

# **Family Friendly**

King Air Matches Owner's Personal & Business Philosophy



### SAFER. MORE CAPABLE. FULLY COMPLIANT.

For a Pro Line 21 modernization, call the experts at Elliott Aviation. Our more than thirty trained avionics technicians can get your Pro Line 21 system upgraded to include the latest technology. From pilot benefits like synthetic vision, charts and LPV approaches to hassle free maintenance with a DBU 5010 or configurable 21, an upgraded Pro Line 21 system will allow you to operate your avionics system for many years to come. Upgrade packages will also take care of your upcoming ADS-B mandates. While the full package can be purchased for under \$200,000, less expensive option packages are available if some of your upgrades are already complete. Call the King Air experts at Elliott Aviation and you'll land a better experience

... because of our experience

AVIATI

MOLINE DES MOINES MINNEAPOLIS 800.447.6711 www.elliottaviation.com

#### 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: kblonigen@cox.net

> PUBLISHERS J. Scott Lizenby Dave Moore Village Publications

**GRAPHIC DESIGN** Luana Dueweke

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. Diane Chauvin Molly Costilow Jamie Wilson P.O. Box 1810 Traverse City, MI 49685 1-800-447-7367

ONLINE ADDRESS www.kingairmagazine.com

#### **SUBSCRIPTIONS**

King Air is distributed at no charge to all registered owners of King Air aircraft. The mailing list is updated bi-monthly. All others may subscribe by writing to: King Air, P.O. Box 1810, Traverse City, MI 49685, or by calling 1-800-447-7367. Rates for one year, 12 issues: United States \$15.00, Canada \$24.00 (U.S. funds), all other foreign \$52.00 (U.S. funds). Single copies: United States \$4.50, Canada/Foreign \$6.50.

COVER PHOTO

Photo courtesy of Cody Lee

## Contents

2 Perfect Plane – Early career success propels businessman by Kim Blonigen

8 Double Coverage = No Coverage? by Kyle White

12 Aviation Issues – Recent Activity Regarding Aviation by Kim Blonigen

16 Ask the Expert – Props Forward on Landing?

by Tom Clements

22 The Air Capital of the World: "Wichita at War" by Edward H. Phillips

32 Value Added

38 Technically...

40 Advertiser Index



King Air is wholly owned by Village Press, Inc. and is in no way associated with or a product of Textron Aviation. King Air (ISSN 1938-9361), USPS 16694 is published monthly by Village Press, Inc., 2779 Aero Park Drive, Traverse City, Michigan

49686. Periodicals Postage Paid at Traverse City, MI. POSTMASTER: Send address changes to King Air, Village Press Inc., P.O. Box 1810, Traverse City, MI 49685. Telephone (231) 946-3712. Printed in the United States of America. All rights reserved. Copyright 2016, Village Publications.

ADVERTISING: Advertising in *King Air* does not necessarily imply endorsement. Queries, questions, and requests for media kits should be directed to the Advertising Director, King Air, P.O. Box 1810, Traverse City, Michigan 49685. Telephone 1-800-773-7798.

MANUSCRIPTS: *King Air* assumes no responsibility for unsolicited manuscripts, photographs, or art work. While unsolicited submissions are welcome, it is best to query first and ask for our Writer's Guidelines. All unassigned submissions must be accompanied by return postage. Address queries and requests for Writer's Guidelines to the editor.

# Perfect Plane

# Early career success propels businessman

by Kim Blonigen

Hunter Buildings was the first to design, construct and sell API-compliant, blast-resistant modular buildings for use by the refining and petrochemical communities. It was also the first in the industry to submit its buildings to actual physical blast testing.





ark Massey is a small-town Texas boy who will be the first to tell you how blessed and fortunate he is, and he doesn't take a bit of it for granted. As a new graduate of the University of Texas in petroleum engineering and geology in 1985, he took his first trip on an airplane with a bag full of research that convinced Los Angeles bankers to give him a very large loan to buy two oil refineries in Louisiana. He paid the bank back within 18 months and his good fortune allowed him to semi-retire. "I'm very blessed that those bankers took a chance on me," Massey said. A little over 10 years later, he was given the opportunity to give back and help save lives, and he's been flying high ever since.



Mark and Wendy Massey enjoy taking their family on trips in the King Air. "It's the perfect aircraft for us," he said.



The Massey's 1980 Beechcraft King Air 200 flies about 125 hours a year for business and personal trips.

#### A life-saving business

In 1992, the Department of Labor's Occupational Safety and Health Association (OSHA) enforced the "Process Safety Management of Highly Hazardous Chemicals" standard to reduce the high number of hazardous incidents at petroleum and chemical processing facilities. As an appendix to the rule, a compliance guide was produced discouraging the use of portable buildings within plant process areas. At the time, wood-framed trailers were popular because of the ease in placing the structures (and workers) near the work area. Compliance to the OSHA standards meant that oil refineries and chemical plants would have to locate the trailers a safe distance from their facilities as to not harm employees in case of an explosion. This was far less efficient for the industry.

In 1998, Massey met his current business partner, a lawyer with a degree in chemical engineering. The lawyer had been involved in a case where an explosion at an oil refinery had killed and injured several workers because they were in wood-framed trailers with no protection. He thought he could use his engineering education to develop a blast-resistant material to replace the wood-framed construction buildings. "My partner had the idea and I came up with the money to finance it," Massey said.

In 1999, Massey and his partner launched Hunter Buildings and were the first to design, construct and sell American Petroleum Institute-compliant, blastresistant modular buildings for use by the refining and petrochemical communities. The company was also the first in the industry to submit its buildings to actual physical blast testing. Hunter's first customer was Exxon and the business took off from there. The company now has three state-of-the-art manufacturing facilities to meet worldwide demand. The original facility is located with company headquarters in the heart of the energy industry in Houston, Texas; the other two are located where the largest chemical plant and oil refineries are located, in Sharjah, UAE, and Comutov, Czech Republic.

Hunter's buildings are not only certified to stand up to gas and vapor explosions often caused in the oil and chemical industries, but also forced entry/ballistics, harsh environments and natural disasters. Still, Massey said, 95 percent of Hunter's current business is serving oil refineries and chemical plants.

When asked about his company's philosophy, Massey said, "It's easy, we're family." He went on to say, "The employees that work for me help me provide for my family and I realize I am nothing without them, so I take care of them. I am very blessed to have 300 employees who I provide profit sharing, insurance and a 401(k) to, and they love working for us. I'm a simple guy and it's a simple philosophy: we take care of each other ... we're family."

#### From Microbiologist to Chief Pilot

hen she was a little girl, Angie Terrell, chief pilot for Hunter Buildings, dreamed of learning how to fly. At the age of 9, she flew over to Europe with her sister, whose husband was stationed there. "The flight was exhilarating for me and only grew my passion for flying. But my father was a house painter and my mother was a waitress, so I knew taking flying lessons wasn't financially feasible," she explained.

When it came time to attend college, she decided she would get into the military and learn how to fly that way, so she attended Penn State and was part of the ROTC program. The summer after her first year, she broke her leg and ankle and fell behind in the ROTC program. She decided maybe that was a sign that flying wasn't to be part of her life. She ended up getting a degree in microbiology and worked in the genetic research field in Dallas.



Hunter Buildings' Chief Pilot Angie Terrell with her daughter, Ashlyn, who gets to go along on the flights.

A few years later she saw an ad in the newspaper

publicizing discovery flights at the local airport. She went up in an airplane with an instructor for a 15-minute flight and instantly fell back in love. "The next Monday, I promptly walked into my boss' office and turned in my two weeks' notice. I told her I was going to flight school and at first she thought I was kidding!" Angie explained.

Due to 9-11, it took a bit longer for her to build up her hours because the airlines weren't hiring, but she was able to instruct at her flight school. She soon found a job transporting freight at night, flying six days a week for \$800 a month. But she's not complaining, "I was able to get my multi-engine rating and build up my time," she said. "It also taught me to be a very conservative pilot." She then went on to fly for Continental Express and later worked for FlightSafety training pilots in the ATR.

Although she hadn't flown a Beechcraft King Air much before being hired as Hunter's chief pilot, she was well aware of its operating systems. "A lot of my ATR students were transitioning from the King Air, so I studied its systems in order to understand where they were coming from and how I could explain things better," she said.

Angie can't say enough about flying for the Masseys and Hunter Buildings. "It doesn't get any better than what I do! I mean, who gets to take their 2-year old to work with them? I get to fly a great airplane for a great family and business. I do everything I can to take care of them!" she professed.



# EQUIPYOUR ARCRAFT WITH A TACTICAL ADVANTAGE.

Eliminate uncertainty in your maintenance budget through low, predictable costs and factory-direct service. Combine PowerAdvantage<sup>®</sup> with ProParts<sup>®</sup>, ProPropeller<sup>®</sup> and ProTech for your King Air<sup>®</sup> and experience the unmatched support only available from Textron Aviation.



#### Learn more at service.txtav.com

©2016 Textron Aviation Inc. King Air is a registered trademark and ProPropeller is a trademark of Beechcraft Corporation, used by permission. PowerAdvantage and ProParts are registered trademarks of Textron Innovations Inc., used by permission.



Not much has been changed with the 1980 King Air's panel; Angie says that Beechcraft's standard panel is all that she needs.

