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# Common Ground Pilot, farmer team up with F90

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#### A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT



EDITOR Kim Blonigen

EDITORIAL OFFICE 2779 Aero Park Dr., Traverse City MI 49686 Phone: (316) 652-9495 E-mail: editor@blonigen.net

> PUBLISHERS J. Scott Lizenby Dave Moore Village Publications

GRAPHIC DESIGN Rachel Wood

**PRODUCTION MANAGER** Mike Revard

**PUBLICATIONS DIRECTOR** Jason Smith

#### ADVERTISING DIRECTOR

John Shoemaker King Air Magazine 2779 Aero Park Drive Traverse City, MI 49686 Phone: 1-800-773-7798 Fax: (231) 946-9588 E-mail: johns@villagepress.com

#### ADVERTISING EXECUTIVE ASSISTANT

Betsy Beaudoin Phone: 1-800-773-7798 E-mail: betsybeaudoin@villagepress.com

#### SUBSCRIBER SERVICES

Rhonda Kelly, Mgr. Kelly Adamson Molly Costilow Diane Smith Jamie Wilson P.O. Box 1810 Traverse City, MI 49685 1-800-447-7367

**ONLINE ADDRESS** www.kingairmagazine.com

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# Farming, Friendship and the F90

A Winning Combination for King Air Owner Larry Hancock

by Kim Blonigen

Pat Reaume (left) and Larry Hancock were friends before he started flying the King Air F90 for LKH Farming. (Photo by Rob Turchick of yipDog Studios) h tł T an re pi ge bu ai w arry Hancock and Pat Reaume built their friendship in a typical way. Both had children

the same age and in the same high school sports, and they followed them wherever they were competing. That allowed for a lot of time to talk and get to know each other. Pat is a retired airline pilot and Larry had his pilot certificate and used airplanes to get to farther destinations in his farming business. So, of course they had many airplane and flying conversations, that's what pilots do!

he King Air F90 fulfills LKH's mission. One of the ways it is used is to transport investors to the distressed land they have purchased and hired Larry to develop it. (Photo by Rob Turchick of yipDog Studios)

Larry also drove up to 100,000 miles a year to keep up with his farming operation. As Pat describes it, "what should have been a life-ending accident" gave Larry physical limitations to where he couldn't be a pilot anymore. Wanting to cut down on the amount of driving he did, Larry asked Pat if he wanted to fly for him. Pat was flying very little at the time and it would take four years for it come to fruition.

Arizona and after he graduated from high school, he moved farther north to start out on his own. He took various jobs until he had enough money to lease some land to farm and kept expanding from there; soon, LKH Farming was established. LKH's office headquarters are based in Ehrenberg, Arizona, on the state's border with California. Larry, Pat and the aircraft are all based about 100 miles east of there in Wickenburg.

Larry grew up in a farming family in southeastern

**Building a business** 

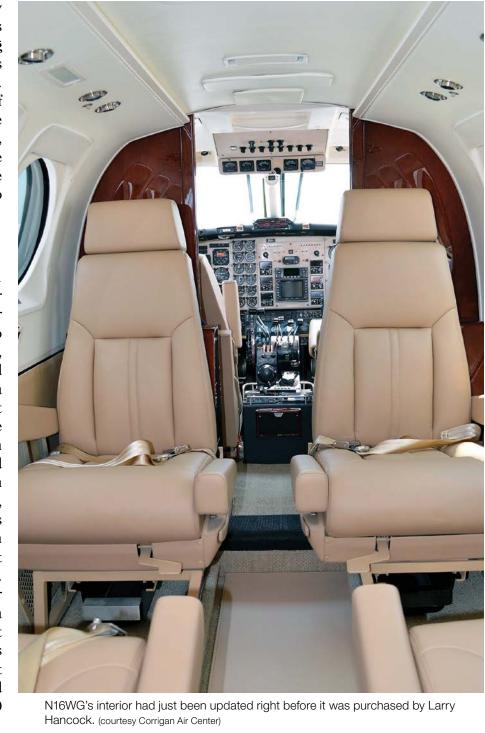
Larry currently farms about 11,000 acres and is one of the largest cotton growers in Arizona; he also grows alfalfa, organic vegetables and provides hav for ranchers in the Southwest. What has become Larry's forte, though, is making worthless land profitable. The primary way he is able to accomplish this is through drip irrigation that is installed underground; this allows farmers to cut their water usage nearly in half. A big part of his business now is developing distressed property that has been purchased by investors. His life-long experience of farming has given him the gift of knowing what to plant, as well as how to enrich the soil. That, along with the irrigation, allows the land to become profitable.

#### Made for the mission

Larry owned a Cessna 421 when Pat started flying for him but he was ready for something else. When the two discussed aircraft options, Larry mentioned that he had always dreamed of owning a King Air. Pat told him that first they had to define the airplane's mission and then the right aircraft would present itself. The mission was to access all of the farms, usually less than 1,000 miles away, and be able to land on various surfaces which Pat said dictated a turboprop. They looked into the Piper Cheyenne and Cessna Conquest, but the Beechcraft King Air became the obvious choice, especially since it uses phase inspections and they would fly less than 200 hours per year.

Once they had decided on a King Air, Pat contacted King Air expert Tom Clements. He wanted to get a feel of what to expect flying the airplane. "He has been there to answer any question I have had about the King Air and also gave me Dean Benedict's name for maintenance questions.

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I consider both Tom and Dean my mentors," Pat expressed.

Bill Woods at Western Wings in Oregon helped find the right King Air. A 1985 model F90 (N16WG) became available and looked like it would fit LKH's needs. Bill flew it from Corrigan Air Center in Texas, where it had just received a new

interior and paint, to Wickenburg for Larry and Pat to look over. After a pre-buy inspection by Dean, they made a deal. Pat took his training through the King Air Academy, also located in Arizona, and says it was high quality and very similar to the standard he was used to at the airline.



Something that wasn't updated on N16WG is the avionics. "It's all original, but I actually like it that way. I love where technology has taken aviation, but I'm fine flying the airplane as it is," Pat explained. "Of course, we still need to add ADS-B and to what extent we upgrade everything else is still to be determined."

#### **Building relationships**

The King Air has been more than fulfilling LKH Farming's needs since they acquired it in 2016. A common trip would be Pat flying to pick up a group of investors who own land and want Larry to develop and farm it. Pat flies over the area to give the investors an aerial view and then lands on a dirt strip right where Larry is waiting to give them his recommendation on what would grow best there and propose his plan.

The F90 is also used to visit family, and to follow Larry's son, Matt, who spends his weekends professionally racing UTVs (Utility Task Vehicle, also called a side-by-side). There are six races a year that they fly to in California, Washington, Utah and Nevada. "Matt recently won a pro race in San Bernardino, California; he's a serious contender," Pat said. What is one of the things Pat likes best about the King Air? "Since owning N16WG, we have had 100 percent dispatch reliability," he said. "We've flown it almost 400 hours and all I've had to replace is one windshield and the emergency exit seal – that's it!"

