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The “phenomenal” King Air 350, here at Cutter Aviation in Phoenix (PHX), received the Garmin G1000 NXi flight deck and the Blackhawk XP67A Engine+ upgrade that replaced PT6A-60As with Pratt & Whitney Canada PT6A-67A engines paired with 5-blade natural composite MT Propellers.
Family behind Arizona’s largest hay broker calls King Air 350 with latest upgrades ‘phenomenal’

by MeLinda Schnyder

If you’re reading this article, you likely know of Tom Clements, a regular columnist for this magazine who is admired for his expertise developed over 46 years of flying and instructing in King Airs. So, a few eyes widened when last summer he wrote: “Thus far, this truly is the greatest King Air that I have yet had the pleasure to operate.”
The owners of that Beechcraft King Air 350 were thrilled and thankful, as Clements along with Chip McClure encouraged them to be among the first King Air 350 owners to take advantage of the new Blackhawk XP67A Engine+ upgrade that replaced PT6A-60As with Pratt & Whitney Canada PT6A-67A engines, producing 1,050 SHP up to 25,000 feet, paired with 5-blade natural composite MT Propellers with spinners.

The Petznick family had been working with McClure of Jet Acquisitions to find their next King Air. Their King Air journey began in 2007 with co-ownership of a 2001 King Air C90, then in 2011 they bought a 1999 King Air B200. After six years, they were ready for a faster aircraft and a more comfortable double club interior. They purchased a 2008 King Air 350, serial number FL-602, in 2018 and soon sent it to Stevens Aviation in Nashville, Tennessee.

Clements, a friend of the Petznick family from his early days of managing and flying their King Air C90, has been an adviser on each move they made up the King Air line. He told them he thought Blackhawk’s latest STC would be one of its most successful King Air upgrades. He and McClure also encouraged the Petznicks to consider combining the engine upgrade with installing the new Garmin G1000 NXi flight deck, replacing the original Collins Pro Line 21 system which would need modernization to comply with ADS-B and to mate with the new engines.
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While Stevens had done -67A/G1000 installations on other King Airs, this was the first -67A/G1000 NXi (Phase II) installation done by anyone so there were delays while waiting for the FAA’s approval of this STC combination. The aircraft was ready in late July and Clements assisted the Petznick’s chief pilot, since retired, in flying it home to Arizona.

“This is only the second time I have flown any King Air with MT props and I am quite impressed,” he wrote. “Quiet, smooth, nice flare characteristics. I particularly like the fact that the 1,050 RPM minimum idle speed limit no longer applies and the horrific complexity of the Flight and Ground Low Pitch Stops has been totally eliminated. Only a single LPS now, just like in the C90- and 200-series.”

As passengers for about 250 flight hours during the past year, the Petznicks are happy with their investment. “We’re really proud of this plane,” Earl said. “It’s been
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everything it was advertised to be in the cockpit and in the cabin. The performance is phenomenal."

And the chief pilot who took over flying the aircraft in December 2018 is still pinching himself for landing a dream job.

“The only way I can describe getting to fly this King Air is: it’s awesome,” said Josh Lubbers, the Petznick’s 38-year-old chief pilot. “The extra 30-40 knots of speed, the climb performance and having the G1000 NXi at my fingertips: all the upgrades make the airplane amazing. It’s unlike any other King Air out there right now.”

**Making hay**

Earl Petznick Jr. and Olen Petznick are the third-generation owners and operators of Northside Hay Company and its subsidiaries that predominantly do business in the agriculture sector. The company has been Arizona’s largest hay broker since its founding in 1948.
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and it currently has 157,000 cattle on feed south of the Phoenix metro area along with selling alfalfa hay and alfalfa pellets for the horse market nationwide.

“Both my brother and I have been involved with all aspects of our business and over the years we have both done every job from the ground up,” Earl said.

They learned the business from their father Earl Petznick, Sr., an Arizona Farming and Ranching Hall of Fame honoree who started his career in agriculture in 1960 when he went to work for his father-in-law Olen Dryer at Northside Hay Mill and Trading Company in the community of Laveen just southwest of Phoenix.