#### Adding a King Air to the family

Massey and his wife, Wendy, just happened to be neighbors in Houston with aviation couple Angie and Jeff Terrell. Jeff flies for the airlines and Angie was instructing at FlightSafety. About three years ago, Massey decided he wanted to purchase an airplane that he could use for his business and personal trips. He and Wendy have seven kids and they like to travel as a family, as well as have quicker means to visit the children who don't live in Houston.



He asked the Terrells to help him find the right aircraft to fit his needs and asked Angie if she would be the pilot. He offered to pay her more than she was making and provide her all the benefits as an employee of Hunter Buildings. Shortly after she received the job offer, Angie was surprised to find out that she was expecting at age 43. She immediately told Massey and told him she understood if he wanted to get someone else to be their pilot. Instead, Massey offered maternity leave and they worked out a plan for Jeff to fly the aircraft when Angie was off with the baby. Once she was ready to come back to work, she could bring the baby with her. "The baby is part of the family, too," Massey said.

"It's a workhorse and me and my family feel safe flying in it. It's perfect for us. I don't want another airplane or another pilot for the rest of my life."

Jeff and Angie studied aircraft that would fit the Massey's needs, primarily for company travel and secondarily for their personal use. They looked at jets and the Pilatus, as well as the Beechcraft King Air. "In the end, the King Air won on all accounts," Angie said. Most of the flights for the company would be in Texas and Louisiana, although some trips could be as far away as the Bahamas. Personal trips would include regular flights to Austin (for UT home football games, of course!), Colorado and Mexico. "When we looked at jets, the maintenance costs were three times that of the King Air, and the range, endurance, hauling capability, room in the cabin, quality and excellence of the King Air couldn't be denied," Angie explained.

Mark's wife, Wendy, designed the new interior for their Beechcraft King Air 200.



Aviation couple Jeff and Angie Terrell, with their daughter Ashlyn. Angie is Hunter's chief pilot, and Jeff flies left seat when he has the opportunity.

Jeff started looking for King Air 200s and found one that met their performance needs and happened to be painted with University of Texas orange accents – the perfect King Air for the Masseys.

Once they purchased the 1980 King Air 200, the interior was upgraded and designed by Wendy. They also added UT horns to the tail. It still has most of the original avionics and Angie explains that what Beecheraft

provided is all that she needs. They named the aircraft *Wendy 1* and Angie said, "the old girl doesn't know she's a 35-year-old airplane. She is as exceptional around the mountains and icy runways as she is in the heat and on short runways."

Angie oversees the maintenance and upkeep for the King Air and uses Harco Aviation at Ellington Field in Houston for their maintenance needs. "Skip Harrison, the service center's owner, is also a King Air pilot and mechanic, and I trust his judgment completely," she stressed. Jeff flies with Angie on test flights after the King Air has come out of maintenance and also goes on some of the trips. "When he goes along, we have to play rock, paper, scissors to see who gets the left seat," Angie joked.

The King Air is available for Hunter Buildings' sales team to visit a project site or clients. Mark estimates they use the airplane 25-40 percent of the time for business purposes and the remainder is for personal use. "The King Air's safety record was very important to me because I carry precious cargo," Massey said. He summed it up by saying, "If I won the lottery tomorrow, I'd never get rid of the King Air. It's a workhorse and me and my family feel safe flying in it. It's perfect for us. I don't want another airplane or another pilot for the rest of my life."





by Kyle White

n today's society, nearly everyone wants to have two of everything – two cars, two houses, two airplanes, etc. We have come to believe more is better. However, insurance does not always work that way. If you have coverage for something in one policy, and that same coverage is in another policy, instead of double coverage, what you will likely have is an expensive problem.

Most King Air policies are very detailed, and over the last decade have become even more so with enhanced coverages to benefit the aircraft owner. An insurance company does not want to give you coverage for a peril if you have it covered somewhere else. To avoid this, they put a clause in the policy that states, "if you have coverage available to you under another policy, this policy is excess and the other policy is primary."

Now, imagine if you have two policies and both of the policies have this wording regarding a particular peril. If both policies say the other is "primary" and theirs is "excess," who pays first? Who has two insurance policies, you ask? I would venture to say nearly everyone I know has two insurance policies (or more)! Home, auto, boat, aircraft and many more. For the purpose of this article, we'll keep it aviation related. Many people reading this are involved in a management function of a business. The company you support may have an aircraft policy to protect the King Air and the liability associated with owning, operating, and maintaining the aircraft. Additionally, the company may have a property policy to protect against physical damage of a hangar you own or lease. Or, you may have a corporate property policy that protects all buildings the business owns and premises liability associated with those properties. There may also be an auto policy that does not exclude aviation exposures.

It is imperative you evaluate all of your policies to find the coverage overlap and the "if you have coverage somewhere else" terminology. If you fail to do this, you may find yourself in an expensive battle while your lawyers convince the insurance companies to cooperate with each other and settle your claim. There are many coverage overlaps our industry fails to address. For the purpose of brevity, we will address a few of the most common – premises liability, non-owned aircraft liability and contents – keep in mind, there are many more!

#### If both policies say the other is "primary" and theirs is "excess," who pays first?

We routinely come across double coverage for premises liability. Many King Air owners are based outside of metropolitan areas, at rural airports. In doing so, they may find that there isn't an adequate hangar to house their aircraft, so they work with the airport authority and build their own. Like other property the King Air owner has, they purchase an insurance policy to protect their asset against physical damage and liability that may arise out of ownership, maintenance, or operation. Some King Air owners may also find themselves contractually obligated to do the same, even if they are only involved in a long-term lease. There are also FBOs that have attorneys create detailed contracts to protect the airport authority. We can usually differentiate the aviation-focused attorney from the generalist, in the event property damage or negligence occurs, because of the coverage required and how it is described.

Generally, King Air policies contain liability coverage for airport premises liability. There is language within the policy that may be limiting or more inclusive for this coverage though. Such as, does the policy extend to premises you rent, occupy, use, and own? Or does it exclude property you actually own? It is important to review the wording buried in the policy to address your specific situation.

A few months ago, a reader of this magazine contacted my office for some advice and guidance. I reviewed their two policies, one for the King Air and the other for the hangar they owned. Then we had a conversation about their operation and ownership structure. One of the items we discovered was double coverage for premises liability. There was \$1,000,000 of coverage under the property policy and \$10,000,000 under the King Air policy. Which limit would you rather have protecting you? When I explained to the King Air owner that he was actually paying more money to be in the undesirable situation of having two policies point at each other and say the other one is primary in the event of a simple "slip and fall" claim in front of his hangar, he was more than a little shocked. Understandably, he thought he was buying the insurance correctly. Who pays more for something when you do not actually need it? To alleviate this problem, we simply deleted the premises liability coverage from the property policy, saving the client roughly 300 gallons worth of Jet-A dollars.

One of my favorite double coverage finds pertains to non-owned aircraft. Some people are fortunate enough to own two airplanes. Some of which may have two separate policies. This could be disastrous in the event you have a claim involving a non-owned aircraft. The reason is because most likely you have the following language in both of your aircraft policies: "This coverage shall be excess insurance over any other valid and collectible insurance available to you."

Once again, you have two policies pointing at each other. How do we determine which policy is primary? Most likely, if you own both a King Air and a Bonanza, you would want the King Air policy to be



# Suarantee peace of mine projection (AUK/MUK) Well-beino

primary, as it presumably has significantly higher liability limits available to protect you in court. I have also seen situations where a non-pilot aircraft owner owns one airplane, but then decides that watching the professional pilots fly the King Air is so much fun they decide to start working on their pilot's license. With good intentions, they purchase a renter's policy (non-owned coverage) and start taking lessons. You now have the same problem – two policies pointing at each other.

For those of you that only have one aircraft and one aircraft policy: Do you ever use a non-owned aircraft? One of our clients called last week stating their Hawker was going to be down for maintenance and they were going to use a friend's King Air 90. Whose policy would pay in the event of a claim? If the PIC from the Hawker meets the pilot warranty of the King Air and is PIC, will the King Air policy be primary? This exact scenario is something that should be addressed in a contract between the two parties in order to avoid litigation in the unfortunate event of a claim.

The third coverage that can come into play is contents of your hangar. You could find yourself in

a double coverage situation if there is a property policy in addition to your King Air policy. Be sure you understand if your aircraft policy is going to make you whole in the event of, say, a hangar fire, in which you may have coverage under your aircraft policy for "spare parts," or if your property policy is going to respond. In this scenario, it doesn't have to be a fire. What if you have "mechanic's tools" covered under your aircraft policy, but also covered under your property policy?

It is important, whether you are a business or an individual, to make sure all of your policies are aligned with each other and working in a concerted effort as to not unintentionally undermine one another. Additionally, by streamlining coverages within your policies, you may find that you reduce your premiums.

Kyle P. White, an aviation insurance specialist, is CEO of Aviation Solutions, a Marsh & McLennan Agency LLC company. He has professionally flown King Air 90s and B200s, and holds an ATP and multi-engine instrument instructor license. You can reach Kyle at *kyle.white@marshmma.com*.

## MAKE YOUR KING AIR FASTER FOR LESS THAN YOU'D IMAGINE. READY. SET. GOGO.



Adding in-flight connectivity to your King Air lets both you and your passengers fire up your devices and apps—including cockpit apps and get things done in flight. That makes you faster. And with systems starting at just \$35,000\* plus Pay As You Go data plans, and even financing, it's all a lot more affordable than you'd imagine.