He also appreciates the way the King Air performs. Flying out of Arizona, the density altitude starts at 7,000 feet and during the summer can be over 10,000 feet. When flying to the West Coast, the aircraft is great flying above the marine layer but also handles well flying IFR. "There have been times when I've transported six to seven

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Larry is one of the largest cotton producers in Arizona; here is one of his cotton crops with hay, which he also grows, being stored in the background. (courtesy LKH Farming)



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#### **About Retirement:**

"Larry isn't slowing down, and I can tell you that ... the flying I'm doing now is fantastic."





Larry follows his son, Matt, who competes professionally in UTV races, which occur six times a year. (courtesy Harlen Foley - ATVriders.com)

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people aboard the F90 and it's all about the payload there," Pat explained. "Everybody I've dealt with in the King Air community has been great. I have built relationships with all of them."

Larry just turned 65 and Pat is the same age. When asked if retirement was in the picture, Pat quickly replied, "No way! Larry isn't slowing down, and I can tell you that in my history of flight instructing, flying DC-6s out of Miami and flying for the airlines, the flying I'm doing now is fantastic. What pilot wouldn't want to fly and maintain a great airplane?" The men's families have grown even closer and become, Pat says, "more than friends. We spend the holidays together and we're really more like family, in every sense of the word." 📧

# Autofeather Review

#### by Dean Benedict

see a lot of questions about the King Air's autofeather system in online discussions. It's not just the newly minted King Air pilots that are asking. Many a King Air pilot with plenty of hours under their belt have had the occasional "synapse lapse," so I thought a basic review of autofeather would be in order.



#### **The Haves and Have Nots**

Not all King Airs have it. Back when I was corporate shop foreman at Beech West in Van Nuvs, California, autofeather was not a standard feature. The sales staff ordered all new King Airs from Wichita without it. When they sold the aircraft, they convinced the buyer to add autofeather - this was a major job. You have to remove the leading edges and rip into the nacelles and the interior to run the necessary wiring. Although it kept the shop plenty busy, I thought this was a foolish way to sell a King Air. I never got used to tearing into a brand-new airplane.

Eventually, I got the sales team in Van Nuys to order King Airs from Wichita with autofeather every time. Later, a group of us in the field convinced the factory to add the autofeather wiring into the master wiring loom; this made subsequent installation of autofeather a much more efficient process.

Over time, autofeather became a standard feature, but there were plenty of King Airs built without it, and many of those still don't have it. This is something to keep in mind if you're shopping around in the used King Air market – don't assume they all have autofeather.

If your King Air does not have autofeather, you can research the serial number to see if the necessary wiring was installed at the factory when your aircraft was built. If the wiring is there, then adding autofeather

would involve the installation of some switches and cannon plugs in the pedestal, new torque manifolds and pressure switches, and some annunciator panel revisions.

Autofeather is a nifty thing to have, and if an engine fails during takeoff, it is a godsend. Feathering the propeller on the failed engine is one less thing to worry about in a eluteh situation.

#### Autofeather Test

On takeoff, the autofeather system arms when the power level reaches 92 percent N, or higher. But in your preflight run-up on the

ground, it's a pain to run each engine up to takeoff power for an autofeather test. You'd have to stand on your brakes and hope your fillings don't pop out while pulling each power lever back one at a time. Fortunately, the Test position of your autofeather switch eliminates that problem.

In Autofeather Test, the power lever switches in the pedestal (the ones set at approximately 92 percent N<sub>1</sub>) are bypassed. This enables you to test the autofeather function at a much lower power value.

#### **Autoignition and Autofeather**

Each engine has a high-pressure switch on the torque manifold that actuates at approximately 400-500 footpounds (ft-lbs) of torque. These pressure switches have a dual function: they turn your autoignition off and they arm your autofeather (they don't activate the system, they just *arm* the system). It is common practice to test autoignition and autofeather in the same power run-up. At this point in your ground run-up you would have the autoignition switch in the On position and you're holding the autofeather switch down in the Test position.

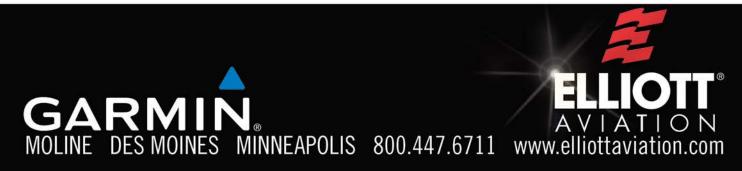


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Both the autofeather and the autoignition annunciator lights are green. Below 400 ft-lbs your autoignition annunciators will be on. As the power levers are advanced toward 500 ft-lbs, the autoignition greens go out and the autofeather greens come on. Most King Air training programs use the phrase "two greens off and two greens on" as a memory technique to teach this relationship.

Just don't expect the autofeather greens to come on simultaneously. The pressure switches on the torque manifold can trigger anywhere between 400 and 500 ft-lbs, and engine N, acceleration is another variable. You want two greens off and two greens on ... eventually.

The main thing to remember about autofeather arming is that each engine arms the opposite side. This is where new King Air pilots can easily get confused. The left engine arms the right side autofeather and vice versa.

Imagine advancing your power levers and the left autofeather light comes on but the right light does not. You have to fight the instinct to continue advancing your right engine power lever, because at this point, the right engine just armed the left-side autofeather. In this scenario, the right-side autofeather is not yet armed and the left power lever must be moved further forward.

So, if your left light comes on first, continue advancing your left lever until you get the right-hand autofeather light. Conversely, if you get the right light first, keep advancing the right lever until the left light comes on. It's counterintuitive in the beginning, but you soon get the hang of it.

#### **Autofeather Test Continued**

You have two greens on, so autofeather is armed on both sides; now it's time to test the system. Pull one power lever back while still holding the autofeather switch in the Test position. Let's start with the left side. As you pull back through 400 ft-lbs with your *left* power lever, the *right light* should extinguish (the right side is now unarmed and cannot go into feather). At approximately 200 ft-lbs of torque the *left prop* should feather.

A different pressure switch on the torque manifold triggers the feathering. It activates a solenoid on the overspeed governor when the torque drops to 200 ft-lbs. Prop blades are kept in flat pitch by oil pressure. When the oil pressure dumps, the prop feathers.

Autofeather function is wired on the same side. In other words, the left engine controls the feathering of the left prop and vice versa. Only the arming of each autofeather system is wired to the opposite side. There's a good reason for this and I'll come to it shortly.





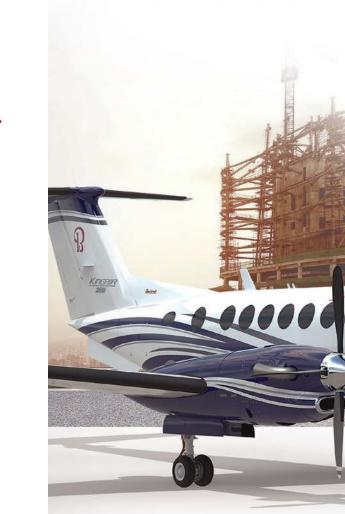


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#### **Flickering Lights and Oscillating Blades**

I am often asked about autofeather lights blinking during test. Well, when a prop goes into feather, particularly while on

the ground, it increases the engine torque. In the example where you just feathered the left prop, if the torque pushes far enough above 200 ft-lbs, the left autofeather light will come back on and the left prop will flatten out. Flat pitch reduces torque. If it falls back down to 200 ft-lbs, the left annunciator light will go out again and the left prop will feather again.