Northside operates mostly in Arizona, where it has about 140 employees, but does business in several western states, Earl said. Specializing in the purchase of hay and feed ingredients, Northside has continued to grow over the years with the help of their employees.

Earl Petznick, Sr. (center), an Arizona Farming and Ranching Hall of Fame honoree, recently retired from Northside Hay Company and his sons, Olen (left) and Earl Jr. (right) are the third generation to run the business.

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and sale of baled products and servicing the feed needs of dairies, feedlots, ranchers, stables and horse owners means frequent travel to remote areas to cultivate relationships with the largest and most productive farms in the Southwest.

“Most of the places we visit are not accessible same-day in any way, shape or form,” Earl said. “We do a lot more customer visits and a lot more property visits with a plane than we would have ever considered before.”

The company started using general aviation in 2007 when they partnered with good friend and business associate, Pat Feenstra, on the 2001 C90.

“The C90 was a great first airplane for us to experiment to see how having an airplane could work for us,” Earl said. “It was too small for most of our missions, though our partner in the C90 was a pilot, so it was better suited for him. We made it work until we were ready to move up to a 200.”

In 2011, they went in with another partner on the 1999 King Air B200 that has Raisbeck wing lockers and dual aft body strakes. They put about 1,000 hours on it over six years of ownership and are currently selling it.

“King Airs have always been on our radar ... They seem to fit our company image and missions better than jets. We love the safety history of the King Airs, and you can get into some places that you can’t with jets.”
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through Elliott Jets’ office in Minneapolis. It has 6,800 hours total time and ADS-B installation is scheduled this fall with Elliott.

The King Air 350 is based at Cutter Aviation at Phoenix Sky Harbor International Airport. They use the Textron Aviation Mesa Service Center for some maintenance work as well as continuing to use Stevens Aviation in Nashville for larger jobs.

“King Airs have always been on our radar,” Earl said. “They seem to fit our company image and missions better than jets. We love the safety history of the King Airs, and you can get into some places that you can’t with jets.

“While the majority of our flights are west of the Mississippi River, we’ve covered a pretty good range in our King Airs. We’ve gone as far north as Norman Wells, Canada, which is about 60 miles from the Arctic Circle, and we travel down to Mexico about four times a year. We’ve been as far east as Georgia a few times, too.”

In addition to touring properties they own and visiting calf suppliers, the family uses their King Air to take customers and employees fishing or for personal trips to visit family, take vacation, hunt and fish.

More upgrades on the way

The Petznicks see N416NH as a keeper. They appreciate the time savings, for example regular trips to Sandpoint, Idaho, almost to the Canadian border, take 30-45 minutes less with the Blackhawk-upgraded 350 compared to the B200. The interior double-club configuration is more comfortable compared to the sofa and three forward seats in the B200.

They also appreciate the enhanced safety with the G1000 NXi avionics suite. Prior to Lubbers joining the company, they had been flying with two pilots.

“When I started, their insurance required two type-rated pilots,” Lubbers said. “I mentioned to the brothers that I’ve flown single pilot in my family’s 300 and C90B for the past five years and that might be something to look into. They called their insurance company and were able to get single pilot usage for less money than they were paying for two type pilots. Going forward, we’ll still use a second pilot if any passengers want the peace of mind of having another pilot, or if we’re heading out for a long day or a trip where there might be some difficult weather.”
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For anyone wondering about the investment in the G1000 NXi, Lubbers has this to say:

“I’ve had experience with the legacy G1000 in the 300 that I flew and now I have time behind the NXi – it’s a night and day difference as far as how fast it starts up, how much clearer and brighter and detailed the screens are, how much faster you can pan around on the moving map, being able to overlay your active weather radar on your moving map. I think it’s a pretty easy upgrade if you have the legacy, so if anyone is on the fence, I would do it if you can afford it for all of the upgrades that comes with the NXi.”

