King Air

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

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Aircraft Assessment

Evaluating the King Air Market

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COVER PHOTO
Photo courtesy of
Paul Bowen Photography

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WHAT'S N

An Appraiser's View of the King Air Market

As an aircraft appraiser, I often get casual questions like "what's the King Air market doing?" My standard answer is, "it depends." When looking at an aircraft that has been in production as long as the King Air, there are many variables. It is generally impossible to accurately describe what an entire market is doing based on the many production changes to that particular model.

Not many airplane models can claim continuous production for 50 years. With production starting late in 1964, the King Air's success and versatility has led to many variations over the past five decades. With each variation comes a different type of buyer with a different mission profile and a different type of market.

MOVING?

by Jim Becker

PHOTO CREDIT: DAN MOORE VMG LLC

While all King Airs are not created equal, this leads to the creation of many different market types. This is seen not only in the model variation – C90, B200, B300, etc., but within each model, there can be half a dozen markets due to variances on what came standard on the airplane during given model years. All of these differences tend to cloud the market and make it very difficult for King Air owners to truly understand the value of their aircraft.

Because there are so many market types, in this article, we are going to focus on only the variants that are still in production – the King Air C90, B200, and 350. We also will not focus on after-market modifications as these can greatly affect the value of the aircraft.

King Air C90

For this discussion, I am going to review the King Air C90B through the GTx. When looking at the C90, there are several defining points where the market views a production change significant enough to affect value beyond an adjustment for the model year. For example, the King Air C90B was pretty uniform for its entire production run. All but a handful of 1992 models had Collins EFIS-84, and all had Pratt & Whitney PT6A-21 engines. For the most part, the C90B market is fairly homogenous. It is moving in the same direction with little difference at either end. Produced in 2006 and 2007, the King Air C90GT was an improvement over the C90B as the engines were upgraded to Pratt & Whitley PT6A-135 models. This provided a nearly 30-knot increase in airspeed, and created a distinct market segment within the 90 series. In 2008, Rockwell Collins Pro Line 21 avionics were added and the C90GT was rebranded as the C90GTi. This further segmented the C90 market and created a large value difference between a 2007 and a 2008 model. The final change to the C90 market came in 2010 with another rebranding. Winglets were added and the newest C90 was christened as the C90GTx.

The C90 market is the most sluggish of the King Airs. For the C90B, prices declined about nine percent in 2014. The selling prices for an average aircraft are between $900,000 and $1,400,000. The average number of days on the market in 2014 for

Rockwell Collins Pro Line 21 avionics were added to the C90GT in 2008, and it was rebranded as the C90GTi. This created a large value difference between a 2007 and 2008 model.

the C90B was 230 days, with nearly 12 percent of the fleet sold. However, indications are pointing to a stable C90B market.

The C90GT segment is quite small, with only 98 models produced. Prices for an average aircraft range from approximately $1,750,000 to $1,800,000. The average hold time of a C90GT was 253 days, with just under 10 percent of the fleet selling in 2014. The C90GT market appears to be stable at this time.

There were 125 King Air C90GTi models produced, and six units sold in 2014, representing just under five percent of the fleet. The average days on the market in 2014 for it was 125 days. Pricing for an average C90GTi model ranges from approximately $1,900,000 to $2,000,000. Currently, pricing has stabilized for the C90GTi.

The C90GTx, which is the most current version of the C90, has a current production of about 132 aircraft. Six units sold in 2014, which represents four-and-a-half percent of the segment. Average hold time was 261 days on the market. Pricing for a used C90GTx is between $2,200,000 to $2,700,000 for an average aircraft. The pricing on the used C90GTx is trending downward.

King Air B200

The King Air B200 has enjoyed an amazing production run with a basic aerodynamic design that has been largely unchanged for over 40 years. At first glance, it would be easy to group all of the B200s together as one single market. For the King Air B200 market, I can point to at least seven distinct market segments. The original B200 was an improved version of the King Air 200, from mid-year 1981 to 1984. For model year 1985, improvements such as a hydraulic landing gear, three element wing spar, and triple fed electrical bus created a separate segment within its market. For model year 1994, improvements such as a standard four blade propeller and a cabin noise reduction system created another market segment. In 1999, there was a redesign of the B200's interior, as well as an increased TBO to 3,600 hours. Model year 2004 encompassed the biggest changes to date with the switch to the Rockwell Collins Pro Line 21 Avionics System. This created a several hundred thousand dollar difference in value between the 2003 and 2004 model years. Another significant model change occurred in 2008 with the switch to Pratt & Whitney PT6A-52 engines, which resulted in the aircraft being rebranded as the King Air B200GT. The last model segment occurred in 2011 with yet another rebranding. Composite curved propellers, winglets, and Raisbeck's Ram Air Recovery were added to the B200GT to make the new King Air 250.

For the 1981-1984 B200, approximately 280 airframes are still in service. Out of these, 29 sold

The B200 was an improved version of the King Air 200 model. Throughout more than 40 years, it has gone through various improvements and modifications making it the largest segmented market of King Airs.

In 2008, a more powerful set of Pratt & Whitney engines, the PT6A-52, was added to the King Air B200 which resulted in rebranding it to a King Air B200GT.

in 2014, making up around 10.5 percent of this segment. The average number of days on the market for a 1981 to 1984 B200 was 388 days in 2014. Prices for an average aircraft of this vintage is between $1,000,000 and $1,200,000, and remains fairly stable.

The next segment of the B200 market, produced in 1985 through 1993, contains roughly 250 aircraft that are still in service. Of these, there were 18 sales to retail customers in 2014. This represents roughly seven percent of that segment. The average hold time for the models that sold was 371 days on the market. Expect to pay between $1,300,000 and $1,600,000.

In the 1994 to 1998 segment, around 180 aircraft remain in service. Of these, 10 units sold to retail customers in 2014. This represents five-and-a-half percent of that segment. The average hold times for those aircraft that did sell was 393 days. Expect to pay between $1,700,000 and $1,900,000 for an aircraft of this vintage. Pricing in this segment has been very firm in the past year with pristine aircraft selling quickly.

The 1999 to 2003 sector contains approximately 190 aircraft. There were 18 retail sales in 2014, making up nearly nine-and-a-half percent of this sector. Average days on the market for the ones that sold were 388 days. Prices for an average B200

in this segment range from between $2,000,000 to $2,200,000, and it is pretty active with pricing pretty firm.

The next segment is the 2004 to 2008 Pro Line 21 market. It contains 157 aircraft with 13 sales in 2014. Roughly eight percent of this section traded hands last year, with a lengthy hold time averaging 462 days on the market. Pricing on a B200 in this part of the market is still relatively soft with values still declining. Expect to pay between $2,400,000 to $2,600,000 for a B200 of this kind.