This flicker of the annunciator lights and oscillating of the prop blade is not unusual during autofeather testing on the ground. But it's equally normal for that annunciator light to go out and stay out. There are lots of variables (engine rigging,  $N_1$  settings, pressure switch adjustments) that influence whether or not you'll have a blinking annunciator during autofeather test. Either way you are good to go. Now let's bring the left engine back to speed and do the same with the right engine.

#### Autofeather Test – Last Step

Once you have brought each engine, one at a time, down to 200 ft-lbs to feather each prop, there's one more check to do. Assuming

## <sup>66</sup>... how you squawk an autofeather problem can make your mechanic's job simple or complex.<sup>99</sup>

that you feathered the left prop first and now you have your right prop in feather, there's one more step – pull back the *left* power lever and make sure the left prop *does not* go into feather. Also make sure that the right prop comes out of feather. This is a crucial test; it ensures all switches and wiring are operating properly. If, in

this last test step, the left prop feathered along with the right, you have a problem; or if the right prop doesn't come out of feather, you have another problem and either way your autofeather system needs attention.

#### **Test versus Arm**

You are ready for takeoff; you put the autofeather switch in the Arm position and take the runway. You go through 500, 600, 700 ft-lbs of torque, but the autofeather lights don't come on. Why? Because you have not yet gone through 92 percent  $N_1$ . Once you pass that  $\blacklozenge$ 







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N, threshold your autofeather annunciators should come on and both sides are armed and ready to go.

The Test position of the autofeather switch is springloaded for a good reason. It makes it impossible to accidentally leave the system in Test mode and risk unintentional arming of the autofeather system at an insufficient power level.

A King Air's automatic feathering system is designed to allow only one engine to feather at a time; they will never go together. You will recall that the left engine arms the right side autofeather (between 400-500 ft-lbs in Test and above 92 percent N, in Arm). If the left engine has failed on takeoff and the left prop goes into feather, it is now physically impossible for the right prop to feather. The left engine, being well below 92 percent N<sub>1</sub>, has unarmed the right side autofeather.

#### Leaving the Switch in Arm

In my opinion, autofeather is most crucial during takeoff. Some leave the switch armed in cruise, but at FL 250, if you had an engine failure and the switch was off, you'd still have plenty of time to cage the problem engine.

On approach, even if the switch is in the Arm position, the system will not be armed as long as you are below the 92 percent N<sub>1</sub> threshold. However, if you need to perform a go-around and your switch is in Arm, the system will be armed as soon as you push the power up high enough.

#### **Maintenance**

Where's the "Maintenance Tip" in all of this? Well, how you squawk an autofeather problem can make your mechanic's job simple or complex. Many a pilot has dropped the aircraft off for maintenance on a Sunday night and realized they forgot to write up their squawks, so they leave a hastily scribbled list in the cockpit that includes "Autofeather inop."

Of course, I can troubleshoot from square one and work my way to the root of the problem, but if I get more precise information from the start, the job goes faster and you save money.

How about this squawk: "Autofeather tests good on ground but L/H annunciator fails to illuminate on takeoff." Aha! That sends me straight to the R/H power lever switch on the pedestal. Or this: "Autofeather will not test." Great! I can verify that the greens are not coming on at 400-500 ft-lbs torque, and then I know to zero in on those torque switches.

> The more specific the information you give to your mechanic, the faster the problem will be diagnosed and fixed. I hope this helps.

Meanwhile, enjoy the heck out of vour King Air. 🔼

Note: This article originally appeared in the November 2013 issue of King Air and was republished (with minor revisions and corrections) at the request of new magazine subscribers regarding this subject.

Dean Benedict is a certified A&P, Al with over 40 years' experience in King Air maintenance. He's the founder and former owner of Honest Air Inc., a "King Air maintenance boutique" (with some Dukes and Barons on the side). In his new venture, BeechMedic LLC, Dean consults with King Air owners and operators on all things King Air related: maintenance, troubleshooting, pre-buys, etc. He can be reached at *dr.dean*@ beechmedic.com or (702) 773-1800

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# FAA Bill, U.S. Airport News and a New Nall Report

#### by Kim Blonigen

#### **Another Extension on the FAA Bill?**

It looks like it. Congress has yet to come to an agreement on a long-term FAA reauthorization bill. The agency is operating under it's fifth short-term extension set to expire Sept. 30 and will likely see its sixth.



The Airlines for America (A4A) president and CEO Nicholas Calio stressed last month that all stakeholders need to collaborate to get a long-term FAA reauthorization passed. "This is critical for FAA to maintain and advance the safest, most efficient airspace system in the world," he said. "There have been far too many extensions over the years, and we simply can't have stop-andstart funding."

Many see action possible in the days following the November elections. But if Congress fails to act by the end of the year, a new Congress begins and all bills must start from scratch.

Late Breaking News: A new FAA Reauthorization bill was released on Saturday, Sept. 22, which could be voted on by the House and Senate and approved by President Trump by the Sept. 30 deadline. The bill eliminated one of the most contentious clauses, but still has a few that may take some further compromising. The question is, can it be done in a week?

The National Air Traffic Controllers Association (NATCA) commended the bill as having five years of reliable funding would be very helpful in dealing with controller shortages throughout the system. As mentioned, the reliable funding is also critical in order to advance the airspace system to where it needs to be.

#### **McCarran Airport Introduces Tool to Help Reduce Departure Delays**

The National Business Aviation Association (NBAA) reported that a new tool has been unveiled at McCarran International Airport (LAS) to help business aviation operators significantly reduce potential departure delays when they take off from Las Vegas, Nevada.

The Departure Delay Mitigation Tool (DDMT) was developed by the Las Vegas Terminal Radar Approach Control (TRACON) facility and collects and presents departure demand information for an entire day in an easy-to-view format, allowing crews to decide whether to reschedule a departure for a lower-demand window. The tool is expected to be especially useful during the many high-traffic special events that Las Vegas hosts.

NBAA's Director for Air Traffic Services and Infrastructure, Heidi Williams, said the association supports the DDMT as an alternative to previously used tools like the FAA-managed Electronic Special Traffic Management Program, which was widely regarded as ineffective due to timing and compliance issues.

"With the DDMT, the Las Vegas TRACON has created what we believe will be a valuable tool for the business aviation community," Williams said. "We appreciate that they are hearing and acting on the needs of our industry."

The DDMT is available on kiosks at Signature Flight Support and Atlantic Aviation and went into service Sept. 10.

The FAA plans to eventually make the DDMT available on a smartphone and tablet app, and potentially institute the program at other airports.

#### **Customs Ends Landing Rights at Michigan's Drummond Island Airport**

Effective Sept. 30, U.S. Customs and Border Protection (CBP) will withdraw the "landing rights" designation for Michigan's Drummond Island Airport (DRM) and will no longer service the airport for private international arrivals.

CBP inspected approximately 55 arriving aircraft a year at DRM and continuing the services was "cost prohibitive and adversely affected CBP operations in the area."

The agency plans to continue servicing private aircraft at Sault Ste. Marie (CIU) or Sanderson Field (ANJ); both located about 60 miles west of Drummond Island, where CBP assets are already in place. CBP had previously assigned seasonal staff to DRM to conduct small boat inspections, but the boating community can now report arrivals to Drummond Island and surrounding communities electronically.