More upgrades are on the way for the Petznicks. When they can carve out downtime they plan to get a new paint job and eventually an interior refurbishment. Earl said he is eager to add the electronic polarization package that the factory King Air 350i offers, and he wants to upgrade the Wi-Fi system when they change out the interior.

Meanwhile, Lubbers said he sees the family flying more than the 250 hours they averaged in the B200 because the 350 is faster, quieter and more comfortable. While taking the job required a move from Florida to Arizona, Lubbers said he’s enjoyed the new landscapes and
Chief Pilot Josh Lubbers recently started flying for Northside Hay Company when their previous chief pilot retired. With 1,600 hours in King Airs under his belt, he says he enjoys the challenges of flying in the southwest and the opportunity to fly “the best and fastest King Air out there.”

Lubbers came to Northside Hay Company with 1,600 hours in King Airs. He first got his pilot’s license while in community college in Iowa, but lost interest while playing golf professionally from 2003-2006. In 2011, he was working in the golf industry in Florida and was visiting his parents on their Iowa farm when crop dusting planes flying overhead reminded him how much he missed flying. He found a flight school in Florida and by 2012 he had earned his instrument, commercial and multi-engine ratings.

In 2013, his parents purchased a Cessna 414A and Lubbers flew it for them as a shuttle between their home in Florida and their chicken hatchery business in Iowa. They moved up to a King Air C90B, then a King Air 300 that allowed for nonstop flights between the destinations. When his parents retired from the business and settled into Florida full-time, they no longer needed the airplane. Lubbers flew the 300 on charter and for about 20 Angel Flights through the Angel Flight Southeast Air Charity Network until the airplane sold, right before learning that Northside Hay Company’s pilot was retiring.

It’s been an ideal partnership, both said.

“He’s from an agricultural background as well and he gets us,” Earl said. “He gets what we do and what we’re about.”

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Years ago, a friend of mine got a $120,000 bill for maintenance – double of what he was expecting – and he faxed it to me. First off, I saw eight items that required the aircraft to be on jacks for proper compliance. The shop had charged him labor to jack and unjack the aircraft eight times. That was just the beginning! I went with him to the shop and examined their invoice line by line. In the end it was whittled down to around $80,000. Sometimes you need someone in your corner.

In a scheduled maintenance visit, it is common to have several inspection checklists being done simultaneously. Some tasks appear on multiple checklists. When overlap occurs I always signed it off wherever it appeared, but I only performed the task one time and charged the customer accordingly. The classic task overlap example is with the engines in a Phase 1-4. Each phase checklist calls out the same engine inspection. Each engine gets one inspection using one set of O-rings and one filter, but all four phases get signed off. That’s just commonsense.

The 2,500-Cycle Inspection

Late in 2017, Beechcraft (Textron Aviation) added two new inspections to the laundry list of required maintenance items for King Airs. The 2,500-cycle inspection was one of them. This is a rather involved inspection covering the cabin and includes things like wall structure, stringers, ducting, the oxygen system, pulley brackets and more. The interior must be removed for access, and this alone is very labor intensive. When this inspection was first issued, all King Air models with 2,500 cycles or more had to comply.

The deadline was unforgiving and because the interior has to be removed and reinstalled afterward, the timeframe was a problem. Shops and King Air owners scrambled to get it done in a timely fashion.

However, there are plenty of King Airs out there with less than 2,500 cycles, and if yours is among them, I strongly suggest you look at your upcoming maintenance schedule and have this done concurrent with a Phase 3. Many tasks on the 2,500-cycle inspection are also stipulated on the Phase 3 checklist. Even if you get the 2,500-cycle a little early, you’ll save a bundle by consolidating these two actions because the interior has to come out for a Phase 3 as well.