#### Find out more: business.gogoair.com/kingair

baconnect@gogoair.com +1 303.301.3271

\*Does not include installation or certification.



# Recent Activity Regarding Aviation

by Kim Blonigen

#### **Concern Over Another Extension on FAA Bill**

viation groups are becoming increasingly concerned that the U.S. Congress is headed for another extension of the FAA's operating authority. The FAA is already functioning under its second extension, and Congress has until July 15 to pass a comprehensive FAA reauthorization bill or opt for a third extension.

General Aviation Manufacturers Association's (GAMA) President and CEO Pete Bunce shared his concern that if the FAA bill gets pushed into next year, it would mean that bipartisan provisions in both the Senate-passed and House Committee-passed FAA bills that would improve aviation safety, reduce bureaucratic inefficiencies and help support aviation manufacturing jobs would not be enacted.

In February, the U.S. House Transportation and Infrastructure (T&I) Committee passed its version of comprehensive FAA reauthorization legislation, but that bill has stalled over opposition to a measure to create a separate not-for-profit air traffic control (ATC) organization. The Senate passed its version of the FAA bill, minus the controversial ATC measure, in April.

A letter sent by Senate Commerce Committee chairman John Thune (R-S.D.) and Democrat Bill Nelson (D-Fla.), urged their House counterparts to take up the Senate bill. The senators warned that the House ATC measure likely would not win full Senate support at this time.

The coalition formed to oppose the ATC measure, the Americans Against Air Traffic Privatization (AAATP), noted that more than 10,000 letters have been sent to Congress in opposition of the ATC reorganization effort.



#### **NBAA Welcomes Sensible Regulations** for Commercial Small UAS Operations

he National Business Aviation Association (NBAA) welcomed the FAA's publication of formal regulations providing clear guidance over the use of small unmanned aircraft systems (s-UAS) for commercial purposes, including applications within the business aviation industry. Other general aviation groups, including AOPA (Aircraft Owners and Pilots Association), are also in support of the new regulation.

The newly-created Federal Aviation Regulation (FAR) 14 CFR Part 107 applies to commercial use of UAS weighing less than 55 lbs., and

generally follows the agency's notice of proposed rulemaking (NPRM) released in early 2015 with key differences reflecting input from NBAA and other industry stakeholders.

"We commend the FAA for balancing the imperative to maintain safety for manned aircraft operating in the national airspace system (NAS) with the practical needs of this rapidly-emerging industry," said Bob Lamond, NBAA director, air traffic services & infrastructure.

Changes from the Notice of Proposed Rule Making (NPRM) include lowering the maximum operating altitude for UAS to 400 feet above ground level (100 feet below the minimum altitude for manned aircraft) and revised classification of a UAS operator as Remote Pilot in Command (PIC).

Remote PICs must be at least 16 years of age, and be able to read, speak, and write in English. New UAS operators will be required to obtain a remote pilot certificate by passing an initial aeronautical exam at an approved FAA testing center, with subsequent recurrent testing every two years. Operators with an existing, non-student Part 61



pilot certificate may meet the exam requirement through an online training course.

Remote PICs will also be required to obtain prior permission from ATC when operating small UAS in Class B, C, D and E airspace, likely through an online portal. However, specific information about this process remains largely unknown at this time, with the FAA stating the issue will be addressed in the coming weeks.

"With the mixing of UAS and manned aircraft in the vicinity of airports, NBAA is very concerned that clear guidance for notification of UAS activity near airports is provided by the FAA as soon as possible," Lamond added.

Carrying over from the NPRM are requirements that small UAS be registered with the FAA, and operate only in daytime VFR conditions within visual line-of-sight of the Remote PIC or visual observers. Unmanned aircraft may not be operated over people on the ground, and all UAS must yield right-of-way to all other aircraft.

The FAA intends Part 107 to eliminate many burdensome hurdles under the current Section 333 exemption process, including certificate of authorization (COA) requirements and that Notices to Airmen (NOTAMs) be issued for UAS operations. However, current exemption holders may continue operating under Section 333 until that exemption expires.

Part 107 also allows exemptions to be granted for missions not otherwise authorized under the rule, including flights over people, nighttime operations, and flights occurring outside published altitude, cloud distance and minimum visibility, and speed restrictions.

NBAA personnel have participated in UAS working groups for 10 years, including participation through RTCA. The association has also published an expansive online resource covering UAS industry developments of importance to the business aviation community.

The new Part 107 regulations are expected to go into effect by late August, 60 days after publication on the Federal Register. Commercial operator testing and issuance of Remote Pilot Airman certifications will not be available until the rule goes into effect.

#### Customs Soon Available in Houston Area

he former Lone Star Executive Airport (CXO), now Conroe-North Houston Regional Airport, will offer U.S. Customs service from a newly constructed \$2.4 million facility. The 3,200-square-foot building is located on the ramp next to the Galaxy FBO.

The service will incur a user fee and be staffed by U.S. Customs during regular hours of 10:00 a.m. to 6:00 p.m. Monday through Friday and available after hours on demand. The airport, which is owned by Montgomery County is located 46 miles outside of Houston, and has a 7,500-foot main runway. Supporters of the newly added customs service say it will allow long-range business jets to fly direct from Central and South America, Canada and Europe, while bypassing the congested metro-Houston airspace.

The customs service is projected to be open by mid-July.









# AIRCRAFT FINANCING

# We know aircraft financing and we know banking.

1st Source Bank has 30 years of experience as a leading national aircraft lender, and over 150 years as a full-service bank.

The aviation lenders at 1st Source – *experts in aircraft financing* – give you the right advice and the right financing to get you airborne quickly. Whether you are a first-time buyer, trading up or refinancing your current aircraft, give us a call. Strong, stable and personal, we'll keep your best interests in mind.

Contact us at 574 235-2037, 800 513-2360 or at marketing@1stSource.com.





### **Props Forward on Landing?**

by Tom Clements

ver since the first reversing propellers appeared on King Airs – with the introduction of the A90 in 1966 – there has not been universal agreement concerning where the propeller levers should be positioned before landing. The Beech Pilots' Operating Manuals (POMs, earlier models) or Pilots' Operating Handbooks (POHs, later models) were consistent in stating that the prop levers did not get positioned full forward until after touchdown for a normal landing. However, if and when the landing was not normal - the two examples covered by the POM/POH were Maximum Reverse Thrust (Short Field) landings and No Flap landings - then the published procedure was/ is to advance the prop lever(s) fully forward before touchdown. However, even though this has been official "factory standard" procedure for five decades, a number of King Air operators treat the King Air props very much like the ones on their previous Queen Air, Baron or Apache ... place them full forward for all landings. After all, what would GUMP be without the P?! (I know, wise guy ... GUM.)

Since most pilots transitioning into a King Air have previous experience in piston twins and almost assuredly received their multi-engine training in one, they have the "P" step – props forward – wellingrained. So why would Beech change the checklist to leave props alone until on the runway?!

Noise. That's the reason. Because of the free turbine nature of the PT6, it is easy for the props to turn at maximum speed even when relatively low airspeeds and low power settings exist simultaneously. Thus, when the prop levers are pushed forward, almost always the prop speed indeed goes to maximum ... with the resultant extra noise both inside and outside of the cabin. On the other hand, most light piston twins will be in an underspeeding – "Off of the governor" – condition somewhere on the base or final leg and at that time the prop levers may be placed fully forward with no noticeable change in RPM or noise taking place. The benefit of this procedure is being more ready to reach full power in the event of a balked landing.

So does that mean that we are less ready for a balked landing in a King Air when we leave the props back at the cruise setting? Unlike the situation with some piston engines, there is no "over-boosting" concern when maximum torque is applied on a turboprop engine while the propeller is turning, even at the lowest speed setting of the governor. For example, a member of the King Air 200-series has a redline torque limit of 2,230 ft-lbs and a propeller governing range from 1,600 to 2,000 RPM. The maximum rated airframe shaft horsepower (SHP) is 850 and since SHP = Torque X Np X K, we can achieve 850 SHP only when both torque and Np (propeller speed) are at their respective limits: 850 SHP = 2,230 ft-lbs X 2,000 RPM X 0.00019.

It does not hurt a thing to set 2,230 ft-lbs while the props are back at 1,600 RPM, but now the formula shows we have only 680 SHP – a 20 percent reduction.

The conclusion here is that if we commence a Missed Approach or a Balked Landing by pushing the power levers forward to the torque limit – assuming ITT is not a limiting factor – while the prop levers have not been pushed full forward, no harm is done but we have not produced full power. Let's face it, however: Unless we are talking about one-engine-inoperative operation, a twin engine airplane performs rather well even with a 20 percent power "loss." Not to mention, the next step that should be accomplished after POWER has been added is to consider the PROPS and, if more power is needed, push them forward before retracting FLAPS and GEAR.

(Power, Props, Flaps, Gear ... that has a familiar ring to it, doesn't it?!)