Under CBP regulations, private aircraft entering the United States from a foreign area must first land at a landing-rights facility, user-fee airport, or international airport designated in their advance passenger information system (APIS) transmission.

#### **ASI Releases Latest Nall Report**



The AOPA Air Safety Institute (ASI) released the 27th Joseph T. Nall Report in early September. The Nall Report provides an in-depth look at general aviation accidents from the most complete year that information is available and also includes trends. The National Transportation Safety

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Board (NTSB) requires substantial time and resources to investigate accidents, so ASI uses the latest year where 80 percent of its accidents have a probable cause determined by the NTSB, which is 2015 for this latest report.

Per the report, general aviation (GA) is defined as all flight activity except that done by the uniformed armed services and the scheduled airlines. In addition to personal and recreational flying, it includes public-benefit missions such as law enforcement and fire suppression, flight instruction, freight hauling, passenger charters, crop-dusting, and other types of aerial work that range from news reporting to helicopter sling loads. The report covers airplanes with maximum rated gross takeoff weights of 12,500 pounds or less and helicopters of all sizes. Collectively, these types of aircraft account for 99 percent of GA flight activity.

In all, general aviation aircraft were involved in 1,173 total accidents, 221 of which were fatal resulting in 375 fatalities. The number of fatal accidents was down

4 percent over the 229 in 2014. This decline occurred during a year when flight hours increased by 3.6 percent, reaching 23.98 million. The more detailed look at the Nall Report did highlight the continued need to focus on training, with pilot-related accidents accounting for 74 percent of the non-commercial accident total during 2015.

Breaking it down further, there were 967 total fixedwing, non-commercial aircraft accidents; nine were multiengine turbine aircraft. Statistics show that fixed-wing commercial operations are among some of the safest in GA operations. Of the Part 135 charter or cargo operations accidents, a total of 26, the majority of the aircraft were single-engine; only three were multiengine turbine. 🖾





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## **Ask** the **Expert**

# **Why Do Some Switches Have White Circles?**

by Tom Clements

n late June 2018, there was a thread on the BeechTalk forum that asked about the white circles around some cockpit switches. It also raised the question of why some switches had red inserts. I was surprised to find that some King Air pilots were not aware of the white circles' meaning, so I decided to address this issue in my monthly article.

One of the major changes that took place with the F90's introduction in 1978 was the change to an entirely new electrical system. I have no complaints with the electrical system in the previous King Air models; and the same goes for the latest 250 model of today which has a system nearly identical to that in the prototype serial number BB-1 manufactured in 1972!

The F90's system has some capabilities that its predecessors do not. Chief among those is automatic *load shedding*. In the admittedly unlikely occurrence of a dual generator failure, relays automatically open to remove power from the Left and Right Generator Buses.

All components wired to these "Main" buses are now without power. What is the benefit of this; losing a lot of equipment in this critical time? Of course, it is to prolong battery life, since the battery is the only source of electrical power that we now have.

Before the F90-style system – often called the "Triple-Fed Bus System" or the "Five-Bus System" - it was incumbent upon the pilot to turn off the major electrical demands that he could identify and terminate to save the battery from rapid depletion. These items included the air conditioning and electric heater, the vent blower, windshield heat, propeller heat, and lip boot heat on the earlier 90- and 100-series models that had the old-style "Chin Cowl." With automatic load shedding, these items were killed without any pilot action required. Cool!

By the way, do you realize that a lot more King Airs than you would think have suffered dual generator failures? Yes, it's true ... because the pilot gave the failures to himself! How? By mistakenly moving the

"Ignition" and "Engine Start" switches to the top position when he/she meant to move the "Auto-Ignition" switches to their top, "Arm," position. That huge mistake will never go unnoticed in the later-style electrical systems since so much equipment shuts down – including two-thirds of the avionics – as the generator buses are shed. Yet the mistake has not been caught and has led to total electrical failures in some models with the earlier-style system.

The F90's brand-new electrical design had a few minor mistakes. It would be amazing for the design engineers to achieve perfection in their first go-around of this new design, right? For example, how come the "Gen Ties Open" annunciator sometimes means that both left and right generator



Figure 1: The pilot's left subpanel on a 1988 C90A.





bus ties are open and at other times means that only one is? Why does the airplane have five buses - Left Generator Bus, Right Generator Bus, Center Bus, Triple-Fed Bus and Hot Battery Bus - yet voltage can only be checked on three of them? Exactly why does the voltmeter's "Battery" position measure the Triple-Fed Bus? How come the "Bus Sense Test" switches are labeled so peculiarly?

Six years later, in 1984, two other King Air models hit the scene - the C90A and the 300 - and both had the F90-style electrical system with almost all of the

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little glitches addressed and corrected. As mentioned, the 250 is the only currentlymanufactured model that does not have the newer-style system, whereas the 350 and C90GTx models have the latest.

Now about those white circles ...

Some clever Beech designer came up with a nifty way to indicate to the pilot which items would still be working following load shedding - paint a white circle around them. In previous King Airs, when the battery got turned on, everything in the airplane was capable of operating. It would surely drain the battery quickly to run the electric heater or air conditioner vet nothing - except commonsense - prevented that from happening. When the battery is turned on in the newer-style system, however, only the white-circled items are functional. Need to check the right pitot tube's heat? Want to run the flaps down to wash them? If you want the battery to power these items - and many more – then you need to complete another step, in addition to turning the battery switch on: Move the Generator Ties switch momentarily up to the "Man Close" position to manually close the left and right generator bus tie relays.

I am surprised by the number of King Air pilots who are not aware of the white circle's significance. I think training providers need to do a better job of educating their customers to the meaning of these circles since it is important to know at a glance what has not been shed when the generators are not online.

Figure 1 shows the pilot's left subpanel on a 1988 C90A. A lot of white circles, eh? Notice the ones on the "Engine Anti-Ice" switches. Get your black Sharpie felt-tip pen out and mark over them ... they should not be there! Notice that there are no circles around the "Actuators" switches. Well, if neither Standby nor Main motors are powered

following load shedding, then how can Engine Anti-Ice function? It cannot, so the white circles are a design flaw / manufacturing mistake.

Now examine the same location on a newer 350 as shown in Figure 2. Notice the half-circle on the Main actuators. On the 350, the Main actuators receive power from the Triple-Fed Bus while the Standby actuators come from the Generator Buses ... a better design by far.

Keep in mind that the non-circled components, the items that are shed, can be easily brought back to life by the simple action of moving the "Gen Ties" switch



Figure 4: The righthand subpanel of a 350.

up to "Man Close." (It then springs back to Norm while giving you an advisory annunciator of "Man Ties Close.") I would strongly suggest doing this in the C90A- and F90series if the dual generator failure happens in cruise and you need to descend through an ice-laden cloud deck for your landing. Once the ice vanes are extended, then remove the power, the extra battery drain, by moving the "Gen Ties" switch down to "Open." I surely wish the 300 electrical designers had shared their ice vane wiring idea with the C90A group!