When reviewing your invoice, make sure you are not being charged twice for the same task. You might ask for a copy of the two checklists. In the Phase 3, Section E covers the Pilot’s Compartment and Section F covers the Cabin section. Many of the tasks in these two sections of the Phase 3 are also on the 2,500-cycle checklist. Look further and you’ll find more duplicates.
10,000-Cycle Inspections

When a King Air hits the 10,000-cycle mark there is a significant list of inspections to be done. (For 90 models, it happens at 9,000 cycles.) Again, there is a lot of overlap between the 2,500-cycle checklist and these 10,000-cycle items. Maybe the factory thought some of these items shouldn’t go for 10,000 cycles before getting inspected, so they added a look-see at the 2,500-, 5,000- and 7,500-cycle intervals. This means it will also come due again at 10,000 cycles. Time to guard against double-dipping.

Recently I was hired to represent the seller of a King Air that had just reached 10,000 cycles and 10,000 hours total time. Logbook research by the buyer showed that the shop doing the maintenance for the seller had missed a few required items, including the 2,500-cycle inspection. Coincidentally, the buyer was having the shop complete a Phase 3 and Phase 4 as their pre-buy. The shop charged meticulously for every task called out on all checklists. Needless to say, I found a lot of double-dipping between the 2,500-cycle and the Phase 3 inspections.

Additionally, I found triple-dipping in the case of some 10,000-cycle tasks that also appeared on the other two inspections. All these duplicate items were brought to the attention of the shop administrators in a face-to-face meeting. It was a bit of a battle, but I won many credits for the seller.

The 3,000-Hour Flap Inspection

This flap inspection is the other maintenance item added recently by Textron Aviation. It calls for in-depth inspection of the flap roller bearings, flap tracks and associated structure. Unlike the 2,500-cycle inspection, there is no clear-cut duplication with a Phase checklist or other special inspections. Of course, you want to have it done during a Phase for the sake of convenience, but it will be an added labor cost.

In recent years I have seen a lot of flap roller bearings going bad, so I am a fan of this 3,000-hour flap inspection. A bad roller bearing, if not detected and replaced early enough, will wreak havoc on your flap tracks and possibly the flap itself. These are costly repairs to make, but easy to prevent by being proactive with the Teflon washers in your flap assemblies.

At the risk of sounding like a broken record, I will beg, plead and admonish you to check for the white, or whiteish, Teflon washers. I’ve written four articles on flaps and I mention these Teflon washers every time. (Note: see my October 2016 article featured in this magazine for detailed directions on doing this simple check and adding it to your preflight routine. Email me or give me a call if you can’t locate the article.) You cannot afford not to know about the correct placement of these washers and having them replaced at the slightest sign of wear.

Invoice Review

Double- and triple-dipping by a shop might be on purpose or may be an oversight – or perhaps a little of both. These days shops have software programs that take a simple entry by the mechanic on the floor and parlay it into a line item on the invoice replete with a full description of the task, parts required, freight charges and sales tax. This is great for the shop to keep track of all pertinent expenses. Customers, however, need to go over these invoices with a fine-tooth comb.

Automated systems have no commonsense. If the Phase 3, 2,500-cycle inspection and the 10,000-cycle inspections are on the same job, all the tasks for each inspection are loaded into the invoice, regardless of duplication. Sometimes the person churning out these invoices has zero knowledge of the invoice content. The shop needs someone with maintenance knowledge and experience to vet the duplicate charges and fine-tune the invoices.

In the case I presented above where I represented the seller, the person who reviewed and revised the invoices had an A&P certificate and some familiarity with what goes on in the hangar, but they failed to notice the double and triple-dipping until I came along.
And it didn’t end there. I found an instance where the shop charged 3.5 hours in labor to change the O-rings at the brake bleeder valves. This is a five-minute task once the mechanic has the parts in hand, so I questioned the 3.5 hours of labor. They said “Well, the guys had to bleed the brake lines.” So, I pointed out a previous squawk where they replaced the master brake cylinder on that side and had charged plenty of hours to cover bleeding the system.

