# **AOPASWEEPSTAKES**

# Special features



n January, Howard Aviation began installing Chelton's FlightLogic EFIS (electronic flight information system) in the AOPA 2005 Commander
Countdown Sweepstakes airplane, a 1974 Rockwell Commander 112A.

In March, the Chelton FlightLogic EFIS helped guide adventurer Steve Fossett around the world nonstop in the Virgin Atlantic *Global Flyer*.

Within a month of Fossett's triumph, I too had the pleasure of flying the FlightLogic EFIS, in this case in the AOPA 2005 Commander Countdown Sweepstakes airplane, on a trip from Wickenburg, Arizona to Lakeland, Florida (see "2005 AOPA Sweepstakes: The Big XC," June *Pilot*).

In late April, Evernham Motorsport, which fields three Nascar teams, chose the Chelton EFIS for the panel of its company aircraft, a Beechcraft King Air 200.

Did AOPA start something, or has everyone else discovered





Chelton's EFIS? It really doesn't matter who came first; the Chelton EFIS is loaded with features that make it a pleasure to fly.

### The building blocks

The AOPA Commander's Chelton EFIS installation features two displays arranged side-by-side in front of the pilot. The left screen, the primary flight display (PFD), presents the same information that primary flight instruments always have: airspeed, altitude, rate of climb, heading, attitude, and vertical speed—all the information every trained pilot depends on.

While it's all familiar information, it does take a little time to get used to interpreting it when it's presented on a single 6.25-by-5.5-inch display. The system isn't hard to manage or understand, it just takes some time to get used to the new look of EFIS flying.

Flying the highway-in-the-sky (HITS) depiction on the PFD is quite simple. While in cruise flight, you do whatever it takes to keep the flight-path indicator within the series of green boxes that form a "tunnel"; when on final, keep it on the end of the runway.

The flight-path indicator is a new concept for almost all general aviation pilots; it's not the same as the little airplane symbol that's part of a traditional "steam gauge" artificial horizon. The airplane symbol shows where the nose of the airplane is pointed relative to the horizon while the Chelton flight-path indicator tells you exactly where the airplane is going. All a pilot has to do to prove the worth of a flight-path indicator is hold an airplane in a power-off stall and glance at the artificial horizon (AH) and the vertical speed indicator (VSI). The two traditional instruments might appear to give conflicting information: The AH indicates a nose-up condition while the VSI shows a descent. There's no possibility of a mixed message when flying with reference to a flight-path indicator.

Chelton recently achieved two milestones with their FlightLogic system. It released software version 5.0B and announced that the new software had passed RTCA DO-178B Level A software design compliance standards. The latter, in particular, is a big feather in Chelton's cap—Level A compliance is the same standard that the FAA requires for FAR 25 aircraft, those Boeing and Airbus widebodies that fly up where there's not much to see.

The Chelton GPS also is WAAS (Wide Area Augmentation System) compliant, meaning it is approved to take advantage of both vertical and horizontal guidance during GPS approaches. The terrain awareness warning system (TAWS) installed in the AOPA Commander is the "C" version; this version provides plenty of terrain warning for the low-and-slow capabilities of the Commander. The Chelton FlightLogic TAWS system can be configured to provide TAWS-B- and TAWS-A-level capabilities for turbine and passenger-forhire aircraft. For a look at the future of general aviation navigation and HITS technology, sign up on the Web site for a free DVD from Chelton (www.cheltonflightsystems.com/Prod \_cert\_request\_info.html).

## Seeing is believing

The Rockwell Commander 112A seemed to be standing a little taller on its gear after AOPA showed it off for a week at the Sun 'n Fun Fly-In in Lakeland, Florida, in mid-April. AOPA members flocked to get their first look at the finely detailed red, white, and blue paint scheme, the coffee-and-cream color of the Mayfield leather interior, and the latest in glass-

### **Data gathering**

The Commander's powerplant also has been "digitally enhanced," in this case with an EDM-800 engine monitor. Larry Elbert of J.P. Instruments stopped by during the Sun 'n Fun Fly-In and downloaded all the engine data stored in the Commander's EDM-800 engine monitor since it was installed back in January by Howard Aviation.

The data can be downloaded through a serial cable into engine data files on a laptop computer; it also can be dumped into a personal digital assistant (PDA) and transferred to an engine data file later. EZPlot software included with each monitor opens compressed data from the download and plots exhaust gas temperatures (EGTs) and cylinder head temperatures (CHTs) as well as other data.



panel avionics from Chelton Flight Systems and Garmin.

On Friday, April 15, it was AOPA Day at Sun 'n Fun and members took advantage of special admission rates and gathered to look at and talk about "their" next airplane. The sight of the Commander caused many to stop and stare; one member was so taken with the airplane that he appeared to stop in mid-stride—like he instantly went from normal cruise to the edge of a power-off stall. No one was actually seen falling to the ground, but each *AOPA Pilot* editor who stood with the airplane for Commander duty to answer members' questions soon had Commander stories to tell.

AOPA Pilot Editor at Large Thomas A. Horne was on duty when the test pilot who first put Commander single-engine airplanes through their paces stopped by to tell a few stories. He told Horne about the trials of flight-testing the Commander prototype airplane flight experiences that brought about important engineering changes. Later the next day, I noticed a member running his hand knowingly over the aft fuselage and explaining some airframe technicalities to a friend. On further questioning he told me that he was a member of the original design team.

AOPA members who own Commander singles—such as Nor Becker, who has owned his 112 for 26 years, and Dan Moody, who flies a well-loved 114B—stopped by to check on progress and share some Commander flying stories.

AOPA Pilot staff member Alyssa Miller recorded members' comments as they drew near AOPA's big yellow tent only to be captivated by the Commander. "Drooling, I think, is the word," said Brian Smith, who joined AOPA as soon as he saw the aircraft's glistening paint.