Figure 3 shows the pilot's righthand subpanel on the C90A, and Figure 4 exhibits the same on a 350. Can you find the subtle differences? One nice improvement on the 350 is that the beacon will work before engine start without having to close the Generator Ties manually. Do you, like most of us, leave the beacon on when securing the airplane? That is an old trick





receive inflow for pressurization and heating

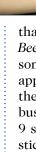
only from the left side's Flow Pack. A confusing realization in the C90A system is that both the Air Conditioning and the Electric Heater systems receive power from the Center Bus ... and it is not a bus that is shed! Rest easy, however – a special circuit causes those two heavy-load items also to be unavailable.

Lastly, look at the fuel panels of the 350 (Figure 7), then the C90A (Figure 8). Oops! The memo about using the white circles must never have

gotten to the silk-screening folks who did the C90A's fuel panel! Nor did it get to the guy or gal who labels the switches on the pedestal. The later C90B and C90GT models finally did get a circle on every switch on the fuel panel ... as they should have had all along.

Fred Scott, a C90A owner-pilot from Virginia, had the electroluminescent panels in his lovely King Air redone to a better-than-new condition by a shop specializing in that process. It took a while for Fred to recognize

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that all the circles were gone! Reading the thread on BeechTalk, then talking and emailing with me, Fred had some stick-on circles manufactured and painstakingly applied them to all the proper switches ... including the fuel panel. He spent a lot of time researching the bus components and learned a lot from doing so. Figure 9 shows a photo of him positioning one of the circle stickers. The circles he added totaled up to 33. I admire vour effort and results. Fred!

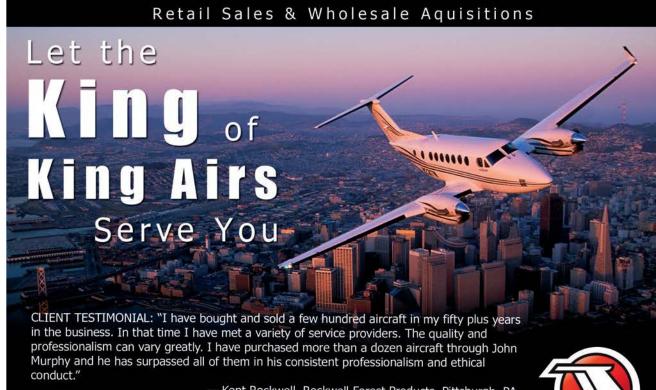


The fuel panels of the King Air 350 (Figure 7, left) and the C90A (Figure 8, center).

Here are a couple of additional switch-related comments. First, as you likely already know, the switches with the round silver base are a combination switch and circuit breaker. If excessive current flow causes too much heat, the switch will spring down to the off position. The amperage value at which it should trip is the number that you can see stamped on the end of the switch shaft.

Second, yes indeed, you can see red on some of the switches. I believe this is the color of a rubber seal that prevents dirt and grime from entering the switch. I have never observed the red seal on a CB switch, but they are quite common to find elsewhere.

I'll close with a short quiz: Which switches on your B200 should have white circles? Depending on your point



- Kent Rockwell, Rockwell Forest Products, Pittsburgh, PA

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of view, the answer should be "all of them" – since everything keeps working following a dual generator failure – or "none of them," since there is no such thing as Automatic Load Shedding and you know that it is you alone who must shed the undesired items. I am personally happy that the 200 panels are not cluttered with useless circles!

King Air expert Tom Clements has been flying and instructing in King Airs for over 46 years, and is the author of "The King Air Book." He is a Gold Seal CFI and has over 23,000 total hours with more than 15,000 in King Airs. For information on ordering his book, contact Tom direct at twcaz@msn.com. Tom is actively mentoring the instructors at King Air Academy in Phoenix.

If you have a question you'd like Tom to answer, please send it to Editor Kim Blonigen at editor@blonigen.net





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ACQUISITIONS

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Figure 9: C90A owner Fred Scott, carefully positioning stick-on circles to the appropriate switches on his panel.



# The Saga of NAT No. 17

More than 80 years after it rolled out of Walter Beech's Travel Air factory in Wichita, Kansas, one of only two Type 5000 cabin monoplanes known to exist has been resurrected to honor the birth of scheduled passenger service in North Texas.

#### by Edward H. Phillips

o other airplane typifies the diversity of our aviation heritage more than National Air Transport's Type 5000," said Jim Hodgson, executive director of the Fort Worth Aviation Museum. The airplane, designated as No. 17 in the National Air Transport (NAT) fleet, was presented to Texas aviation enthusiast Amon G. Carter, Sr., after it was retired from service early in 1931. Carter was a well-known and wealthy Texas oilman, advertising mogul and a staunch advocate and promoter of aviation in the Lone Star state, particularly the North Texas region.

In 2012 the Fort Worth Aviation Museum initiated a campaign to acquire the vintage Travel Air and reunite the old monoplane with its home city. In 2013 it was purchased from Harry Hansen, a former Continental Airlines captain, by Fort Worth-based oil and gas energy company, MorningStar Capital LLC. "We are so pleased to be a part of this project to bring a piece of history back to life," said Joy Webster, vice president of facilities for the company.

After acquiring the Travel Air from Carter's family in 1963, Hansen spent the next 50 years attempting the monumental task of rebuilding an airplane that had been exposed to the vagaries of Texas weather for more than 30 years. Carter had parked No. 17 outside at his Shady Oak Farm near Lake Worth, and by the time Hansen hauled away the remains, the Travel Air's doped cotton fabric on the fuselage and wings had long since withered away, the welded steel tubing fuselage was rusted and the wood wings had rotted and collapsed to the ground. As for the engine, the Wright Aeronautical J-5CA static,

National Air Transport operated eight of the Type 5000 cabin monoplanes built by the Travel Air Manufacturing Company, Inc. All eight were built and delivered during 1926 and 1927. In-flight photographs of NAT No. 17 are rare, and this view shows the airplane in its final configuration before being retired from service in 1931. MorningStar Capital via Lanny Parcells)





service shows passengers about to board No. 17 at a scheduled stop along the route between Chicago and Dallas/Fort Worth. Note the clear Pyrolin canopy above the cockpit.

(Edward H. Phillips Collection)

air-cooled, radial powerplant, externally was a severely corroded hulk and all of its internal parts were seized.

NAT's old No. 17 (constructor number 172 registered C3002) was one of eight Type 5000 airplanes ordered by National Air Transport late in 1926.<sup>1</sup> Early in 1925



investors from Chicago, New York and Detroit formed the company to provide air mail service between the three cities as well as smaller towns along the route. Texan Amon G. Carter eventually became involved with NAT and helped the company win a contract to carry air mail into Forth Worth. The Contract Air Mail (C.A.M. 3) route connected Chicago and Moline, Illinois; St. Joseph and Kansas City, Missouri; and Wichita, Kansas, with Ponca City and Oklahoma City, Oklahoma; as well as Dallas



To honor the efforts of Amon G. Carter (center) to bring air service to Fort Worth, in February 1931 NAT officials presented No. 17 to Carter at the city's Meacham Field. Humorist and aviation enthusiast Will Rogers (right) flashed his famous smile in approval. (MorningStar Capital via Lanny Parcells)

and Fort Worth, Texas. By the summer of 1926, C.A.M. 3 was being operated using rugged Curtiss Carrier Pigeon biplanes, but later that year the new Type 5000 ships began flying the route between Chicago and Dallas carrying both mail and four passengers in the cabin. The pilot sat up front in a cockpit covered by a canopy.