Eventually the labor for the bleeder valve O-rings was removed. There were other instances along those lines where I refuted excessive labor charges. I also sourced parts with better pricing and stuck my nose in a number of places where it probably was not wanted. I think I reviewed no less than a dozen versions of the invoice before it was finalized. It was a brutal job, but in the end, my client was happy. The seller, their pilot and their broker all agreed that they couldn’t have achieved the end result without my assistance. So, there are times where it pays to have someone in your corner.

**The Bottom Line**

I’m not trying to make an A&P out of anyone reading these *Maintenance Tip* articles. My goal has always been to help King Air pilots and owners become better informed about the maintenance needs of their King Air. Of course, safety is No. 1 – always and forever. But spending your maintenance dollar wisely comes in second. Where possible, I’m looking out for your bottom line.

I hate to speak ill of any shop because I know how difficult it is to succeed in this business. One of my longtime customers (a Duke owner still flying the aircraft he purchased from BeechWest in Van Nuys over 40 years ago) told me time and time again, “Dean, if aircraft maintenance was easy, everybody would be doing it.”

Trust me, it’s not easy. When you find a good shop – and they are out there – be nice, be patient, and you’ll get the same treatment in return. They will work with you to achieve the safest and best result while doing everything in their power to control your costs.

Later, when someone admires your King Air and asks where you go for maintenance, tell them.

Dean Benedict is a certified A&P, Al with nearly 45 years’ experience in King Air maintenance. He’s the founder and former owner of Honest Air Inc., a “King Air maintenance boutique” (with some Dukes and Barons on the side). In his new venture, BeechMedic LLC, Dean consults with King Air owners and operators on all things King Air related: maintenance, troubleshooting, pre-buys, etc. He can be reached at dr.dean@beechmedic.com or (702) 773-1800.
**Canada has New Fuel Tax, Welcome to House GA Caucus Launch and Sharing Safety Data**

by Kim Blonigen

**New Fuel Tax in Canada**

Authorized through the Greenhouse Gas Pollution Pricing Act, Canada is implementing a new fuel surcharge for aircraft. Operators, including those that are international, who fly or do business in Manitoba, New Brunswick, Ontario and Saskatchewan must register with the Canada Revenue Agency (CRA), which will extend to including Nunavut and Yukon territories July 1, 2019.

According to the CRA, the rates were designed to reflect a carbon pollution price of $20/ton of carbon dioxide equivalent and rising by $10/ton annually to reach $50/ton by 2022. For avgas this equates to almost 5 cents per liter starting out and increasing to 12.44 cents April 1, 2022. For jet fuel, the rates begin with 5.16 cents per liter and grow to 12.91, starting April 1, 2022. While registration is required for Nunavut and Yukon, there will be no surcharge for those territories.

Further guidance on the collection of the taxes is expected soon from the CRA.

**NBAA Welcomes House GA Caucus Launch in the 116th Congress, Urges Members to Contact Congress**

In mid-May the National Business Aviation Association (NBAA) applauded the launch of the U.S. House of Representatives General Aviation (GA) Caucus and provided an online tool for NBAA members to call upon their elected federal representatives to join the House caucus.

Congressional caucuses are informal groups of lawmakers united in a common interest. Founded in 2009, the House GA Caucus promotes the importance and value of general aviation, including business aviation, and its vital role in the nation’s economy and transportation system. It also serves to educate all members of Congress and their staff about issues that are critical to the success, strength and growth of GA.

“Time and again, House GA Caucus members have been among the most effective champions for the general aviation community,” said NBAA President and CEO Ed Bolen. “The GA Caucus is a bipartisan group of members of Congress from urban and rural states and districts who share common support, and a clear understanding of the importance of general aviation to our nation.”

Serving as co-chairs of the House GA Caucus in the 116th Congress are U.S Reps. Marc Veasey (D-33-TX) and Sam Graves (R-6-MO). They recently sent a “Dear Colleague” letter urging their House colleagues to join the GA Caucus.
“The GA industry employs over 1.1 million workers and contributes more than $219 billion to the U.S. economy annually,” the congressional Dear Colleague letter read. “In 2018, U.S. general aviation airplane manufacturers delivered 1,746 airplanes worth $11.6 billion with more than 39 percent of total shipments tied to exports. In fact, the GA industry is one of the few remaining U.S. manufacturing industries that provide a trade surplus for the U.S.”