Here's my strong suggestion: Yes, for the normal landing, leave the props alone until the RPM decreases. For many King Air models, this won't happen until in the flare or even after touchdown. The 300-series is the exception, with the props going into an underspeed condition slowing down, coming off of the governor - usually on short final. However, the instant the landing becomes *abnormal* in any way, forget the noise concerns and push the prop levers fully forward early in the landing procedure, usually about the time the gear is extended. These abnormal situations include, to me, not just the Short Field and Single-Engine situations that Beech addresses, but also include (1) very low ceiling and visibility precision approaches in which the chance of a missed approach is greater, (2) landing with very gusty winds, in which not only will power be jockeyed a lot more than normal on the approach but, again, the chance of a balked landing is greater, and (3) unusual and challenging visual approaches to airstrips in mountainous terrain.

Suppose that your King Air model rarely, if ever, carries passengers for the landing. Freight haulers, sky-diving jump airplanes, and special mission military operations come to mind. Now interior noise is not a factor and, to be frank, exterior noise from a landing King Air is relatively minor even when the props are turning at maximum speed. So it probably



Effective, Affordable Anti-Skid Braking for Your Aircraft

### Advent <sup>©</sup>ABS

CERTIFIED | LIGHTWEIGHT | EASYTO INSTALL Eclipse 500/550 | King Air B200/B300 | Pilatus PC-12/12NG

**Advent Aircraft Systems** 

Contact tom.grunbeck@aircraftsystems.aero | 918.388.5940 | or see aircraftsystems.aero/dealers.php



makes sense to complete GUMP and move the prop levers forward early for these operators.

As most of you know, the maximum propeller speed of various King Air models has been decreasing with the passage of time. From a 2,200 RPM maximum in the early 90s and 100s, it went to 2,000 in the 200-series, then to 1,900 in the F90-series and the C90GT variants (and the Blackhawk -135A installations), and finally down to 1,700 in the 300-series. "Great!" you say, "The lower RPM reduces noise and must be good thing!"

Well, it seems to me that the old adage "For every good, there's a bad," applies here quite well. Here's the bad: If other factors are equal, the slower a propeller turns the more difficult it is to utilize Beta and Reverse. Let me try to explain; a graph may be helpful here. Imagine starting at a speed of 140 KIAS or more in your 90-series or 100-series model, pulling power back to Low Idle, and then holding altitude as the airplane slows. There'll come a time when the propeller speed began to decrease, since the low blade angle limit of the propeller governing range – the LPS, or Low Pitch Stop – had been reached. The RPM would drop below 2,200 well before it would decrease down to 1,900.



As you can see, for the same propeller and the same Low Idle N1 speed, about 110 KIAS is necessary before the propeller speed drops below 2,200 RPM, yet about 95 KIAS is required to get below 1,900 RPM. Realize that Beta and Reverse are achieved by repositioning the movable Low Pitch Stop (LPS). Thus, until the propeller blade angle is being controlled by the LPS – and that only takes place when in an underspeed condition – utilization of Beta and Reverse is impossible.

The F90 made its appearance in 1978 and was the first King Air to have 1,900 RPM as its maximum propeller speed. For the first time, Beech actually added a comment into the POH concerning this fact. It states, "WARNING: Propellers will NOT Reverse at airspeeds in excess of 95 knots IAS."

Consider this: If an F90 at maximum weight makes a No Flap landing, it should be at 127 KIAS crossing the 50-foot threshold point on landing. At touchdown, it is probably still going between 110 and 120. That means that no Reverse is available until about another 20 knots is lost while rolling on the runway. Good thing we selected a long enough runway!

Many F90s, F90-1s, C90GTs or Blackhawkconverted 90s, and Raisbeck-converted 90s and 100s, often do their cruising and approach phases with the prop speed pulled back to 1,700 or 1,750 RPM. Do you see what's coming? My goodness, it will now take probably less than 80 knots to be able to enter Beta and Reverse with the governor set for such a low speed! So I recommend that the prop levers be advanced fully forward – or at least to 1,900 RPM for the Raisbeck systems that still have a higher maximum RPM setting – when flying these models unless you plan to roll a long distance on the runway to make a distant turn-off taxiway, without lifting the power levers until you are quite slow.

"But wait," you may be thinking, "I'll just go ahead and run the props forward at touchdown and then I'll be ready to use Beta and Reverse, right?" The problem with that idea is, since you'll still be on the governors after touchdown, you will get the resultant prop speed increase, additional drag, and very likely even some asymmetrical drag unless both props are rigged identically. The only way to avoid these annoyances is to wait long enough to observe the RPM decrease before pushing the prop levers forward.

Speaking of asymmetric drag, if you are experiencing some of this while flaring – perhaps it seems the airplane wants to start a little sashaying dance left and right – I think I know the cause and the solution. It only happens with the later style, Type II, prop synchrophaser systems. In this system, there is no fixed master and slave unit, but instead the slower propeller always tries to flatten its pitch to speed up to and match the faster one ... in a very limited RPM range, of course. I believe when this is taking place, yet with the range of blade angle travel being limited by the LPS, we sometimes encounter this left versus right "battle." Solution? Easy – turn the Prop Sync switch off before landing ... just like you need to do with the older style, Type I system.

As mentioned briefly before, the 300-series airplanes are the exception to the need for a relatively low airspeed before reaching an underspeed condition, before being able to use Beta and Reverse. Their Flight Low Pitch Stop is set at a surprisingly large blade angle, causing them to reach an underspeed condition at a much higher airspeed than other King Airs. Their propeller governing range extends from 1,700 RPM maximum to about 1,450 RPM minimum and 1,500 is the common cruise and approach setting. When the power levers are reduced to Idle in the flare – this series really wants to float on landing! It is rare that the RPM will not immediately start to underspeed even below 1,500. So you may choose to not wait until *after* touchdown to place the propeller levers forward in these models, but instead get it done on final when you observe the decreasing RPM.

Conclusion? For normal operation, it is standard King Air operating practice to *not* move the propeller levers forward to the High ROM position until on the runway. That's what I teach and do. However, except for the additional noise, there is no reason not to do it on the downwind leg or when approaching a Final Approach Fix. If you prefer to keep the habit patterns you have already developed, feel free to place the prop levers forward just as you did before. And, for everyone, when faced with an abnormal landing situation, be sure to select maximum propeller speed nice and early, no later than 500 feet above touchdown, if not well before then.

King Air expert Tom Clements has been flying and instructing in King Airs for over 43 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, go to www.flightreview.net. 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 kblonigen@ cox.net. From the Technology Leader in Aircraft Environmental Systems

### New Replacement Air Conditioning for King Air 200/300/250/350

- Pre-cool from an extension cord without cabin access!
- High capacity air conditioning from APU or engine power
- > Typically 14 pounds lighter than OEM system
- > Environmentally friendly refrigerant
- > 2-year parts warranty, 6 months labor

If you have a King Air, you need this!

4900 Forrest Hill Road Cookeville, TN 38506 phone 931-537-6505 peterschiffaero.com



KING AIR MAGAZINE • 19

# MAKING IT THE

RAISBECK'S SYSTEMS American Ingenuity, American Engineering, American Manufacturing, American Leadership, International Acceptance!

#### Detailed Performance at Raisbeck.com

Available through all Textron Aviation Service Centers and over 100 independent Authorized Dealers worldwide.

# AMERICAN WAY

*"Every part of every Raisbeck Performance System is conceived, engineered and built in the United States of America."* 

James D. Raisbeck, CEO Raisbeck Engineering, Inc.

Simply more of what you bought your King Air for!

info@raisbeck.com (206) 723-2000 (800) 537-7277 www.raisbeck.com

RAISBECK ENGINEERING

# The Air Capital of the World: "Wichita at War"

During World War II, the prairie city became a major contributor to President Franklin D. Roosevelt's "Arsenal of Democracy" that helped to crush the Axis powers into submission.

#### by Edward H. Phillips

**B** y 1939, the United States was slowly emerging from the Great Depression that had decimated the national economy for nearly 10 years. Job growth was increasing each month as thousands of people abandoned the soup lines for work in America's industrial complex. In the words of a popular song of the time, "Happy days are here again."

Across the Atlantic Ocean, however, Europe was plunging into another major war with Germany as Great Britain and France pledged to come to the aid of a besieged Poland. A majority of Americans paid little attention to the daily headlines about "Europe's new war" while staunchly supporting the Roosevelt Administration's isolationist policy. Despite his constant assurances that the cream of America's youth would not be sent to fight Europe's war, in 1940 the president had accepted the fact that unless the British and French defeated Germany quickly, the day would come when the United States would be forced to take up arms against Adolf Hitler. To make matters worse, the militarists in Tokyo had cast their lot with Berlin along with Italy's dictator Benito Mussolini, creating the Tri-Partite Pact.