The B200GT was introduced in 2008 and has an active fleet of 116 units. Only six of these aircraft sold in 2014, representing five percent of this segment. The average number of days on the market for the aircraft that sold was 406 days. Pricing on this model is still soft. Expect to pay between $2,900,000 and $3,500,000 for an average aircraft.

There have been approximately 100 King Air 250s produced since 2011, with four used retail sales in 2014; this represents four percent of the fleet. The average number of days on the market for the aircraft that sold was 166 days. Pricing on the 250 is trending downward. Expect to pay between $3,900,000 and $4,500,000 for an average aircraft.

King Air 350

The King Air 350 debuted in 1990. Although the model was largely unchanged until it upgraded to Rockwell Collins Pro Line 21 avionics in 2004, there are still some areas of segmentation with different activity levels at either end of the market. As mentioned, the avionics upgrade in 2004 created a distinct segment in the 350 market. The final upgrade to this series was an upgraded interior and a rebranding as the King Air 350i.

The King Air 350's interior was redesigned to a more modern and luxurious feel and included the ability to connect to high-tech devices, as well as the flexibility to remove the aft club seats to work with the owner's needs.

Even though the 350 is largely unchanged from 1990 to 2004, the newer models perform differently in the used market than the older ones. For this market segment, there are roughly 180 airframes with 10 retail sales in 2014. This equates to about five-and-a-half percent of the fleet in this segment. The average days on the market for these aircraft was 194 days. Pricing on this part of the 350 market is stable. Expect to pay between $1,800,000 to $2,250,000 for an average aircraft.

For the 1997 to 2003 model years, there are around 190 airframes still in service with 24 retail sales last year. This represents 12.6 percent of the fleet, with an average hold time of 397 days. Prices in this market segment have softened a bit in the

Even though the King Air 350 is largely unchanged from 1990 to 2004, the newer models perform differently in the used market than the older ones. The avionics upgrade in 2004 created a distinct segment in the market.

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latter half of 2014. Expect to pay $2,300,000 to $2,600,000 for an average aircraft.

The 2004 to 2009 segment includes the change to Rockwell Collins Pro Line 21 avionics. There are 255 of these aircraft in service with 11 retail sales in 2014. This represents 4.3 percent of this market sector with an average hold time of 377 days on the market. Pricing on these 350s are still relatively soft. Expect to pay $3,000,000 to $4,200,000 for an average aircraft.

There have been 240 King Air 350i's produced with seven retail sales last year, representing three percent of the total fleet. Average hold time was 325 days on the market. The 350i market is still trending downward. Expect to pay between $4,600,000 and $5,000,000 for an average aircraft.

In Summary

For those King Air markets that are still experiencing soft or downward pricing trends, there are a couple of reasons for this. First is the natural depreciation cycle that occurs on most new aircraft for the first few years. After five years or so, the depreciation slope begins to ease significantly. Second, the price of near new aircraft is affected by whatever programs or incentives the manufacturers may have on new aircraft.

As you can see, there are many facets to the King Air market, and we have only discussed three basic models. In order to understand it, you must break it up into the natural market divisions. Once that is done, it is easier to understand the different segments within any of the King Air models. KA

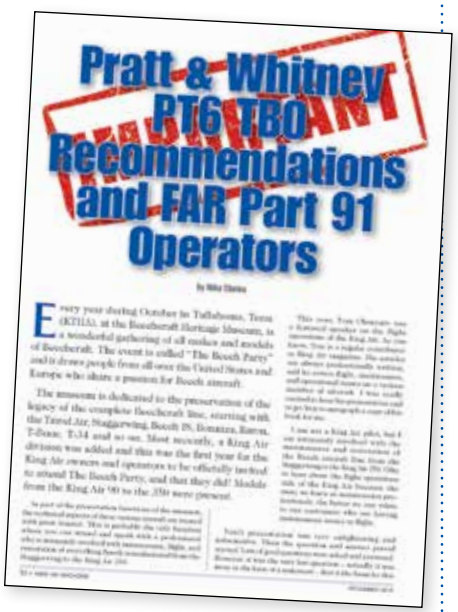
Note: Figures for average days on the market and aircraft transaction numbers are courtesy of JETNET LLC.

About the Author: Jim Becker is a graduate of the Aviation Institute at the University of Nebraska at Omaha, and also holds a FAA Airframe & Power Plant Mechanic license. With over 20 years in the aviation industry, 18 of those years have been with Elliott Aviation in the capacity of valuing aircraft. Jim is also an Accredited Senior Appraiser with the American Society of Appraisers.

Pratt & Whitney PT6 TBO Recommendations and the FAR Part 91 Operator ... the Discussion Continues

by Mike Stanko

The December issue of *King Air* magazine containing my article has created the biggest amount of pushback that Tom Clements said he has seen in a long time. I am amazed at the number of calls, emails and letters that I had received.



It has really been gratifying to know that we can still spark a good debate amongst pilots, instructors, owners, operators, and maintenance personnel, and come to a well-researched and

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

National Policy

ORDER 8620.2A

Effective Date: 11/5/07

SUBJ: Applicability and Enforcement of Manufacturer's Data

1. Purpose of This Order. This order provides information and guidance to aviation safety inspectors (ASI) regarding the applicability and enforcement of Original Equipment Manufacturer's (OEM) data listed on the Federal Aviation Administration's (FAA) type certificate data sheet (TCDS). Information and guidance is also provided regarding OEM maintenance manual material, Service Letters (SL) and Service Bulletins (SB), and other maintenance or flight operations information including any material that has been identified or labeled by an OEM as "Mandatory."

2. Audience. The primary audience is Flight Standards District Office (FSDO) ASIs. The secondary audience includes Flight Standards regional and headquarters branch and division personnel.

3. Where You Can Find This Order. ASIs can access this order through the Flight Standards Information Management System (FSIMS) at http://fsims.avr.faa.gov. Operators and the public can find this order at http://fsims.faa.gov.

4. Background. Title 14 of the Code of Federal Regulations (14 CFR) part 43, §§ 43.13(a) and 43.13(b) outline the performance standards for accomplishing non-air carrier maintenance, preventive maintenance, and alterations on U.S.-registered aircraft. This order provides clarification and guidance about the applicability of those regulatory performance standards when maintenance documents and maintenance requirements have been identified and labeled as mandatory by the OEM.

5. Related Guidance (current editions).

a. 14 CFR part 43;

b. 14 CFR part 91; and

c. FAA Order IR-M-8040.1A, Airworthiness Directives Manual.