“NBAA has always strongly supported efforts to build and expand the congressional GA Caucus in both the House and Senate,” Bolen continued. “We commend Congressmen Graves and Veasey for standing tall for GA, and for their efforts to expand membership in the House GA Caucus. We urge NBAA members to join this important effort by contacting their elected representatives and request them to become part of the caucus.”
FAA Highlights Importance of Safety Data Sharing

From a recent National Business Aviation Association (NBAA) Update:

A recent FAA Fact Sheet – Aviation Safety Information Analysis and Sharing (ASIAS) Program – highlights agency and industry efforts over the past 11 years to continuously improve safety through the open exchange of safety data.

Eighty-eight business aircraft operators, 47 Part 121 airlines, 12 universities, five manufacturers and two maintenance, repair and overhaul organizations participate in ASIAS. The FAA plans to phase in more business aviation and light general aviation operators, as well as the helicopter industry.

“NBAA encourages members to participate in safety data sharing programs, whether through providing narrative safety reports, [Flight Operational Quality Assurance] FOQA or FOQA-like data, or other means,” said Mark Larsen, NBAA’s senior manager of safety and flight operations. “Data sharing is an important way to benefit the community broadly and to learn lessons from other aviation organizations.”

NBAA’s Safety Committee recognized the importance of safety data sharing by including the issue in its Top Safety Focus Areas of 2019.

ASIAS is a data repository of more than a dozen public and proprietary data sources, including, but not limited to:

- ASAP (Aviation Safety Action Program) and ASRS (Aviation Safety Reporting System through NASA), and proprietary system narrative safety reports
- FOQA (Flight Operational Quality Assurance) and FOQA-like flight operations data
- NMAC (Near Mid-Air Collision reports) and other ATC narrative safety reports
- SDR (Service Difficulty Reports)
- Aeronautical facility (airport and heliport) information

The General Aviation Joint Steering Committee (GAJSC) and airline-oriented corollary Commercial Aviation Safety Team (CAST) are integral components to ASIAS. The GAJSC uses operations data to identify risks, develop recommended risk mitigation measures and evaluate the effectiveness of implemented solutions.

ASIAS also partners with the semi-annual Aviation Safety InfoShare meeting.

Doug Carr, NBAA vice president of regulatory and international affairs, is a member of the ASIAS Executive Board, which oversees the ASIAS initiative. Larsen is a member of the General Aviation Issue Analysis Team that focuses on general aviation safety topics and develops proposals on priorities and process changes for consideration.

“NBAA has long supported FAA/industry data sharing initiatives through programs such as ASIAS as a means to prevent incidents and accidents in business aviation,” said Larsen. “We know effective and broad-reaching aviation safety data sharing will help the industry evolve to the next level of safety.”

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It’s going to do it anyway, right? Since the feathering springs and blade counterweights are always trying to move the propeller blades to high pitch – and the extreme of high pitch is the feathered position – and propeller oil pressure is what prevents the springs and counterweights from succeeding in their job, then as the engine stops turning and hence oil pressure is lost, the blades must feather. Right? So why does the checklist tell us to feather them ourselves?

There is a one-word answer to this question: Safety. Let me explain.

The engine’s oil system serves four functions. First, as in all engines, it provides vital lubrication and cooling for all of the engine’s moving parts. Second, it is used in measuring the torque being supplied to the output (propeller) shaft so that the amount of torque may be displayed in the cockpit. Third, it is used to heat the fuel, to decrease the likelihood of liquid water that may be suspended in the fuel from turning into ice crystals that could clog filters and passages. Lastly, it is used to make propeller blade angle changes. The oil that is used for all four of these functions is the same oil, most commonly the “2380” turbo oil variety that has had many different names over the years: Esso 2380, Exxon 2380, BP (British Petroleum) 2380, and now Eastman BP 2380. As the oil is pumped from and scavenged back to the integral oil tank, a molecule that was in the oil-to-fuel heat exchanger a moment ago may now be in the propeller dome and one that was in the propeller may now be spraying onto a bearing.