According to the Fort Worth Aviation Museum, NAT No. 17 was the first passenger-carrying transport employed by a scheduled airline to serve the city, operating from Meacham Field.<sup>2</sup>

Travel Air's new transport was based on a design by Clvde V. Cessna, which he built and flew in 1926. Beech also flew the ship and quickly recognized its potential as a small airline transport that, after modifications, could meet NAT's requirements. A prototype was built in only 69 days and Beech flew the airplane to Kansas City in December. In January 1927, Travel Air was awarded a contract that specified delivery of all eight monoplanes within 120 days at a cost not to exceed \$128,676. The first transport was delivered in April and a second ship took to the skies in May, with two more, including NAT No. 17, under construction in the cramped workshop on the west side of Wichita. For the next five years NAT's small fleet of cabin monoplanes plied the airways on a variety of routes throughout the Midwestern United States.

In recognition of his dogged support of aeronautics in North Texas, on February 1, 1931, No. 17 was gifted to Amon Carter by NAT officials. After America's entry into World War I, Carter became a driving force in the establishment of three flying fields near Fort Worth to train would-be aces to fly above the blood-red fields of



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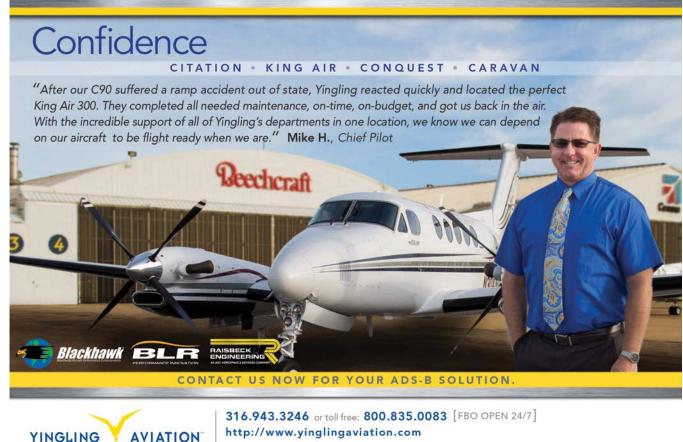
Chris Crisman/TNC/LightHawk

From 1931 to 1961, the Travel Air sat in an open field in front of Carter's Shady Oak Farm near Lake Worth. The historical value of the airplane was not considered, and during the 30 years, the ravages of nature and time took a terrible toll on the old Travel Air. (MorningStar Capital via Lanny Parcells)



Europe. During the 1930s he was elected to the board of directors at American Airlines, and when the United States entered World War II Carter's influence helped secure construction of a massive factory in Fort Worth that would build the Consolidated B-24 Liberator heavy bomber. Throughout those years 'ol NAT No. 17 sat rotting away at Carter's farm – forgotten and neglected.<sup>3</sup>

Forward to 2013: After acquiring the Travel Air from Hansen, MorningStar Capital shipped the airplane to Justin, Texas, where a small group of antique airplane enthusiasts at Cowtown Aerocrafters would tackle the project where Hansen had left off. Hansen had manufactured new wings and the fuselage had been welded in a special jig using new SAE 4130 steel tubing.



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project to MorningStar Capital, who hired Lanny Parcells and his Cowtown Aerocrafters to rebuild No. 17 for static display in downtown Fort Worth.

(MorningStar Capital via Lanny Parcells)

Working under the direction of Lanny Parcells, the group spent a majority of 2013 and 2014 (3,000 manhours) slowly rebuilding the monoplane as close as possible to its 1931 configuration. In addition to Lanny Parcells, the team included Bob Parcells, Tom Swindle, Dave Ozee and Gerry Asher. Doug Fulk, Tom Keim and Kerrie Black Bourland also assisted the crew during the rebuilding process.

Parcells said bringing back the Travel Air to its appearance when it served with NAT was a major challenge. "We are pleased with the way this project turned out considering the amount of reverse engineering necessary to obtain the level of authenticity." The

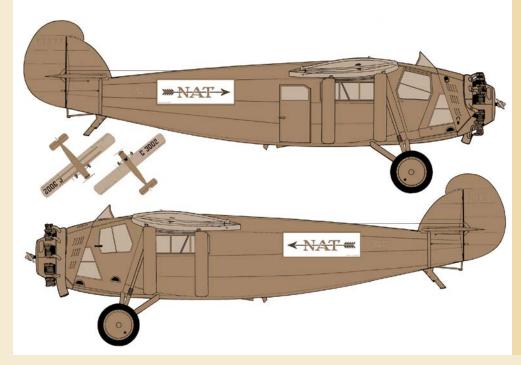
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chief obstacle was determining the design and fabrication of the many wood fairings and formers that gave shape to the fuselage and the cockpit enclosure. A large number of photographs were available, but these were of limited value. Because of its limited production potential, Travel Air did not certify the Type 5000 and the absence of engineering and technical information proved disappointing.

"We only attempted a cosmetic preservation of the engine because it was so badly deteriorated from decades of exposure to the outside elements," Swindle said. Although the Wright radial powerplant appears complete externally, internally it is missing seven of the nine pistons, the cam ring and all of the pushrods. "Two of the pistons were so badly seized we could not remove them, and the cylinder barrels had completely rusted through in places," he said. Similarly, the two Bosch magnetos mounted on the engine's front crankcase were seized and could not be salvaged, but Swindle and Ozee did replace



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ignition leads for the 18 sparkplugs with a replica harness that closely resembles the original. As for the Hamilton Standard, ground-adjustable steel propeller, it was severely pitted but Parcells and his team managed to restore both blades and the hub thanks chiefly to sheer determination combined with aggressive treatment and polishing. Their efforts were rewarded when the



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Color profile of NAT No. 17 reveals the airplane's simplistic design. During the late 1920s the Travel Air Company was among the earliest airframe manufacturers to develop cabin monoplanes, including the Type 5000, Type 6000 and Type 10 business aircraft. (MorningStar Capital via Lanny Parcells

cosmetic state of the propeller was deemed satisfactory for static display.

The crew at Cowtown Aerocrafters recovered the fuselage, wings and empennage using fabric supplied with the Stits Poly-Fiber system and painted the fuselage a shade of blue that closely resembled the color applied by



the first to be "manufactured" since 1927. The recessed exhaust manifold was developed by Travel Air engineers in 1926.

(MorningStar Capital via Lanny Parcells)

the Travel Air factory. The Type 5000's semi-cantilever wings featured an M-6 airfoil and spanned more than 51 feet tip-to-tip, providing a generous wing area of 312 square feet. Each wing was covered, rib-stitched by hand and given a final coat of aluminum dope to protect against deterioration from the sun's ultra-violet rays. Parcells said all of the wood, steel tubing and fabric repair work was done in accordance with FAA Advisory Circular AC 43.13-2.