Distribution: A-W(VR)-1; A-W(SI)-2; A-W(FS/IR/VN); A-X(FS/SI/CD)-3; A-FFS/FIA/FAC-0(LTD); AMA-200 (12 cys)

Initiated By: AFS-300

Figure 1: Page one of FAA Order 8620.2A.

well-documented conclusion from our peers in the industry.

I have come to find that this is a debate that has been ongoing for well over 50 years with different views, different opinions, and different conclusions. One conclusion that I am sure everyone will agree on is that every FSDO is apparently "individually owned and operated." Even though we have the same set of standard rules, the interpretation of these rules seems to never be the same.

During all of the discussions after the article, a very important document came to light submitted by E90 owner/operator Steve Wagner. Steve brought to the surface FAA Order 8620.2A (page one* shown in Figure 1), effective 11/05/07, which really takes the weight out of a lot of documents that I personally believed carried mandatory guidance for the industry. I have now come to find that these documents carry very little weight. I had not seen the FAA Order prior to receiving it. I now totally agree that this is a very important game-changing bit of information.

After digesting order 8620.2A, I can see where I was wrong in my interpretation of the power that a Type Certificate Data Sheet (TCDS) carried. It makes me wonder what other documents are out there floating around that negatively impact the credibility of what we were taught in class as students and as we progressed into the industry.

I now must reverse my conclusion and opinions voiced in the original article and agree with Tom Clements, Jack Braly, Steve Wagner, and others, that you can indeed run a PT6 past the manufacturer's recommended TBO as a Part 91 operator. (Wouldn't it be nice if our government would make a simple, solid statement like this?)

With that being said, there is another issue that I want to address. Several of the calls that I received after the December issue were from various maintenance facilities and some individual A&P mechanics. The concern that was voiced is that while you may be perfectly legal in running an engine past TBO, there is a very high degree of uncertainty as to how you now maintain that engine. There is nothing published in any of the manuals for a maintenance facility to continue to abide by after the TBO is exceeded. If you're on the MORE program, then you have established criteria to go by. But what do we do at the 3,600 hour mark? Do we perform another hot section?

When do we execute another hot section now that we have exceeded TBO?

Of all the maintenance professionals I spoke with, this was the biggest concern. They are concerned that now the liability for the maintenance of that engine is falling on their shoulders and there is no clear course of action for the company or individual to take to give them the comfort level they desire.

I believe that this is coming from the fact that facilities are now being found liable in court cases once they sign off an engine that has been past the recommended TBO.

As maintenance professionals, we all want to keep the aircraft that we maintain as safe as possible and as economical as possible, but no one really wants to assume unrealistic liabilities in doing so. I think in the future you may begin to see maintenance personnel and facilities just not wanting to work on aircraft that have engines exceeding TBO.

Ironically, in my entire turbine customer base, I do not have a single customer that has requested an exceedance of a TBO.

In conclusion, I originally asked Tom for documentation that would counter my assessments of the FARs and it has been provided. I therefore very respectfully thank Tom and you others who have done so. I stand corrected.

Let's now have even more fun with the FAA definition of the "Current Manual" and how it is applied to maintenance!

Respectfully submitted,
Michael E. Stanko KA

Editor's Note: For Order 8620.2A in its entirety go to *www.faa.gov/documentLibrary/media/Order/8620_2A.pdf*

About the Author: Mike Stanko established Gemco Aviation Services in 1977, which specializes in maintaining the Beech aircraft line from the Staggerwing through the King Air 350. He has been recognized as the industry leader in the restoration and maintenance of the Beechcraft Staggerwing, having restored over 15. He actively serves as a board member for the Beechcraft Heritage Museum.

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FAA's New Sleep Apnea Policy Includes Direction Provided by Aviation Groups

The Federal Aviation Administration's (FAA) once-controversial plan for testing pilots for obstructive sleep apnea (OSA) now reflects a practical approach for addressing the condition, without compromising flight safety.

National Business Aviation Association (NBAA) President and CEO Ed Bolen said, "This new guidance reflects a pivot for the agency, which combines common sense with clinical discipline. Particularly noteworthy is that under the new guidance, pilots will be able to continue to fly while being evaluated for OSA."

In late 2013, the FAA revealed a plan that it would consider requiring any pilot with a body mass index (BMI) of 40 or greater, and a neck size of 17 inches or greater, to undergo OSA screening prior to receiving a medical certificate.

On Jan. 23, 2015, the FAA's federal air surgeon shared aviation organizations its revised plans for aviation medical examiners (AMEs) regarding screening for OSA. Set to take effect on March 2, 2015 the new AME guidance will not rely on a pilot's BMI to diagnose OSA; instead the new policy states: "The risk of OSA will be determined by an integrated assessment of history, symptoms and physical/clinical findings," and must incorporate guidance from the American Academy of Sleep Medicine in determining pilots' airworthiness.

Along with a broader, more practical view of a pilot's overall health situation, the FAA's new guidance will also facilitate an easier process for individuals who exhibit a series of OSA symptoms to receive a medical diagnosis by their own health care provider, not just sleep specialists. Additionally, the FAA has provided up to 90 days for pilots required to receive additional evaluation to provide documentation to an AME. Pilots can also request an additional 30 days if they notify their AME.

NBAA's website (www.nbaa.org) has information on the situation, and the Association's efforts to ensure that the industry's concerns are understood.

New Wake Turbulence Spacing Procedures Will Increase Efficiency At Airports

Air traffic controllers (ATC) are planning on decreasing the spacing of aircraft in the skies surrounding some of the nation's busiest airports. This will save fuel and time, and increase capacity, while reducing aircraft emissions.

According to the NBAA, "wake turbulence recategorization," or "Wake RECAT," enables controllers to space aircraft by type and performance, considering wingspan and approach speed, rather than just takeoff weight. By accounting for the different wake vortices generated by each aircraft, controllers can achieve greater flight efficiency while not compromising safety.

"More than likely, as a pilot you will never know this change in separation is being applied to your aircraft," said Bob Lamond, NBAA's director of air traffic services and infrastructure. "Further, no control instructions will be issued to pilots to use the new separation standards. RECAT is an internal procedure applied by the radar controller at the ATC facility. NBAA supports the

RECAT effort and believes it will pay benefits to business aviation."

The new standards came about after a decade of collaborative research by turbulence, safety and risk experts from the FAA, Department of Transportation, European nations and the aviation industry.

At Memphis International Airport, the busiest cargo airport in North America, reduced spacing saved FedEx 4.18 million gallons of fuel and chopped the company's aircraft emissions by nearly 40 metric tons.

The FAA will soon add Wake RECAT procedures at several New York area airports, including : John F. Kennedy International Airport (JFK), Newark Liberty International Airport (EWR), LaGuardia Airport (LGA) and Teterboro Airport (TEB).