During the closing months of 1939 in Wichita, Kansas, the boss of Boeing Airplane Company's Stearman Division, Julius Earl Schaefer, was not concerned about the war in Europe as much as he was about finding more floor space to build airplanes. Three weeks before Germany struck Poland, the United States War Department had awarded contracts worth \$688,888 for Stearman primary training aircraft, with an option for more that could drive the total value to nearly \$2 million. The local press summed up the good news: "There was no disguising the pleasure felt at the plant

The Boeing/Stearman factory's greatest numerical contribution to the war effort was construction of PT-13-, PT-17- and N2S-series primary trainers for the United States Army Air Corps and Navy. The N2S-2 (shown) was powered by a Lycoming R-680-8 radial engine rated at 215 horsepower. More than 120 were built, but the improved N2S-4 was built in greater numbers than the N2S-2 version. (KANSAS AVIATION MUSEUM)



over the order, the largest ever placed here, and the anticipation of the stimulation in activity it cannot fail to bring at the Stearman factory."<sup>1</sup>

Demand for the Model 73, Model 75 and the export Model 76 left the 1930 factory swamped with business. Late in September Schaefer was informed that the War Department was ordering another \$3 million-worth of PT-13 trainers, requiring the hiring of another few hundred workers, bringing total employment to nearly 1,000 people. When the word got out, the factory was flooded with applications. The qualifications were stiff and the competition for jobs was almost ruthless, but Schaefer made it clear that "Only American citizens of undoubted loyalty will be carried on the payroll."<sup>2</sup>

The surge in orders for new airplanes experienced by the Stearman Division was only one example of the tremendous boom in Wichita's airframe manufacturing industry. Journalists began to wonder if 1940 would be the year that the Stearman, Beech, Cessna and Swallow companies would break their record, set in 1928, of building 1,000 aircraft. That year the four manufacturers produced 25 percent of the total number of new airplanes built in America. The Wichita Eagle newspaper asked, "Can this figure be claimed today and can it be truthfully said that the aviation industry here is at an all-time high in productivity? The answer for 1940 will be 'yes'." The reporter went on to say that ferry flights of Stearman trainers were increasing each month, and Walter Beech was delivering new singleand twin-engine ships "almost daily." Swallow was thriving and Cessna was completing "several planes each week" and plans called for increasing production space to accommodate increasing demand for the twin-engine T-50.

The fall of France in May 1940 left Great Britain to stand alone against the might of Hitler's Third Reich. Back in Washington, D.C., President Roosevelt knew he had to find a way to help America's greatest ally in its struggle against the Nazi regime. His Lend-Lease program, hotly debated in Congress, was intended to do exactly that – assist the British people without dragging the United States into the war. To make Lend-Lease work, every facet of America's industrial powerhouse would be brought to bear. The results were impressive. In 1941, aircraft production tripled and orders from England for everything from textiles to tanks poured in to American factories. Roosevelt's "Arsenal of Democracy" was flexing its muscle.<sup>3</sup>

The president, however, did not stop there. His massive defense program, funded at an unprecedented \$5 billion, coupled with implementation of Lend-Lease, led financial experts to declare that the sudden expansion was but a foretaste of what was coming in the near future. Their sentiments were echoed by Waldo G. Bowman, editor of the *Engineering News-Record*. He estimated that Roosevelt's defense plans alone would require a minimum of \$500 million to construct new military facilities. In addition, during the first five months of 1940, the aircraft, tool and chemical industries led the way in construction projects by spending \$171 million compared with only \$73 million in 1939.<sup>4</sup>

The steel industry was shifting into high gear, too, as orders for structural steel increased significantly in 1940 compared to the previous year, and a part of that production would soon be headed for Wichita. Newspapers were quick to report that, "A boom in steel making, fed by a wave of buying to acquire inventories before the U.S. defense program gets into full stride, marked the transition to a war economy." Sources close to the industry predicted that the rate of steel production in America, which had increased to more than 80 percent from 65 percent during May 1940, would soon exceed 85 percent.<sup>5</sup>

The strong growth in demand for military equipment and facilities was a major factor in the emerging economic recovery of 1939-1940. After years of absence, prosperity was making a comeback. Meanwhile, workers at the Stearman Division were completing as many as five new primary trainers each day – a phenomenal feat, even by Wichita standards. Such a high rate of production had not been seen since the summer of 1929 when the Travel Air Company achieved that level for a short period of time.

What happened next stunned the people of Wichita and served to raise the nation's awareness of the *City on the Plains*. In August, the War Department announced that \$3 million would be spent to greatly expand the size of the Stearman factory complex. The money was part of a \$10.5 million package allotted to Boeing for enlargement of its facilities in Wichita and Seattle, Washington. When asked about Wichita's role in the plan, Julius Schaefer's lips were sealed. The plot really thickened when two VIPs arrived in the city – William S. Knudson, chief of the national defense commission, and General Henry H. "Hap" Arnold, chief of the Army Air Corps.

The two men kept a low profile during their brief visit, which centered on inspection of land south of the Stearman factory. As quietly as they had come, they departed without any comment to the press. Wichitans were scratching their heads trying to guess the purpose of the trip to Kansas. They could not have known that the visit eventually would have a profound, long-term effect not only on the city, but the war effort and human history itself. Behind the scenes, the War Department was planning to construct a factory whose proposed dimensions would boggle the imagination. It would exist solely for the purpose of building the super-secret Boeing B-29 heavy bomber, then in development (the story of Wichita and the B-29 program will be addressed in an upcoming article).





238715

In September 1940 the War Department dropped another "bomb" on Wichita when it handed out a \$6.9-million contract to Stearman for hundreds of PT-13 and PT-17 primary trainers that were sorely needed by the Army Air Corps. Hot on the heels of that award came a large contract from the RCAF to manufacture 180 Crane I – a military version of the commercial, twin-engine Cessna T-50. The United States War Department also ordered 33 multiengine trainer versions of the T-50 designated AT-8. The company was scheduled to fly the first production Crane I by Christmas and deliver the first AT-8 to the Army Air Corps before the end of the year.

(KANSAS AVIATION MUSEUM)

In addition, Beech Aircraft Corporation had received contracts worth \$9.3 million for C/UC-43 military versions of the Beechcraft Model D17S, as well as AT-11 and C/ UC-45 versions of the prewar Model C18S. In total, the three major airframe manufacturers in Wichita were scrambling to build \$40 millionworth of aircraft, and America was not at war! By the end of 1940, these three companies employed 3,800 workers. Walter Beech, Julius Schaefer and Dwane Wallace later estimated that by January 1941, that number would increase to about 8,700 and production floor space would surge to more than 1.5-million square feet.<sup>6</sup>

By December 1941 even the most pessimistic, isolationist American began to realize that the escalating war in Europe, coupled with Japan's increasing aggression against China and its military buildup in the Western Pacific Ocean was threatening to entangle America in another world war. On December 7, 1941, the Japanese Imperial Navy's surprise attack on the United States Pacific fleet at anchor in Pearl Harbor, Territory of Hawaii, erased any hope of peace and galvanized America's will to fight.

Although America's capacity to manufacture the weapons of war had expanded by 400 percent during 1939-1941, the nation's industrial might would experience explosive growth after December 7. The Stearman factory had already delivered 2,000 PT-13/PT-17 primary trainers to the Army Air Corps and the United States Navy, but the pressing pace of the war effort left no time for celebration. During the months ahead the 3,000<sup>th</sup>, 4,000<sup>th</sup>, 5,000<sup>th</sup> and 6,000<sup>th</sup> biplane rolled off the assembly lines in rapid succession, followed by the 7,000th in April 1943.7

Despite the enormous challenge and seemingly insurmountable obstacles, the thousands of Stearman trainers taught many more thousands of fledglings how to fly before they were shipped out to fight a global war on two fronts. According



E<sup>2</sup> = Exceeding Expectations In Performance Upgrades

Bob Knueve, Lead Tech, Dayton

Chris Turner

### "From pre-purchase evaluation to a Garmin G1000" installation, Stevens is our King Air specialist."

"Even though we have 75 techs who work exclusively on our helicopter fleet, we went to Stevens for their expertise with the King Air. They are fast, efficient and totally dependable. We have relied on them for everything – from pre-purchase evaluation four years ago and ongoing maintenance to installing a new interior, winglets, Blackhawk engines and new props, additional FM radios and, most recently, the Garmin G1000<sup>®</sup>."

State-of-the-art performance upgrades for jets and turboprops – in propulsion, avionics, interior design and exterior airframe modification – are a Stevens Aviation tradition. We continually exceed our customers' expectations by providing diversified expertise in aircraft maintenance, modification and refurbishment, aircraft sales, aircraft management, flight services, and fixed base operations.

You'll find our facilities in Greenville SC (GYH), Dayton OH (DAY) and Nashville TN (BNA). For more information, contact Phil Stearns, Sales Manager, at 937-470-1851 or pstearns@StevensAviation.com. Chris Turner, President CHI Aviation Howell, MI





During the years of war, Beech Aircraft Corporation built thousands of twin-engine military airplanes based on the pre-war Model C18S. A majority of these were designated C/UC-45 and were similar to the SNB-series (shown here) that served with the United States Navy. The Royal Air Force operated the "Twin Beech" under the designations "Expeditor II" and "Expeditor II." (EDWARD H. PHILLIPS COLLECTION)

to official records, between July 1939 and August 1945, the Army Air Forces and the Navy trained 768,991 pilots, including women aviators, Americans enrolled in British flight schools based in the United States,



26 • KING AIR MAGAZINE

instructors and other individuals. Of these, 233,198 successfully completed their primary flight training, and a majority of those pilots earned their wings in a PT-13 or PT-17. Another 202,986 graduated from basic flight training and 193,440 finished advanced training, with 102,907 assigned to fly single-engine fighters and 90,533 were assigned to multi-engine transports and bombers. Unfortunately, about 40 percent of cadets "washed out" of flight training and were assigned to other aircrew positions such as navigator and bombardier.<sup>7</sup>

From 1927 to 1962, the Stearman Aircraft Company and the Boeing Airplane Company's Stearman Division built more than 14,500 aircraft. Boeing records indicate that of these, 247 were original Stearman biplanes, 10,346 primary trainers (including equivalent spares), airframe assemblies for 750 Waco CG-4 troop-carrying gliders, 1,769 Boeing B-29 heavy bombers (including equivalent spares), 12 single-engine L-15 liaison aircraft, 1,390 Boeing B-47 *Stratojet* bombers, and 467 Boeing B-52-series *Stratofortress* bombers.<sup>8</sup>

Across town the Cessna Aircraft Company was bustling with activity following the attack on Pearl Harbor. Even as the fires still raged along the harbor's "Battleship Row" at Ford Island, Dwane Wallace and his management team began to receive large orders for AT-17 advanced trainers as well as more orders (550 airplanes) from the RCAF for the improved Crane Ia (production of the commercial T-50 was terminated in June 1942 after 25 airplanes had been delivered). To meet demand, the factory was again expanded. In 1941 production floor space grew by 358 percent and by May 1942, new buildings were cranking out increasing numbers of AT-17 trainers by operating on a 24-hour basis. By the end of the year Cessna workers had produced 190 Crane 1a, 450 AT-17, 33 AT-17A, 466 AT-17B and 60 AT-17C ships for the Army Air Forces, Navy and Marine Corps. The RCAF received only 182 of the Crane Ia order before the Army took over the remainder as AT-17 trainers and UC-78 transports.