The exact configuration of NAT No. 17's cockpit and cabin are unknown, except that Travel Air normally installed four wicker seats for the passengers and the





tl n a

fuselage featured sliding window panes to allow cool air during the hot months – a welcome advantage because the airplane usually flew at relatively low altitudes of 3,000 to 5,000 feet. A crude, but effective, heating system provided a limited degree of warmth during the winter months. In addition to these amenities, NAT specifically called for a small outlet (vented directly to atmosphere) mounted in the aft section of the cabin for use by passengers afflicted with airsickness.<sup>4</sup>

The other surviving Type 5000 is the *Woolaroc* flown by Art Goebel and William Davis to victory in the Dole Race from Oakland, California, to Honolulu, Territory of Hawaii, in August 1927. The airplane is on static display at the Frank Phillips Museum in Bartlesville, Oklahoma.

#### NOTES:

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- 1. All 11 of the Type 5000 monoplanes manufactured by Travel Air were licensed under Department of Commerce Group Two Approval Number 2-27, issued in February 1929. Maximum gross weight was limited to 3,600 pounds. The only engine approved for the Type 5000 was the Wright J-5-series rated at 200-220 horsepower.
- 2. Morris, Bill: "History Lost, History Found;" Fort Worth Aviation Museum, 2013.
- 3. According to FAA records, NAT No. 17's original registration number, C3002, remains assigned to Travel Air Type 5000, constructor number 172.
- 4. NAT eventually was absorbed into United Airlines. By the mid-1930s the airline was operating modern, twin-engine, all-metal Boeing 247 transports.

Ed Phillips, now retired and living in the South, has researched and written eight books on the unique and rich aviation history that belongs to Wichita, Kan. His writings have focused on the evolution of the airplanes, companies and people that have made Wichita the "Air Capital of the World" for more than 80 years.

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In 2015, NAT No. 17 was suspended from the first-floor ceiling of the former Star-Telegram newspaper building in the heart of the city. The monoplane serves as a memorial not only to the foresight of Amon G. Carter, but as a reminder of days gone by when air travel initially came to Fort Worth.

(MorningStar Capital)





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#### **Pro Line Fusion® upgrade for King Air B200** and B300 series now certified in Europe

Rockwell Collins' Pro Line Fusion® avionics upgrade for Pro Line II-equipped King Air B200 and B300 series aircraft has been certified by the European Aviation Safety Agency (EASA). The upgrade previously was certified by the Federal Aviation Administration (FAA) in 2016.

JetSupport B.V., headquartered in Amsterdam, is the first European dealer to complete a Pro Line Fusion upgrade for the King Air B200, which completed its first flight on Sept. 4.



Rockwell Collins' Pro Line Fusion upgrade for King Air B200 and B300 series turboprops provides turnkey compliance with airspace modernization deadlines and transforms the flying experience with the largest widescreen primary flight displays available. It enhances the aircraft's value with the same iconbased, touch-screen technology found on new-production King Airs and is the first touch screen primary flight display to be certified for operational use.

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- Geo-referenced electronic navigation charts that display own-ship aircraft position
- Easy and fast database updates using a standard USB drive port on the front of the displays

#### **Mid-South Avionics awarded Rockwell Collins dealership**

Mid-South Avionics was recently awarded a Rockwell Collins dealership, to go along with their Garmin, L3, Avidyne and more certificates, giving King Air owners another solution for their day-to-day avionics needs.

The company was purchased in June 2017 by Rhett Hart and moved to Bessemer, Alabama (KEKY), where he also owns The Aircraft Maintenance Company, Inc., a full maintenance and paint facility for general aviation and the corporate aircraft community, including Pratt & Whitney expertise.

For more information call (205) 349-3502 or email info@midsouthavionics.aero.

#### **Texas Aircraft Propeller & Accessories** Named Hartzell Recommended Facility

Hartzell Propeller Inc. named Texas Aircraft Propeller & Accessories, an industry leader in propeller and governor overhaul, repair and sales, as a Recommended Service Facility. The company is based at Pearland Regional Airport (KLVJ) near Houston.

As a Hartzell Recommended Service Facility, Texas Aircraft Propeller & Accessories has heavily invested in tooling, equipment and training. In addition, the company is audited on a periodic basis by Hartzell. Its technicians also regularly attend Hartzell training to ensure that they are up to date with all product and technical improvements. They have more than 115 years of combined experience in the overhaul of both piston and turbine engine propellers.

Hartzell Propeller encourages customers to use a Hartzell Recommended Service Facility for propeller repairs and overhauls. As a member of the network, Texas Aircraft Propeller & Accessories joins a network of recommended facilities located throughout the Americas, Europe, the Middle East, Asia, Australia, and New Zealand.

This group of repair stations, with factory trained technicians and appropriate equipment, ensures that owners and operators of Hartzell propellers are only a short flight or drive away from a recommended service facility.

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#### **Garmin® acquires FltPlan.com**

Garmin<sup>®</sup> recently announced that it acquired Flight Plan LLC (FltPlan), a privately-held provider of electronic flight planning, scheduling and trip support services, including the popular website *FltPlan.com* and mobile application FltPlan Go.

FltPlan is one of the largest flight planning companies in the world, creating more than 6.3 million flight plans annually. With 19 years of experience and more than

165,000 registered users, FltPlan offers comprehensive, self-service flight management solutions as well as premium offerings ideal for Business and General Aviation operators. Popular tools include its free flight planning and filing website, FltPlan.com, available for U.S., Canada, Mexico, the Caribbean, Central America, Panama, and parts of Venezuela and Columbia, as well as other premium web-based offerings. The company also offers a complementary free FltPlan Go app for iOS, Android and Windows.

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#### **Pilots N Paws®** is an online meeting place for pilots and other volunteers

who help to transport rescue animals by air. The mission of the site is to provide a userfriendly communication venue between those that rescue, shelter, and foster animals; and pilots and plane owners willing to assist with the transportation of these animals.

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#### A ADDED

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FltPlan also offers a range of premium services including: SMS (safety management service), PDCs (pre-departure clearances), eAPIS and APIS (advanced passenger information system) for Mexico, Canada and the Caribbean, premium flight tracking, the unique DCM (dot com) call sign program, and runway analysis. Newer programs include both FltLogic and FltPlan Manager and offer a comprehensive suite of services from scheduling and trip coordination to post-flight reporting. All the company's services and products are backed with outstanding customer support offered 24/7 every day of the year.

FltPlan is headquartered in Southbury, Connecticut, and the facility will continue to support the complete portfolio of FltPlan.com and FltPlan Go and will work to integrate those services into the Garmin aviation ecosystem.

For more information about Garmin's full line of avionics, go to garmin.com/aviation.

#### **ForeFlight Adds PDC and D-ATIS**

ForeFlight, in partnership with Satcom Direct, now delivers mobile Pre-Departure Clearance (PDC) and Digital Automated Terminal Information Service (D-ATIS) at the busiest airports in the United States.

PDCs are official text clearances issued for U.S. IFR flight plans, and include the filed route, the cleared altitude, transponder code, departure frequency and any special instructions. It replaces, and is the same as, a verbal clearance from Clearance Delivery. The PDC integrates with your preflight workflow in ForeFlight. Register your aircraft then file with Foreflight and you>ll automatically receive your full clearance, and current ATIS information, via email and text message.