Charlotte Douglas International Airport (CLT), Chicago's O'Hare International Airport (ORD) and Midway International Airport (MDW), San Francisco International Airport (SFO) and at both George Bush Intercontinental Airport (IAH) and William P. Hobby Airport (HOU) in Houston are also slated to start using Wake RECAT procedures soon. KA


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EQUIPPED KING AIR...

Starter Time Limits

by Tom Clements

You memorized this during your Initial King Air training program, right? "Use of the starter is limited to 40 seconds ON, 60 seconds OFF, 40 seconds ON, 60 seconds OFF, 40 seconds ON, then 30 minutes OFF." For the 300-series of King Airs, the limits are more restrictive: "Use of the starter is limited to 30 seconds ON, 5 minutes OFF, 30 seconds ON, 5 minutes OFF, 30 seconds ON, then 30 minutes OFF." In addition to merely reminding you of these important limits, the intent of this article is to explain the reasoning behind the limits and to emphasize the real-world method of observance.

Engine starting subjects the electrical system to the highest current flow it ever experiences during normal operation. A peak flow in excess of 800 amperes is typically experienced in the fraction of a second that the starter motor receives power before it begins to rotate. The current demand rapidly decreases as the starter and engine increase speed, but when stabilized N1 or Ng speed is attained, usually there is still over 200 amps flowing to the starter motor.

Current flow generates heat energy in a squared relationship. That means that when current is tripled, heat production goes up nine-fold. Comparing the heating effect of 800 amps to that of 200 amps, this four-fold reduction reduces heat generation by a factor of sixteen! It is quite apparent then that the starter is building up a lot of thermal energy when it is being used, especially in the early stages of a start. Does this mean it is getting hot? Usually, yes, but not always.

The other factor that determines how hot the starter becomes is its cooling mechanism … how, if at all, the thermal energy is being removed. Although it would be ridiculous to submerge the starter in a vat of ice water in the cowling, it could stay quite cool throughout the starting process if such a setup were available. Since it is not available, however, the only mechanism that is designed to help remove the thermal energy buildup is a fan that pushes air across the starter. This four-blade fan is attached to the rear of the starter's armature shaft and rotates with it. Hence, the faster the starter turns, the more thermal energy dissipation capacity it has. That explains why when this starter device is being used as a generator, limits exist requiring us to use higher N1 speeds when experiencing higher electrical loads.

During the initial stages of engine starting, when the starter is providing all of the power that is providing compressor rotation – not yet helped by any exhaust gas flow – we are faced with a double-whammy: The most heat production and the worst heat dissipation. The heat production comes from the high current flow at this time and the poor heat dissipation comes from the relatively low N1 – and cooling fan – speed.

The bottom line? We can burn up the starter by getting it much too hot if we do not abide by the starter time limits. To state the reasoning very simply, "Don't use the starter for such a long time that it gets too hot and also give it enough time at rest to dissipate the heat before using it again."

The 300-series engines are physically larger than those on previous King Airs and their starters generate more heat while spinning the bigger compressors. This explains why their limits are so much more conservative, requiring both shorter working times and longer cooling off times.

The starter will get hotter during a particular period of use when the ramp temperature is over 100° Fahrenheit on an August afternoon as compared to its operating cooler on a January ramp with the temperatures

below zero. I have been told that the actual starter tests that Beech conducted aimed for the worst possible set of extenuating circumstances, hot OATs and higher density altitudes. Furthermore, they did not actually start the engine but rather merely motored it with the starter while monitoring Starter/Generator temperatures.

More than once I have been asked about the typically-sluggish engine starting acceleration experienced on cold days, and the question involves the necessary exceedance of a starter time limit. Namely, starting the stopwatch when the starter switch was activated and stopping the timer when the starter switch was turned off at Low Idle (or above) speed, led to the realization that more than 40 seconds had elapsed. Uh-oh!

Don't lose any sleep over this one. You see, once the exhaust gases start to flow, the workload of the starter is decreasing in synchronization with the workload of the exhaust gases increasing. At some point – usually in the mid-40 percent N1 range – the engine becomes self-sustaining due to its own gas flow. The starter is no longer expending power at all, but merely going along for the ride. The exact point at which the starter's heat generation becomes so small as to be immaterial is impossible to locate due to the variety of conditions that may be experienced on a particular start, but it is my strong belief that all concerns about starter time limits are rendered null and void after we see N1 leave its stabilized starter-only speed and continue its acceleration, now being aided by exhaust flow.

I have also heard worries along this line: "My mechanic is not being careful enough about the starter time limits. I've seen him start the engine, run it up to make a check, shut it down, make an adjustment, and then do the whole thing again and again. I know he's not letting the 30-minute cooling time go by, even after the third or fourth start!"

Again, no worries. With the engine actually running, now the starter has been turned off and the generator has been switched on. Yes, the generator also develops heat – the more so as load increases – but not as much as the starter. More significantly, now we have enough compressor speed that the cooling fan is doing good work in helping dissipate the thermal energy. If you're still worried, just ask the mechanic – after making his engine adjustment and before reclosing the cowling – to simply place his hand on the Starter/Generator to gauge its temperature. If he comes back with blisters on his palm – which he won't! – then have him wait a little longer to let that sucker cool.

A situation in which starter time limits can indeed be exceeded due to maintenance procedures is while doing motoring compressor or turbine washes and/or rinses. Fuel is never introduced so all rotational energy is provided by the starter. A competent mechanic will know this already, but you may want to remind a new helper that he cannot run the starter too long, nor wait too short of a time between uses, when doing this important task.

Finally, what about us, the pilots? When is it most probable

that we may overheat and ruin a starter? This most likely may happen when faced with the aftermath of an unsuccessful starting attempt.

As we know, three ingredients are needed for the fire to begin in the combustion chamber: air, fuel, and ignition. In the early days of King Airs, the only one of these three that the pilot could truly verify was happening was air, as shown by the compressor spinning up to a typical stabilized speed well above the minimum 12 percent required. As for fuel? In those days, the fuel flow gauges were AC-powered and did not operate during the start since no inverter was yet on. Ignition? For all King Airs, the ignition annunciator does *not* verify actual ignitor operation but instead just shows that the appropriate relay has activated to send power to the system. Well, the glow plug-type of ignitors that early King Airs used made no sound, unlike the rather loud snapping that can be heard from the newer spark-type of ignitor. Thus, if a start was unsuccessful with no light-off in an earlier King Air, the pilot really could not tell whether the problem was ignition or fuel related.

This has not been the case for over three decades. Now in most cases, except on a very noisy ramp, the sparking sound of the ignitors may be heard to support the ignition annunciator. The fuel flow gauges are now DC-powered, meaning they are working during the start and the pilot can observe the expected fuel flow when the condition lever is advanced forward from Cut-Off.