The C/UC-78 was intended to serve as a lightweight, multi-engine aircraft for flying personnel and small cargo, occasionally including senior officers who used the airplanes for VIP flights. By war's end, 937 C/UC-78 monoplanes served with the Army Air Forces, while another 67 were operated by the Navy and Marine Corps as the JRC-1. When production ended in 1944, the factory had built 1,052 AT-8 and AT-17-series, 3,160 C/UC-78/JRC-1 airplanes, and all 40 commercial T-50 ships were impressed into military service for the duration of the conflict.

It is interesting to note that in addition to major orders for airplanes, the Stearman Division, Cessna Aircraft and Beech Aircraft also were under contract for subassemblies that were crucial to the war effort. During 1941-1942 the Stearman Division built flight control surfaces for the Boeing B-17 before shifting all of its assets to building the mighty B-29 beginning in 1943. Boeing needed help and the Cessna factory responded by manufacturing 1,400 vertical stabilizers, 1,894 rudders, 1,658 heat exchangers, 1,619 pilot and co-pilot instrument panels, 1,536 dorsal fairings, 1,567 elevators, 1,343 wing leading edges and 1,583 sets of rudder pedals for America's super bomber. Meanwhile, Beech Aircraft and Cessna workers were busy building assemblies for the Douglas A-26 Invader. The Beechcraft factory completed 1,635 wing assemblies and the Cessna company contributed 6,500 engine cowlings and 2,046 landing gear sets for the speedy attack bomber.

Despite increasingly high workload demands, in June 1942 the three major airframe manufacturers were tapped by the War department to give top priority to manufacture of subassemblies for the Waco CG-4A troop-carrying assault glider that was destined to play a pivotal role in the D-Day invasion of June 1944. A total of 1,500 of the powerless gliders were to be built and delivered by October 1942 – a near impossible task. Beech was assigned to construct the inner wing panels, empennage surfaces and all forgings and castings. Cessna workers built the outer wing panels. When the two companies completed their work, the assemblies were shipped to the sprawling Boeing, Wichita Division factory where the gliders were assembled and delivered to the Army.<sup>9</sup>

As with the Stearman Division and the Cessna Aircraft Company, the Beech Aircraft Corporation began building "warbirds" well before America was suddenly thrust into the conflict. The first Beechcraft to wear military colors was a sole C17R built in 1936 for the United States Navy as the JB-1. In June 1939, the Army Air Corps received the first of three commercial D17S cabin biplanes designated YC-43 that were assigned to American embassies in England, France and Italy. That year the Navy ordered seven D17S models for service





Olive Ann Beech posed with a new UC-43 transport at the factory. Mrs. Beech played a major role in managing the company's war contracts, which included wing/nacelle assemblies for the Douglas A-26 Invader. (EDWARD H. PHILLIPS COLLECTION)

as GB-1 personnel transports and to perform general liaison duties.

After Pearl Harbor, Walter and Olive Ann Beech received huge orders for military versions of the Model D17S and the twin-engine C18S. These included 105 C/UC-43 biplanes for the Army Air Forces, of which Great Britain received 30 UC-43s that were operated by the Royal Air Force and Royal Navy as the *Traveler Mk. 1*.



Inspect · Overhaul · Exchange · Install
 Complete Ship Sets · King Air Aircraft Maintenance



The factory also built 310 GB-2 models for the United States Navy, but 75 were transferred under Lend-Lease to Great Britain and another 14 were shipped to Brazil.

It was, however, the versatility of the Model C18S that garnered a majority of orders from the Army Air Forces and the Navy. Although the smaller, twin-engine Cessna AT-17 and Beechcraft AT-10 were ideally suited for teaching pilots how to fly and manage systems in multi-engine airplanes, it fell to the larger Beechcraft to teach airmen the darker arts of war such as bombing targets. The first military Beechcraft Model 18 (18D) was sold to the Philippine Army Air Corps in March 1939. Soon after orders were received from the United States Army Air Corps late in 1939 for 14 ships designated F-2/F-2B for instruction in high altitude photography. Eventually, the Army bought 56 F-2A/F-2B.

In 1940 the Navy ordered five C18Ss that were specially modified versions of the commercial C18S. These ships featured a cupola above the cockpit that housed an operator who "flew" a target drone via remote control. The Swedish Royal Air Force bought a Model 18R late in 1939 that was specially equipped as an aerial ambulance, and in 1940 China ordered another Model 18R in a similar configuration.

The brood of all-metal, twin-engine Beechcrafts built during the war centered on the AT-7, AT-11, C/UC-45, SNB-1 and SNB-2. The first batch of more than 1,400 C/ UC-45s built during the war years was delivered in 1940. As the war progressed, Great Britain received the C-45 version under Lend-Lease, but was operated by the Royal Air Force as the Expeditor II. In 1941, "Beechcrafters" began manufacturing the SNB-1 and a year later the SNB-2 for the United States Navy. Essentially identical to the Army Air Force's AT-11, the SNB-1 was intended to train aerial gunners and bombardiers. A total of 321 airplanes had been delivered when production ended in 1944. A more utilitarian version, the SNB-2, was operated as navigation trainer as well as a VIP and general purpose transport. Deliveries began in 1942 with 44 airplanes, reached a peak of 286 in 1943, with another 276 rolling off the production lines in 1944.

By far the most prolific Beechcraft produced during the war was the AT-11, with 1,560 delivered from 1941-1944. Known unofficially as the *Kansan*, the AT-11 series answered the military's crucial need for a modern, reasonably fast twin-engine trainer equipped to teach bombardiers the deadly trade of unleashing thousands of tons of high explosives on Germany and Japan. The AT-11 was configured with internal racks that held 10, 100-pound practice bombs, and the ultra-secret Norden bombsight was installed in the Plexiglas nose section.

The crew normally included pilot and co-pilot plus three students. The would-be bombardiers took turns using the bombsight, which resided in a large, Plexiglas nose dome, to drop the dummy bombs. Training

28 • KING AIR MAGAZINE

### Fill an empty seat with hope.

# Give a cancer patient a lift on your next flight.



Corporate Angel Network arranges free flights to treatment for cancer patients in the empty seats on corporate jets.

Since 1981, Corporate Angel Network, a not-for-profit organization, has worked with over 560 corporations to schedule more than 46,000 cancer-patient flights and currently transports 225 patients each month to and from specialized treatment. The process is simple. Corporate Angel Network does all the work. All you have to do is offer an empty seat to a cancer patient on your next flight.



Bringing cancer patients closer to their cure.

(914) 328-1313 www.corpangelnetwork.org



In addition to thousands of military trainers based on the Model 18, Beech Aircraft Corporation manufactured 1,771 Model 26 (AT-10) multi-engine trainers that used wood as the primary construction material. In addition, the Globe Aircraft Corporation built 600 AT-10 trainers. (EDWARD H. PHILLIPS COLLECTION)

squadrons were usually based in the sunny southwestern United States where favorable flying weather prevailed year round. At the beginning of the war, training pilots, gunners and particularly bombardiers and navigators was a high priority in order to take the war to the Axis as soon as possible. After the war many AT-11s were converted to C-45G/C-45H configuration and soldiered on until the early 1960s before being retired from service.

Working together with the AT-11 was the AT-7, whose chief mission was to train navigators. Known unofficially as the *Navigator*, the AT-7's cabin was equipped with a small, rotating Plexiglas dome aft of the cockpit for celestial navigation, drift meters, work tables and various types of compasses. An auxiliary instrument panel that replicated those in the cockpit was installed to provide students with essential airspeed and altitude information necessary for making calculations.