Whether you register for PDC, if you file an IFR or VFR flight plan through ForeFlight, the current ATIS will automatically arrive via text message (from over 70 major U.S. airports) about 15 minutes before departure time.

Mobile PDC and D-ATIS are included with ForeFlight's Performance Plus and Business Performance plans.

For more information, go to www.foreflight.com.







#### From Multi-Engine Turboprop Communiqué # ME-TP-010

#### **Date:** September 2018

ATA 5 - Phase 3 Inspection – Interior Removal Clarification

Communiqué 2008-02 and Communiqué 2011-03 were both written with good intent on the subject of, "do we need to remove the interior to perform the Phase 3 Inspection?"

This Communiqué will be the complete overall answer to this question.

Due to the inspection evolving, over time, the final answer is NO full interior removal is NOT required to complete the phase 3 inspection.

The reasoning behind the final answer can be found in its entirety under said above title in Communiqué # ME-TP-010.

ATA 31 - Fusion Equipped B350i King Air Phase 3 Production Update

Textron Aviation recently began deliveries of B350i Pro Line Fusion phase 3 aircraft. The serial effectivity for factory production is FL-1140 and

after; and FM-76 and after. Phase 3 production aircraft will include the equipment changes and additional options shown below.

There are changes to software, databases, electronic activation keys and manuals with this release that should be noted. With the introduction of Phase 3, the Rockwell Collins Pilot's Operating Guide 523-0824675; Pro Line Fusion Aircraft Maintenance Manual 523-0824677; FMS Quick Ref Guide 523-0823290; Fusion Quick Ref Guide 523-0822518 and Fault Isolation Manual 523-0824683. The list for production Phase 3 aircraft software is shown *in this Communiqué online*. The field loadable software files are available on the *txtavsupport.com* web site. The phase 3 AFD software is bundled into a load set as part number 434-310011-0011 file on the web site.

ATA 31 - Fusion Equipped King Air Adaptive Flight Display (AFD-3700) Service Bulletin AFD-3700-31-3

Rockwell Collins has released recommended service bulletin (SB) 3 for the AFD 3700s

Function	New Component in Phase 3
Audio Warning Generation	RIU-4110*
HF Selective Calling (SECAL)	RIU-4110*
Manages 3rd VHF receiver for data- link functions	RIU-4010*
Terrain awareness and warnings	iTAWS Application in AFD 3700
On board weather radar	RTA-4112 MultiScan Weather Radar**
Database updates and flight plan loading	IMS 3500 with Mobile Enablement***
	Audio Warning GenerationHF Selective Calling (SECAL)Manages 3rd VHF receiver for data- link functionsTerrain awareness and warningsOn board weather radarDatabase updates and flight plan

\*\*\*New Option



installed in Fusion equipped King Airs. Textron is recommending that operators have their AFDs modified with this SB at their earliest opportunity. Compliance with SB 3 upgrades the AFD's firmware and is expected to greatly reduce occurrences of blanking or flickering screens and software corruption which can lead to "Config Do Not Takeoff" messages. For units under Collins 5-year warranty, Collins will install this SB at no charge for materials and labor. Once units fall out of warranty, the cost of installation will become the responsibility of the owner. Collins warranty coverage under this SB also expires May 31, 2022.

This SB was installed in Collins AFD production at serial number 4C093D and after. The cut in for Textron aircraft production installation of SB 3 AFDs was LJ-2140 and after: BY-302 and after: BZ-2 and after; FL-1106 and after; and FM-73 and after. If you have had an AFD replaced recently, any exchange AFDs from Collins would also have the SB complied with. If your AFD serial number is prior to the production cut in, you can verify your compliance by inspecting the AFD dataplate. If this SB has been complied with, MODS block 3 will be marked out as shown above. If your AFDs require this modification, please schedule them in advance through your service center as the current turn time is about 10 days once the AFD is received by Collins. Unscheduled requests for the modification could take longer if the backlog is high.

#### ATA 34 - L-3 ACSS TAWS+ Computer Database Memory Limitation

We have been notified by Aviation Communications and Surveillance Systems (ACSS) that database size has grown significantly in recent years. The 9000000-85006 TAWS+ computer installed in many Pro Line 21 and Fusion equipped King Airs is nearing its memory capacity. The date or database revision cycle where the current memory limit will be reached has not yet been defined but after the release of database cycle 041 there will only be 1.1 MB of free memory remaining. When this limit is reached, you will no longer be able to update the databases in the TAWS+ unit. The system will still operate normally on the last database loaded, however new obstacles and airport data would not be up to date in the unit. This could



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cause false alerts and new obstacles would not be identified by the system. ACSS released optional service bulletin (SB) 9000000-34-6037 to upgrade the memory in fielded units from 128MB to 256MB and converts the unit to part number 9000000-85010. Textron has recently approved the new part number as a spares replacement allowing fielded aircraft to upgrade their units through ACSS and reinstall the new part number without the need of an additional kit or other approval. The spares notes should be added to the related model illustrated parts catalogs as future revisions are released. Please contact your local service center in advance for a quote and to coordinate the upgrade as the unit will have to be sent to ACSS for modification. The SB requests a minimum 2-week lead time to schedule units in for modification to avoid delays getting the unit returned.

The 9000000-85006 computer was factory installed in the following aircraft: LJ-1847; LJ-1853 through LJ-2128; BB-2001 and after; BL-152 through BL-171; BY-42, BY-58 through BY-276; BZ-

> 1; FL-600 through FL-611, FL-613 through FL-617, FL-619 through FL-1080; FM-25 through FM-70.

ATA 52 - Cabin Door Upper Latch Hook and **Pin Inspection** 

#### All

The King Air Inspection guide instructs to inspect the cabin door upper latch hook pin for wear and calls for a limit of 10% of the original thickness. The original thickness can be determined by measuring the area where the hook does not contact the pin and make a comparison however for those that cannot accept this method, the original thickness of the pin is 0.25 inches.

The above technical publication information *may be abbreviated for* space purposes. For the entire document, go to www.txtavsupport.com.

NOTE: As a convenience, service documents are now available online to all Textron Aviation customers through a simple, free-of-charge registration process. If you would like to sign up, please visit the Customer Access link at www.txtavsupport. com to register.

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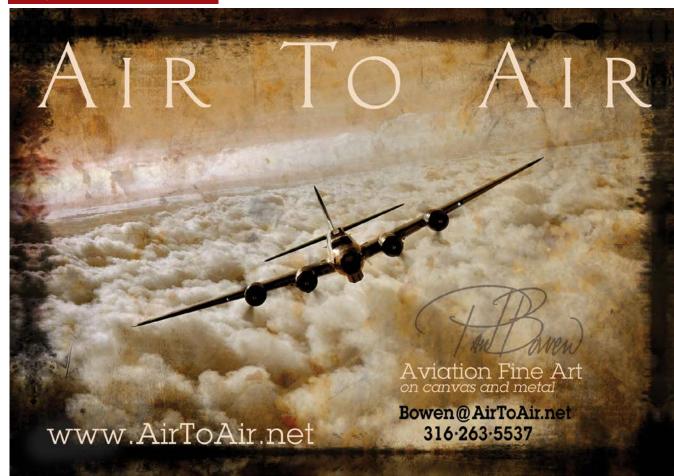
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