What I am saying is that there is less-than-stellar airmanship being demonstrated if the pilot of a more modern King Air does not recognize that something is amiss with ignition or fuel quite early in the starting attempt and does not immediately terminate the attempt to analyze and remedy the cause. For the pilot to actually run the condition lever forward and then wait the full ten seconds before deciding to terminate the attempt should not be nearly as likely now as it was back in the '60s and '70s, during the days of AC-powered fuel flow gauges and glow-plug ignitors.

Nevertheless, let's say we have attempted a start, it was unsuccessful with no light off, and we're going to try it again. Perhaps we found the ignitor circuit breakers still pulled, an action mechanics have been known to take to prevent accidental engine starts in the shop. So we have reset them and suspect that the next attempt will be successful. (Drat! We should have done a more thorough cockpit prestart check and caught this before the starting attempt, eh?!)

Wait! We cannot do another start attempt yet. What about the unburned fuel that has likely accumulated in the engine during that first attempt? We need to conduct an *engine clearing* procedure first, to avoid dramatic torching of fire out the exhaust stacks on the next start. This involves using the "Starter Only," bottom, position of the "Ignition and Engine Start" switch. We keep the condition lever in Cut-Off and then depress and keep holding the Starter Only switch position for a time as long as the starter time limit, although

anything more than 20 seconds is probably sufficient to clear most of the residual fuel that did not already exit the engine via the forward and aft case drains. By the way, these case drains dump right onto the ramp. They aren't involved with any EPA-mandated collector/purge system. Also, if the engine did in fact receive fuel during the first start attempt, there will be a distinct kerosene odor prevalent outside near the engine and the exhaust stacks will likely be damp with kerosene residue. If none of these signs are present, it probably was not an ignition problem after all, but a lack-of-fuel problem.

Since the clearing procedure used some or all of our second allowed starter usage time, now we need to wait for another mandated cooling period, then try again, presuming we have a good handle on knowing why the first attempt was unsuccessful and with the correct solution now having been applied.

You see, therefore, that we cannot do three starting attempts and comply with the starter time limits. No, it's two attempts with an engine clearing procedure in the middle. If there's no luck on that second attempt, you'll need the 30-minute cooling period anyway while you get on the phone and find a mechanic, or perhaps replace the ignitors yourself. (You do carry a spare ignitor or two with you, and the simple tools needed, right? Yes, this is something a pilot may legally do.)

In some future articles I will be discussing other important airplane limitations to remind you of their importance and to present some background information to aid in your understanding. I hope you'll find it worthwhile. Meanwhile, remember to send any questions or topics that you'd like me to address to Kim Blonigen, our editor. KA

About the Author: King Air expert Tom Clements has been flying and instructing in King Airs for over 41 years, and is the author of "The King Air Book." He is a Gold Seal CFI and has over 22,500 total hours, with more than 15,000 in King Airs. For information on ordering "The King Air Book," go to *www.flightreview.net.*

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

Selling Walter's Airplanes
PART TWO

Walter H. Beech's success as an airframe manufacturer during the 1930s can be traced to three things: the Beechcraft Model 17 series, a hefty bank account and a network of dealers dedicated to selling the airplanes that bore his name.

by Edward H. Phillips

"I'm just a country boy. Go get a picture of me when I first came to Wichita. I've made good and I'm not afraid to say so," Walter H. Beech told local newspaper reporters in August 1929. Walter was not one to openly boast of his success, but neither did he apologize for it. The merger late that summer that brought Travel Air Company under the corporate umbrella of Curtiss-Wright Corporation had made Mr. Beech wealthy to the tune of about $1 million (much of that wealth, however, was tied up in company stock).

At the time of the merger, one share of Travel Air stock that had been worth $100 in 1925 now sold for about $4,000 and the company was valued at a staggering $3.5 million. In addition, the one-time farm boy from Pulaski, Tenn., was appointed president of the Curtiss-Wright Sales Corporation responsible for sales of commercial Curtiss-Wright airplanes. He would oversee that operation from offices in St. Louis, Mo. and New York City.

When Walter and Olive Ann Beech struck out on their own to start the Beech Aircraft Company in April 1932, they took with them valuable lessons they had learned during their six years at Travel Air and three years at Curtiss-Wright. Those lessons, coupled with Walter's bank account, contacts and reputation within the aviation industry would be put to use selling the infant company's first and only product – the Beechcraft Model 17R1 cabin biplane.

Mr. Beech quickly realized, however, that none of those lessons would help him sell an $18,000 airplane in a market ravaged by the Great Depression. After 18 months of operation, the Beech Aircraft Company had sold only one airplane, had an order on hand for one

Walter and Olive Ann Beech posed for a photographer on July 4, 1936, while attending air racing events held in Denver, Colo. The C17L probably was a company demonstrator flown to the races and placed on exhibit. The pilot is unidentified, but bears a strong resemblance to Homer "Ding" Rankin, chief pilot for the company. (COURTESY MARY LYNN OLIVER)

more, and the first Beechcraft sat unsold in the factory. It had become painfully obvious to Walter Beech that the Model 17R, despite being fast, luxurious and far ahead of any commercial single-engine airplane then available, was too expensive for the existing business aircraft market.

To remedy that situation, he had engineer Ted Wells busy designing a smaller, more affordable Beechcraft – the Model B17. Priced at $8,000, the B17L earned its Approved Type Certificate in December 1934 and proved to be the right airplane at the right time. Between 1934 and 1936 the company sold 46 examples of the B17L. It was during those years that Walter Beech relocated production from rented facilities at the Cessna Aircraft Company on Franklin Road to his aeronautical alma mater, the former Travel Air factory. In November 1934, Walter was proud to announce to the local press that in the first week of that month the company had sold a record seven airplanes (all B17L) worth $60,000. Newspapers were quick to point out that the sale constituted "the most encouraging spurt in commercial aviation business reported at Wichita in several months."

Of those seven Beechcrafts, one was destined for the American machinery and Foundry Company in New York City, and another for the Danish consulate in Johannesburg, South Africa. The sale had been arranged by the Danish consulate through the Roger Jenkins Company, and the airplane was disassembled, crated and shipped by sea to Capetown aboard the S.S. West Cauthorn. According to Mr. Beech, it was the most distant delivery yet made by the company. Those seven sales were soon followed by those of other new Beechcraft owners including the Olson Drilling Company in Tulsa, Okla. (B17B), air racing pilot Frank Monroe Hawks (B17L) and a brilliant inventor and pilot named William P. Lear (B17L). His Beechcraft was specially equipped with a new automatic direction finder dubbed the "Lear-O-Scope," designed by Lear.

