EFIS is common but the Chelton Flight Systems FlightLogic EFIS features an uncommon trait—3-D synthetic vision that permits pilots to see an electronic depiction of the terrain out in front of the airplane when in solid instrument meteorological conditions. The Chelton system that will be installed in the Commander Countdown airplane features two 6.25-by-5-inch integrated display units (IDUs) that will be configured as a primary flight display (PFD) on the left and a multifunction display (MFD) on the right.

Chelton technology also includes highway-in-the-sky (HITS) technology. HITS technology superimposes a

series of green boxes on the forward-looking display on the PFD. Fly the airplane through the boxes and the system guarantees that the airplane is on course and on altitude.

The same green-box system is used during approaches—fly the airplane through the green boxes down to the runway. The runway position is also shown on the PFD. The Chelton FlightLogic EFIS has too many features to cover in this brief article, but I will be reporting on my impressions of flying the Chelton system in upcoming issues of *AOPA Pilot*. I'm really looking forward to it.

Next month we'll look at more of the features of the avionics suite, and look in on how the Commander Countdown project is progressing. See *AOPA ePilot* and AOPA Online for more frequent updates.

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



Links to additional information about the 2005 AOPA Commander Countdown Sweepstakes may be found on AOPA Online (www.aopa.org/pilot/links.shtml).