Many thousands of navigators graduated from the AT-7 to the nose of Boeing B-17, Consolidated B-24, North American B-25 and other bombers during the war. A small number of AT-7s were modified into the AT-7A equipped with floats or snow skis. Initial deliveries





Dwane L. Wallace (Left) and Walter H. Beech led two of Wichita's airframe manufacturers during the war. Workers at their two companies produced more than 12,000 "war birds" during the global conflict. (EDWARD H. PHILLIPS COLLECTION)

of the AT-7 began in 1941 when 187 were produced. Production peaked at 361 in 1943 and was terminated in 1944 after a total of 884 airplanes had been built. Beech Aircraft began its existence in 1932 with fewer than 10 employees. By 1937 that number had grown to 220. In the spring of 1940, employment had increased to 780 and then soared to 2,354 in April 1941. During the war the number of Beechcrafters peaked at 14,110 in February 1945.<sup>10</sup>

Wichita made a major contribution to the Allied victory in World War II. By 1941 the city on the Plains of Kansas had the right factories, the right people and the right airplanes to equip America's Arsenal of Democracy.

#### NOTES:

- 1. Phillips, Edward H.: "Stearman Aircraft A Detailed History;" Specialty Press, North Branch, Minnesota; 2006.
- 2. Ibid
- 3. Wichita "Eagle," June 27, 1940, Page 5.
- 4. Ibid
- 5. Ibid
- 0. 1010
- 6. The latest contract for the Stearman Division added to an order backlog worth \$11 million. It is also important to note that during the autumn of 1940, the Culver Aircraft Company in Columbus, Ohio, was in the process of relocating its manufacturing operations to the old Bridgeport plant used by the Stearman Aircraft Company during 1927-1930. Culver held orders for airplanes worth more than \$1 Million.
- Phillips, Edward H.: "Stearman Aircraft A Detailed History;" Specialty Press, North Branch, Minnesota; 2006.
- 8. Ibid
- 9. Phillips, Edward H.: "Cessna A Master's Expression;" Flying Books, Publishers & Wholesalers, Eagan, Minnesota, 1985.
- 10. Phillips, Edward H.: "Beechcraft Pursuit of Perfection;" Flying Books, Eagan, Minnesota; 1992.

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.



#### VALUE (KA) ADDED



#### FAA and EASA Approve Pro Line Fusion-Equipped King Air C90GTx

Beechcraft Corporation, a subsidiary of Textron Aviation Inc., announced it has received type certifications from both the Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) for the new Pro Line Fusion-equipped Beechcraft King Air C90GTx turboprop. With this achievement, the company has now completed FAA and EASA certifications to include Pro Line Fusion avionics systems as standard equipment on all current production models of the King Air.

#### Avionics

Per the company, Pro Line Fusion for the King Air brings one of the most trusted avionics architectures to the first full touchscreen flight display system. The new avionics system changes how operators aviate, navigate and communicate through a one-of-a-kind intuitive flight deck interface. Its three 14-inch displays are interchangeable, high-resolution with touch screen and cursor control. Other performance-enhancing capabilities include:

- Integrated touchscreen checklists
- Intuitive graphical touchscreen flight planning
- High-resolution Synthetic Vision System with patented airport dome graphics
- Convenient presets to reconfigure all three displays with a single touch
- Dual multi-sensor flight management systems
- Available automatic wireless database and chart uploads
- Open and scalable architecture for future upgrades and mandates







Pilot training for the Pro Line Fusion King Airs is offered at TRU Simulation + Training's new ProFlight training center near Tampa, Florida. Additionally, TRU offers aircraft maintenance training for the new models in its newly renovated Wichita, Kansas facility.

#### FAA Certification Pending on BLR's Ultimate Performance Package for King Air 90

BLR Aerospace (BLR) is working with the Federal Aviation Administration (FAA) to amend its Supplemental Type Certificate (STC) that will expand the approved performance envelope for King Air 90s equipped with BLR Winglet Systems. FAA approval was expected by the end of June.

The STC, known as the Ultimate Performance Package<sup>TM</sup> (UPP), will enable King Air 90 operators to take full advantage of increased gross weight performance improvements, which are significant, with installation of BLR Winglets.

For example:

- Up to 30 percent reduction in runway length requirements
- Max takeoff weight increase from 10,100 lbs or 9,650 lbs (depending on aircraft serial number) to 10,500 lbs



 Max landing weight increase from 9,650 lbs or 9,168 lbs (depending on aircraft serial number) to 9,860 lbs

The UPP will be available as an upgrade to King Air 90 operators already flying with BLR Winglets. Operators purchasing Winglets and the Whisper Prop<sup>®</sup> propeller



KING AIR MAGAZINE • 33



system will receive the expanded performance STC at no additional cost.

BLR states that it's been clearly demonstrated that installation of BLR Winglets improves aerodynamic performance for King Airs and translates into bottomline productivity improvements. And that UPP will provide access to more runways, provide a significant increase in useful load, increase the margin of safety, and improve virtually every aspect of King Air 90 flight.

The BLR Winglet System adds lightweight, composite winglets and a small wing span extension, reducing drag and improving low-speed handling. This translates into fuel savings or increased climb and cruise speeds and high altitude stability, as well as lower takeoff speeds. Whisper Prop is a five-blade, carbon fiber propeller with natural composite core for superior noise and vibration reduction. Whisper Prop is certified for installation on multiple King Air models.

#### Raisbeck Swept Blade Props Approved by Australia's CASA for 350

The FAA STC for Raisbeck Engineering's Swept Blade Turbofan Propellers for the King Air 350 has been officially accepted by Australia's Civil Aviation Safety Authority (CASA).



Raisbeck's Swept Blade Propellers for the King Air 200 Series and 90 Series were also approved shortly after their introduction by CASA for operations in Australia, and are also certified by the European Aviation Safety Agency (EASA). The Swept Blade Propellers enable larger diameter propellers for increased thrust while significantly reducing in-flight cabin noise levels. Takeoff acceleration, single-engine climb, twin-engine climb to altitude and landing performance are all improved and



#### VALUE ( ADDED



noticeable to the pilot. In addition, there is no floating tendency during landing flare-out.

Raisbeck's Swept Blade Propellers for the King Air 350 are manufactured by Hartzell Propeller, and are available for purchase and installation on short notice. Constructed of aluminum, the four-blade props can be maintained and overhauled by virtually every prop shop around the world using well-known techniques and procedures.

For more information about Raisbeck Engineering and its products, visit www.raisbeck.com.

#### Blackhawk Announces AMK Aviation as Canada's Newest Dealer

Blackhawk Modifications, Inc. and AMK Aviation of Ontario, Canada announce the completion of their recent agreement which signs AMK as an installation and service center for Blackhawk's line of PT6A engine upgrades. AMK Aviation, a repair and overhaul facility based in Murillo, Ontario will offer customers new engine upgrades for aircraft including the Beechcraft King Air 90 and 200 models.

Founded in 2012, AMK brings many capabilities to the aviation market and is able to cater to a variety of operators. As a worldwide service center, AMK is able to serve regional airlines, civilian, military, corporate, and general operations. AMK Aviation's operating structure is designed to provide quality product and services at a lower cost with a diverse product and service offering.

#### FlightSafety Offers Upset-Prevention and Recovery Training for King Air 350

FlightSafety International is adding five more business aircraft types to its advanced upsetprevention and recovery training program, which includes the Beechcraft King Air 350. Courses for the new types will become available between now and the end of this year. According to the company, locations and start dates will vary by aircraft type.

The FlightSafety program uses the only flight simulator expanded with aerodynamic, flight control and motion models specifically for upset prevention and recovery training that is qualified by the U.S. Federal Aviation Administration's National Simulator Program. According to the company, the models developed and incorporated into the simulators include low speeds that replicate full aerodynamic stalls and extreme high speeds beyond VMO and MMO.



#### Meet the pilots who fly with AOPA Insurance.

Who are they?	150 renters to turbine fliers and more.
What do they fly?	From Cub to Experimental, from Jet to Helicopter-we have you covered.
Why do they fly with us?	We are pilots first and foremost. We understand how you fly and get you the coverage you need to keep flying.
What do they have in common?	They love to fly, and they save money with AOPA Insurance.
	What plan is right for you? Call 877.462.2710 for a free quote
AOPAINSURANCE	MORE PLANES. MORE PILOTS. MORE OPTIONS. Visit aopainsurance.org/save for more information.

#### VALUE 🚺 ADDED

#### Of particular interest to European operators, the company explained that its advanced upset-prevention and recovery courses exceed EASA requirements. The courses are aircraft type-specific and include manufacturer-approved techniques and procedures for recovering from upsets due to aerodynamic stall, as well as high-speed/Mach events well in excess of the certified maximum speeds.

#### MT-Propeller Receives FAA STC for Five-Blade Propeller on the King Air F90

MT-Propeller Entwicklung GmbH has received the FAA STC #SA03507NY for the next generation Quiet Fan Jet Five-blade scimitar composite propeller on the King Air F90. Now the MTV-27 is STC'd for the Beech King Air B90, E90, C90, C90A, C90GT, C90GTi and F90 by the FAA and EASA.

The company says the installation of the Five-Blade Propeller provides the following advantages:

- Best vibration damping characteristics for almost vibration free propeller operations
- Bonded on nickel alloy leading edge for superior erosion protection of the blades

- General performance improvement (five percent takeoff & climb, two-three knots cruise with 1900 rpm)
- No propeller speed restrictions on ground while operating in low idle
- More ground clearance for less FODs
- Lower ITTs during start-up for less engine wear
- Unbeatable esthetic ramp appeal
- Significant cabin noise and vibration reduction
- Weight saving of 28 lbs on the King Air F90

All models comply with the strict German noise regulations for unrestricted airport operations in Germany and other European countries.