Late in 1934, Walter Beech announced that in the wake of orders for the popular B17 series biplane, the factory was "sold out of production and would be worked at full capacity for at least a month." He was optimistic about the future, particularly since the company had sold 17 airplanes during the past 12 months with net sales of $173,798. That compared with only $17,551 the previous year when only one airplane had been sold. Early in 1935 he told reporters that a "slow but substantial upturn in prospects for commercial aviation" was occurring that served to reinforce his belief that "introduction of airplanes into business channels offers the only substantial basis" for success.

To help maintain that success, it was essential that the Beech Aircraft Company establish dealerships in key states such as New York, Texas and California, to name only a few. Late in December 1934, he had dispatched a young and inexperienced pilot named Truman Wadlow

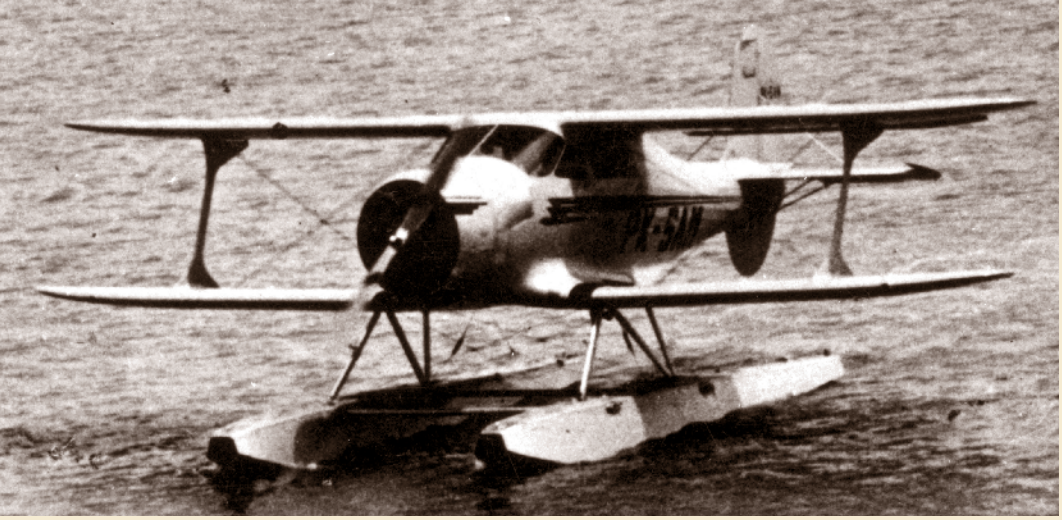
Truman Wadlow had yet to reach his 25th birthday when he was hired by Walter H. Beech to establish a new Beechcraft sales agency in California. The state was known as a hotbed of aviation activity throughout the 1930s, and eventually proved to be an excellent market for new Beechcraft airplanes. (EDWARD H. PHILLIPS COLLECTION)

to the West Coast to sell Beechcrafts. Armed with a factory-fresh B17L, Wadlow set up the first Beechcraft dealership and distributorship in California. In addition to the United States, Europe was an important and growing market for business airplanes. In 1935, a B17L was ordered by Maurice Salle, an affluent Parisian and sales agent for Beechcraft airplanes. Another B17L was sold to famed British aviatrix Amy Mollison, who had signed an agreement to become a Beechcraft sales agent in Great Britain.

The success of the B17 series airplanes was reflected by a significant increase in net sales volume for 1935 that was more than twice that of 1934 – $424,278. In December 1935, Walter hired William A. Ong as company sales manager. He was a nationally-known pilot and air racing competitor and was a skilled salesman. Another important addition to the sales team in the field was O.J. Whitney, Inc., that operated under the name "*Beech-Air Sales Company, Inc*."

Based at North Beach Airport, Jackson Heights, N.Y., the agency was active in selling the B17 series as well as previously owned aircraft. O.J. Whitney always maintained a good selection of used ships, particularly factory demonstrators that had been replaced by newer models. For example, in December 1935 the agency offered a B17L that had accumulated only 310 hours total time, powered by a 225-hp Jacobs static, air-cooled radial engine turning a steel propeller. The ship was painted blue with white trim, featured a 70-gallon fuel tank and basic gyroscopic flight instruments, flares and dual landing lights, all for only $5,800.

Another well-known airman, James G. Haizlip, bought a B17R and took delivery in April 1936. Acting as a sales agent for the Beech Aircraft Company, Haizlip planned to demonstrate the biplane throughout Europe while attempting to set a series of city-to-city speed records. Because flying the Beechcraft



Beechcraft SE17B registered PK-SAM performed humanitarian work in Borneo with a missionary organization during 1939-1940. In the early weeks of World War II, the airplane was destroyed by the retreating Dutch authorities to prevent its capture by invading Japanese military forces. At least one other Beechcraft biplane served with distinction during the defense of Corregidor in the Philippine Islands, but eventually was shot down by Japanese floatplane fighters. (EDWARD H. PHILLIPS COLLECTION)

70 AVIATION December, 1935

B17L OVER ETHIOPIA » »

and even Haile Selassie goes Airminded!

According to reports from Addis Ababa the Lion of Judah became airminded when he saw the performance of a B17L Beechcraft. He was filled with admiration and awe as the wings of the Beechcraft cast a fleeting shadow over the Eucalyptus groves of Ethiopia's capitol city.

Stories of the exploits of this Beechcraft outmaneuvering and out-distancing the trained Italian air forces—bringing back pictures and news from inside the lines—have been front page news in the nation's large dailies for the past month.

The graceful lines, the spectacular and near uncanny performance of the Beechcraft has captured the fancy of the people of all nations.

But what is of even greater importance is the relatively small group of aviation experts—engineers and prominent pilots—who have found the Beechcraft structurally sound and aerodynamically correct. They know that the Beechcraft will fly faster and carry larger useful loads.

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BEECHCRAFT

Walter Beech advertised in a number of prominent aviation publications including Aviation and Aero Digest. This particular advertisement centered on a Beechcraft that caught the interest of Ethiopian Emperor Haile Selassie in 1936. (EDWARD H. PHILLIPS COLLECTION)

across the North Atlantic Ocean was considered too risky, the B17R was shipped to the East Coast, disassembled and stored aboard the famous (and soon to be infamous) German Zeppelin "*Hindenburg*" that carried the registration LZ-129. Haizlip and his family were aboard the airship on its second return transatlantic flight from Lakehurst, N.J., on May 21.

Soon after arrival in Europe the airplane was reassembled, rigged and test-flown by Haizlip. He flew the speedy Beechcraft on a number of demonstration flights that gave Walter Beech's biplane excellent exposure to the public and potential buyers. In addition, the factory sold two C17E Beechcrafts to the government-sponsored Japan Air Transport Company in Tokyo. Plans called for flying a fleet of C17E biplanes on proposed passenger and air mail routes within Japan.