John McCaffrey sees winning the Commander Countdown sweepstakes as a steppingstone. "It would be a good excuse to get a complex rating and an instrument rating as well," said McCaffrey. New ratings and a completely refurbished Commander would fully equip McCaffrey to visit family members in New York from his home in Florida.

Sisters Katie, 8, and Kelsey, 11, told Miller they helped father Robin Hawley work on and fly his airplane, which Katie said is "really old." After a good look at the new paint, windows, interior, and panel gracing the sweepstakes Commander, Katie was a little bit fearful that Dad might not let her take the controls if he won such a new airplane.—*SWE* 

A video of the AOPA 2005 Commander Countdown Sweepstakes airplane at Sun 'n Fun can be found online (http://media.aopa.org/sunnfun05.asx).

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In addition to running plots of variances in the cylinder temps, other data include fuel flow, percent of horsepower, rpm, manifold pressure, and outside air temperature (OAT) can be selected for simultaneous display with the cylinder data. There's also a flight summary page, which contains minimum, average, and maximum values for every cylinder EGT and CHT as well as for all other parameters such as rpm, fuel flow, EGT differences, and horsepower.

Data from the Alexandria, Louisiana, to Crestview, Florida, leg of the Big XC is typical for the Commander with its new Lycoming engine—EGTs averaged 1430 degrees F with the two forward cylinders running 5 percent cooler and the two aft cylinders running 5 percent hotter than the norm.

Average power was recorded at 59 percent at 2397 rpm and 22 inches of manifold pressure. OATs averaged 70 degrees for the three-hour-and-sevenminute flight. The CHT splits averaged 40 degrees.

A few hours spent diligently studying these plots and graphs will do more than a week listening to an expert when it comes to helping pilots understand how every factor—even small changes in mixture, OAT, or rpm—affects other operating values.

### **Back on the road**

When Sun 'n Fun ended on April 18, the Commander was flown 674 nm north to Air Mod at Clermont County Airport in Batavia, Ohio, to get interior touch-up and detail work, and to install a set of Globe Fiberglass wing tips equipped with Whelen recognition lights.

The team at Air Mod—led by owners Dennis and Cynthia Wolter—runs an interior shop that is known for highquality, tasteful interior treatments. Wolter added a few touches to the existing interior. These refinements aren't particularly expensive—laying colorcoordinated fabric over a few of the new interior plastic parts from Vantage Plane Plastics, adding some detail sewing in the door panels, adding additional carpet, and incorporating new door handles—but together they create a one-of-a-kind look and feel that's uniquely Air Mod.

The Air Mod specials were finished by the end of May when N112WN was flown east to AOPA's Fly-In and Open House in Frederick. A few days later I



Air Mod and Vantage Plane Plastics worked together to create the luxurious, interior. The new door handles (left) are classic Air Mod.



Globe Fiberglass wing tips, enhanced with Whelen recognition lights, were installed in Batavia, Ohio.

was scheduled to set off again for another cross-country to Wyoming home to Yellowstone National Park, the Grand Tetons, and places with names such as Cheyenne and Big Piney. Robin Miley of Big Piney is the owner of RCM Normalizing, a Commander maintenance expert, and the developer of the system he's named the Hot Shot Turbo Intercooler system for the Commander.

### **Altitude power**

A turbonormalizing system compensates for the normal engine power drop-off that takes place when normally aspirated airplanes climb. Performance figures from the pilot's operating handbook reveal that the Commander 112 series of airplanes does not have standout performance. For example, a maximum performance climb at maximum gross weight and standard temperature gives 550 feet per minute at 6,000 feet. Sven Faret, a long time Commander 112 owner from Plainview, New York, has written that a non-modified Commander is a 130knot airplane that runs out of steam at around 10,000 feet msl. This is adequate for the half of the country that is east of the Rocky Mountains, but a little anemic for the mountainous part.

The RCM Turbo Intercooler system, which features a new CF600573-0 turbocharger and a CF101633-31 oil scavenge pump from Kelly Aerospace in Montgomery, Alabama, uses a specially designed exhaust system that directs the energy in the engine exhaust pipes into a special high-temperature turbine wheel. That wheel is attached to one end of a shaft that is lubricated by a constant stream of engine oil. On the other end of the shaft is another wheel; this one rotates at the same speed as the turbine wheel and is designed to compress outside air that is drawn through an induction air filter before entering the wheel housing. The compressed air which heats up during compression—is then ducted to an intercooler before entering the engine. Intercoolers are nothing more than air-to-air heat exchangers—hot compressed air goes in and is cooled down before it enters the engine. A pilot-controlled manual wastegate permits the pilot to control the amount of compressed air ducted into the engine. The system is capable of delivering 28.5 inches of manifold pressure up to the authorized maximum altitude of 16,500 feet.

According to RCM and many Commander Owners Group members, a turbonormalizer transforms the Commander into a do-all airplane that is strong enough to get up to oxygen altitudes where true airspeeds slide above the 150-knot mark and capable of operating with increased safety margins out West. This performance boost is a welcome complement to the armchair comfort and the generous cabin dimensions of Commander single-engine airplanes.

The trek of the Commander Countdown sweepstakes airplane continues with more flights to Wickenburg in July for touch-up paint by Master Aircraft Painters before turning northeast to set a course for Oshkosh. There the Commander will take its place of honor in front of AOPA's big yellow tent at EAA AirVenture from Tuesday, July

Links to additional information about the 2005 Sweepstakes airplane may be found on AOPA Online (www. aopa.org/pilot/ links.shtml). 26, through Monday, August 1. Stop by and see what could be your next airplane. See you there.

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