The high technology natural composite blades have no life limitation and can be repaired even in case of a FOD.

MT-Propeller is the holder of over 200 STCs worldwide, OEM supplier for more than 90 percent of the European aircraft industry, as well as 30 percent of the U.S. aircraft industry.



### WOUNDED WARRIORS THEY'VE GOT HEORT THEY NEED WINGS

Imagine returning home from combat facing devastating injuries and long-term hospitalization-in a facility hundreds of miles away from your family.

Imagine somebody brings you together.



The VAC provides free air transportation to wounded veterans and their families for medical and other compassionate purposes, through a national network of volunteer aircraft owners and pilots.

Find out how you can make a difference.

command

952-582-2911

VETERANS A

VeteransAirlift.org



### Service Bulletins

Service Bulletin 34-4163: Navigation – Static System Improvement

Issued: June 2016

Effectivity: Model King Air C90GTi, serial numbers LJ-1847, LJ-1848, LJ-1853 through LJ-2059, LJ-2061 through LJ-2126.

Compliance - Recommended: This service bulletin should be accomplished at a scheduled maintenance period or inspection. A service bulletin published by Textron Aviation may be recorded as completed in an aircraft log only when the following requirements are satisfied: 1) The mechanic must complete all of the instructions in the service bulletin, including the intent therein. 2) The mechanic must correctly use and install all applicable parts supplied with the service bulletin kit. Only with written authorization from Textron Aviation can substitute parts or rebuilt parts be used to replace new parts. 3) The mechanic or airplane owner must use the technical data in the service bulletin only as approved and published. 4) The mechanic or airplane owner must apply the information in the service bulletin only to aircraft serial numbers identified in the Effectivity section of the bulletin. 5) The mechanic or airplane owner must use maintenance practices that are identified as acceptable standard practices in the aviation industry and governmental regulations.

**Reason:** A hose in the pilot's static system has the potential for moisture accumulation in an area that cannot drain.

**Warranty:** Eligible airplanes may qualify for parts and labor coverage to the extent noted in the *Labor Hours* and *Material Availability* sections of the document.

Labor: Modification and Inspection 8.0 Labor Hours

#### From King Air Communiqué 2016-05

Issued: May 2016

#### ATA 20 – Leading Edge Erosion Tape

#### All

The King Air leading edges are protected from erosion by a protective tape or abrasion resistant spray coating. Installation procedures for both are found in the King Air Standard Practices Manual (20-08-00-201). This protective tape comes in different widths to fit in the different areas of the airframe.

Editor's Note: Communiqué 2016-05 has a list that shows the different tapes available from Textron Aviation Parts Distribution (TAPD).

#### ATA 31 – Fusion Equipped King Air USB Device Requirements

Fusion equipped King Airs require periodic database and software updates. On airplanes without the IMS 3500 system, this is performed through the USB port on the AFD 3700 displays. The port on the AFD 3700 is compliant to USB 2.0 standards. The Rockwell Collins airplane maintenance manual excerpt shown below, currently calls for a USB 2.0 or equivalent device formatted with FAT 32. Collins has provided additional clarification that a version 3.0 USB device is an acceptable equivalent as long as it is USB 2.0 compatible and has a capacity between 4Gb and 32Gb. Collins will be adding clarification to the reference below in a future update to the manual.

TASK 31-60-01-470-802

2. Creating USB Media

A. Tools and Equipment

NOTE: Equivalent item can be used.

Part Number	Equipment
Commercially Available	Microsoft Windows 7 Personal Computer (PC) with CD-ROM Drive and USB Port
Commercially Available	USB 2.0 Compatible Flash Drive (empty), formatted with FAT 32, 4Gb capacity or larger

#### ATA 32 – Main Landing Gear Drag Leg "Un-Locking" After Extension

#### C90A/F90-1/B200/300/B300

Operators have contacted Textron Aviation Technical Support to report that after approximately 30 minutes or so, the main landing gear drag leg dog bone is moving away from its stop. This gives the impression that the drag leg locking mechanism has become "un-locked".

During a normal extension of the landing gear, the dog bone contacts the stop to push the landing gear into the down and locked position. When the downlock hooks begin to contact with the lock pin, the dog bone will be in full contact with its stop to complete the movement of the drag leg assembly into the down and locked position, and the downlock hooks will move up and over the lock pin to complete the downlock.

After the hydraulic system turns off, the hydraulic pressure bleeds off. The hydraulic actuator will no longer have the pressure (force) to push the dog bone. The link assembly that connects the dog bone to the downlock hooks has a spring. Due to this spring, the dog bone can move away from its stop as the hydraulic pressure bleeds off. This condition is normal. In this condition, the downlock hooks will remain over the lock pins and keep the drag leg safely in the locked position.

In summary, the dog bone can and does, at times, move away from the stop; as long as the downlock hooks are over the D bolt, it can be considered down and locked. The illustration below shows this condition.



#### From King Air Communiqué 2016-07

Issued: June 2016

#### ATA 46 – XM Weather TAF data on Pro Line 21 King Airs with XM Receiver part number 822-2031-002

Beginning in early 2016, Rockwell Collins began receiving reports of intermittent reception of Terminal Area Forecast (TAF) data through the XM weather receiver installed in Pro Line 21 aircraft. This data



Propeller upgrade available for all 200 and B200 Series King Airs Industry leading 5,000-hour TBO Kit includes: Two Propellers, Two Spinners and STC Paperwork \$62,500 starting price for Kit PL60144 Reliable single-piece aluminum oil filled hubs Quieter and improved flight performance



Contect McCauley today for more information U.S. +1.800.621, PROP | INTERNATIONAL +1.316.831.4021

2016 Testron Available Inc., McCauley, Its logo and Blackmar, are registered trademarks of Destron Invovations Inc., used by permission.

"Roger that!"

He's not a pilot but when you need to talk about aviation marketing, John Shoemaker speaks your language. And more importantly, he listens. Call him today and find how the publications he serves, and the markets they reach, can help your aviation related business grow.

#### 800-773-7798

VP Demand Creation Services – serving your advertising needs with these fine aviation publications: • ABS • Cirrus Pilot • Citation Jet

- Comanche Flyer
  King Air
- Twin & Turbine

john.shoemaker@vpdemandcreation.com

includes products such as METARs and AIRMETs. Investigation determined that the National Weather Service had increased the data package size of these messages and the current configuration of the receiver was causing a software time out and reset before the complete data package was downloaded. Any operators experiencing the issue may utilize Rockwell Collins Service Information Letter (SIL) 523-0824074 to provide an updated receiver configuration allowing it to handle the new data package size. Aircraft with factory installed Fusion avionics are not affected. Pro Line 21 aircraft which have been upgraded to Fusion avionics through an STC may still have the 822-2031-002 receiver and require the update.

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

#### Had Enough \$100 Hamburgers? Fly to help land, water and wildlife



Unique flight opportunities available for 1000+ hour pilots.



Learn more at www.lighthawk.org/ volunteer

6 Chris Crisman/TNC/LightHawk

#### 1st Source Bank..... Advent Aircraft Systems, Inc.....17 BLR Aerospace ......27 CenTex Aerospace.....Inside Back Cover Corporate Angel Netowrk......29 Elliott Aviation ..... Inside Front Cover Garmin International ......Back Cover Gill Battery.....24 Gogo Business Aviation ......11 King Air Academy......13 Light Hawk......40 Luma Technologies LLC...... 7 More Company 34 Murmer Aircraft Services.....14 National Flight Simulator......17 Paul Bowen Photography......40 Peter Schiff Aero Inc. ..... 19 Raisbeck Engineering ...... 20-21 Rapco Inc......32 Survival Products Inc......19 Trace Aviation ..... Veterans Airlift Command ..... 37 Winner Aviation Inc.....

ADVERTISING INDEX



### KING AIR 200 & 250 14,000 POUNDS MAX TAKEOFF WEIGHT



### HIGH FLOTATION LANDING GEAR REQUIRED 13,500 LB MAX LANDING WEIGHT 11,500 LB MAX ZERO FUEL WEIGHT

(INCREASED MZFW YEAR MODEL 1993 & AFTER)



7925 Karl May Drive, Waco,TX 76708 • 254-752-4290 • www.centex.aero AEROSPACE INCORPOR

FAA APPROVED

Put more capability up front. And get more capacity in back.

Res Dank of

It's just smart business. By replacing the panel in your King Air series, Beech 1900D, Twin Commander, Twin Otter, Meridian, Metroliner or Cessna 501 or 525 with a Garmin G1000/G950 integrated flight deck, you not only add to your aircraft's book value, but you also save weight. All from an avionics package that ensures your aircraft is equipped for the future—with moving maps, electronic charts, WAAS/LPV approach capability, integrated FMS, ADS-B', traffic and weather links, plus available SVT<sup>™</sup> 3-D synthetic vision displays—at a fraction of the cost of traditional integrated flight deck retrofits.

For more information, contact Scott Frye, Garmin Integrated Flight Deck Sales Manager at Scott.Frye@garmin.com or 913-440-2412. Or visit Garmin.com/aviation.

### G1000/G950 Upgrade

GARMIN.

@2015 Garmin Ltd. or its subsidiaries \*AD5-8 is not available with Citation 525 installations