During 1936, the Beechcraft factory built 61 airplanes and the future looked bright for 1937. In January of that year, the company purchased the former 160-acre Travel Air manufacturing complex from the Curtiss-Wright Aeronautical Corporation, including about 150,000 square feet of floor space and a 2,200-square foot office building that also housed the engineering department. Two years later, in 1939, the factory produced 75 biplanes compared to 53 in 1938, but only 31 were built in 1940 and a mere six left the factory in 1941 as America answered President

Bullish, powerful and fast, the Beechcraft Model A17FS was the last of four airplanes built that were too expensive to acquire and operate in the severely depressed commercial airplane market of 1934. Built to compete in the MacRobertson International Trophy Race from England to Australia, the A17FS was withdrawn due to lack of funding and sat for months in the factory gathering dust. Walter Beech finally sold the ship to the federal government's Department of Commerce, but it later disappeared after being returned to the factory. Its fate remains a mystery. (STAGGERWING MUSEUM FOUNDATION)

Franklin D. Roosevelt's call to become the "Arsenal of Democracy." The final four commercial Model 17 biplanes were delivered in January 1942 as wartime production shifted into high gear.

During 1937, net sales volume had increased to more than $787,000 compared with $621,000 in 1936, but in 1938 sales exceeded the $1 million mark for the first time in the company's history. That landmark achievement, however, was surpassed in 1939 when sales hit more than $1.3 million. The rosy financial picture soon changed as war clouds over Europe began to spread toward isolationist America.

During 1940 in particular, and continuing in the months leading up to the nation's entry into the Second World War in December 1941, commercial sales of Beechcraft airplanes were becoming increasingly difficult as both airframe and engine manufacturers struggled to meet the president's call for 50,000 combat aircraft. The Beech Aircraft Corporation was hard pressed to fill incoming orders for new airplanes. The situation was breeding a growing unrest in the field. In an attempt to address the growing frustrations of dealers and distributors, in March 1940 company Vice President John P. Gaty sent a carefully-worded letter to all Beechcraft sales agencies: "The unprecedented expansion of aircraft production in the United States has caused a great deal of difficulty in procurement of items necessary for the production of airplanes. Because of a shortage in skilled labor and plant facilities, the cost of

The Beechcraft Model B17 series was the airplane that kept the Beech Aircraft Company out of bankruptcy during 1934-1935. Selling for about $8,000 with standard equipment, the biplane was not only affordable but offered businessmen a modern, fast and economical mode of air transportation. The factory built 46 B17L ships before production shifted to the C17 series. (EDWARD H. PHILLIPS COLLECTION)

labor and component parts have risen very considerably. These cost increases probably will continue as long as conditions of abnormal aircraft demand continue." In the wake of that "unprecedented expansion" Beechcraft prices did escalate almost weekly. In addition, the company was forced to meet rising wage scales within the aircraft industry or risk losing its skilled workforce to other companies.

By May 1941, the situation had become almost untenable. Carl B. Wooten, company sales manager, warned dealers that the "situation in regards to delivery

on new Model 17 Beechcrafts is rather unpredictable." Occasionally enough parts could be scraped together to build one commercial Model 17 and complete an order. In another letter Wooten wrote: "We have two, new [Pratt & Whitney] "*Wasp*" engines available that could be installed in D17S fuselages already built up," but he added the caveat that delivery could not be made before "60-70 days after receipt of a firm order." Every commercial sale, however, depended entirely on whether the United States Defense Commission, whose chief focus was the production of warplanes, approved construction and released critical materials.

Walter Beech sympathized with impatient salesmen who had signed orders in hand for new airplanes that he realized probably would never be built. In an effort to ease the tension, the factory did offer to install used radial engines with only 30-40 hours total time since new, thereby reducing delivery time to about 40 days. That initiative did little to resolve the problem. Faced with the reality that new Beechcrafts had become almost impossible to obtain, early in 1941 the company instituted a "Used Plane Exchange" program that brought salesmen and customers together through a listing of used Beechcraft airplanes available for sale. The program was intended not only to support sales but also to "keep an open channel toward further business in the future," according to Mr. Beech.

During the four years following the Imperial Japanese Navy's surprise attack on American naval forces at Pearl Harbor, Territory of Hawaii, Beech Aircraft Corporation manufactured more than 7,000 airplanes for Allied military forces. A majority of these were variants of the Model 18 "*Twin Beech,*" but a few hundred Model 17 biplanes also served with distinction throughout the conflict. From January 1934 until December 31, 1941, the company sold 84 airplanes to customers in foreign countries, thanks to an effective network of sales agents and dealerships. These agencies helped Walter Beech gain a firm marketing foothold around the world, particularly in Latin and South America that as of 2014 still boast some of the most loyal Beechcraft customers. Other regions include Asia, China, Western Europe and the Pacific Rim.

The recent acquisition of Beechcraft Corporation by Cessna Aircraft Company parent Textron will greatly expand the potential for sales of the King Air series for private, business and special mission applications. KA

About the Author: 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.

Garmin Expands Pilot Training Classes to Include Integrated Flight Decks

Garmin is pleased to announce expanded pilot training opportunities for 2015 to include additional live classes and eLearning courses. Garmin is offering scheduled classes for the GTN 650/750 touchscreen navigator series and G500/G600 glass flight display systems, in addition to on demand classes for the G1000, G3000, and G5000 Integrated Flight Decks. These live classes are held locally at Garmin Headquarters in Olathe, Kansas, and provide customers with a hands-on approach to learning Garmin avionics in a classroom environment taught by experienced certified flight instructors.

Integrated Flight Deck training is tailored specifically to aircraft type and the pilots attending the class. These on-demand courses are dependent upon instructor availability, training aids and other resource considerations, but provide pilots with a hands-on learning opportunity in a structured environment for pilots flying with the G1000, G3000 or G5000 Integrated Flight Decks.

For additional information or to request training for any one of the G1000, G3000 or G5000 Integrated Flight Decks, contact *aviation.training@garmin.com* or call (866) 739-5687.

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VALUE KA ADDED

Blackhawk Modifications Names Executive Flight Training as Authorized Pilot Training Center

Blackhawk Modifications of Waco, Texas has named Executive Flight Training of Beaufort, S.C. as an authorized pilot training center for all twin-engine aircraft models for which Blackhawk provides higher performance, new PT6A engine upgrades, which includes the King Air 90 and King Air 200 models. Executive Flight Training will be able to teach pilots how to get the most from their new PT6A engine upgrades with instruction specifically oriented towards the proper operation of all Blackhawk upgraded aircraft.

Blackhawk's Senior VP of Sales, Marketing and Customer Support, Bob Kromer says that the new PT6A engines that the company provides their customers give the capability to extract more horsepower at climb and cruise altitudes, resulting in superior single and multi-engine climb performance, higher available cruise speeds and capability to routinely cruise at higher, more fuel-efficient altitudes. "We are pleased that Executive Flight Training will be demonstrating techniques to show our customers how to best operate their aircraft to realize these performance increases and improved efficiencies," he added.

Executive Flight Training has been training King Air pilots for 23 years. For further information on its training opportunities, contact Doug Carmody at (843) 521-9412 or *dscarmody@safepilot.com* or go to Executive Flight Training's website at *www.safepilot.com.* KA

Service Bulletins

Service Bulletin 57-4144: Wings – Aileron Hinge Screw Inspection

Issued: February 2015

Compliance – Recommended: Beechcraft Corporation recommends that this Service Bulletin be accomplished at the next scheduled inspection or within 12 months, whichever occurs first.

Effectivity:

Airplanes Model A100-1 (U-21J) King Air; Model 200 King Air; Model 200C King Air; Model 200CT King Air; Model 200T King Air; Model B200 King Air; Model B200C King Air; Model B200CT King Air; Model B200T King Air; Model A200 (C-12A) King Air; Model A200 (C-12C) King Air; Model A200C (UC-12B) King Air; Model A200CT (C-12D) King Air; Model A200CT (FWC-12D) King Air; Model A200CT (C-12F) King Air; Model A200CT (RC-12D) King Air; Model A200CT (RC-12G) King Air; Model A200CT (RC-12H) King Air; Model A200CT (RC-12K) King Air; Model A200CT (RC-12P) King Air; Model A200CT (RC-12Q) King Air; Model B200C (C-12F) King Air; Model B200C (UC-12M) King Air; Model B200C (C-12R) King Air; Model B200C (UC-12F) King Air, all serial numbers;

Model B200GT King Air, serial numbers BY-1 through BY-206, and BY-208 through BY-218;

Model B200CGT King Air, all serial numbers;

Model 300 King Air and Model 300LW King Air, all serial numbers;

Model B300 King Air, serial numbers FL-1 through FL-949;

Model B300C King Air, serial numbers FM-1 through FM-56.

Spares None

Reason: This Service Bulletin is being issued to determine if proper length screws are installed at the aileron hinge points.

Description: This Service Bulletin provides instructions to inspect for proper length screws and replace, as necessary, screws at the inboard, middle, and outboard aileron hinge points.

Warranty: None.

Manpower: The following information is for planning purposes only:

Estimated man-hours: 1 hour
Suggested number of technicians: 1

The above is an estimate based on experienced, properly equipped technicians complying with this Service Bulletin. Occasionally, after work has started, conditions may be found that could result in additional man-hours.

The above information is abbreviated for space purposes. For the entire communication, go to www.beechcraft.com.

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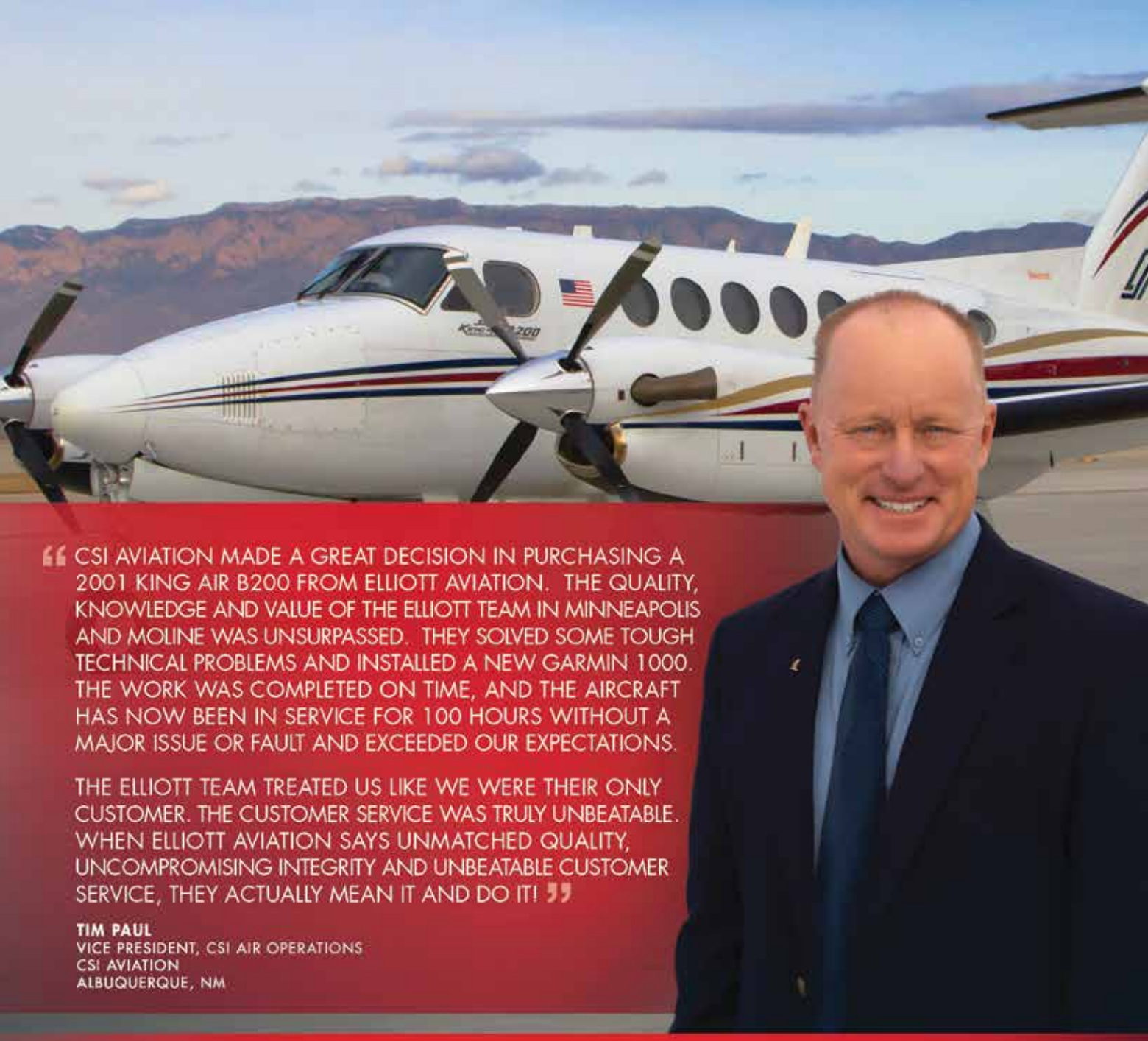

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