However, just because this is all the same oil does not mean that it is at the same pressure. The single oil pump that sends the oil to everything except the propeller has a discharge pressure – depending on the exact PT6 model – of between 60 and 135 psig (pounds per square inch gauge). The oil inside the propeller dome or hub is at a much higher pressure to be capable of overcoming the springs and counterweights. The engine’s oil pump supplies oil from the tank to the Primary Propeller Governor (PPG). This device is mounted on a pad at the front of the engine, on top at the 12 o’clock position. In addition to the speeder spring, flyweights and oil passages it also contains a pump that takes the incoming oil and increases its pressure up to about 400 psig. The position of the governor’s pilot valve determines the exact pressure inside of the dome.

Since the PPG is mounted on a drive pad at the front of the engine, it is rather obvious that it is geared into the propeller shaft (whose speed is represented by the symbol \( N_p \)) instead of into the compressor or gas generator shaft, \( N_1 \) or \( N_g \).

You’ve heard that a PT6 may be started while the propeller is restrained from turning, right? It’s true. If a rope – or a gutsy person – is preventing propeller rotation, then the pump inside the PPG is also not turning so the propeller dome receives no high-pressure oil. The blades remain feathered. Only when the propeller is allowed to start turning is the oil pressure created that permits the blades to flatten their angle or “bite.” Watch carefully when a PT6 is started normally. This is especially obvious when you stand looking parallel to the propeller disk. You will notice that rotation begins while the blade angle is still in the highest pitch, feathered position. Then its
rotation creates the oil pressure that flattens the blades. As the blades flatten, the lesser air bite means less rotational resistance so the propeller speed rises until normal idle conditions are met with the propeller now on its Low Pitch Stop (LPS).

As long as the propeller is rotating then the pump inside the PPG keeps supplying the necessary oil to the dome to prevent the blades from feathering. To demonstrate this, I often have a new King Air pilot not pull the propeller levers into feather after we pull the condition levers into fuel cutoff as we shut down. Usually it is well over one minute before the propeller finally stops turning. At this point we can observe that the blade angle is quite large, in the order of 45 degrees, halfway to feather. As we watch, we can actually see the blade angle slowly becoming larger as the feathering springs force the remaining oil out of the dome and back into the engine’s nose case. Often I will then ask the pilot to pull only one propeller lever all the way back into the feather position. When this is done – opening the passage in the PPG to allow oil to return freely into the nose case – the blade angle moves rapidly the rest of the way and the blades stop moving when they reach the metal-to-metal stop at feather. It takes in the order of two seconds for this to happen. The other side may take another five minutes or more to leak into the fully feathered position.

Try it yourself. Pick a deadhead leg and make sure the ramp is empty of nearby people when you shutdown. Leave the propeller levers alone and watch what happens. It takes a l-o-n-g time for the propeller to stop, eh? In fact, I have done this facing into a strong Kansas “breeze” and the propeller never stopped rotating! There was sufficient windmill effect to keep the not-yet-feathered propeller turning indefinitely.

Do you see why I stated the reason for feathering is “safety”? The lineperson waiting to install your nose chocks, a curious bystander, or the poorly briefed passenger rushing to get to the meeting … there is a lot more chance of someone getting hurt by a rotating propeller than by one that has stopped. When we make the propeller blade angle go to its maximum bite position immediately at shutdown – yielding the maximum amount of rotational resistance – it lessens the dangerous rotating time immensely.

Can you think of a situation in which feathering manually at shutdown is not a good idea? Yes! You are correct: When parked on a very slippery, icy ramp, the thrust that the propellers provide as the blade angle suddenly increases can cause the airplane to slide forward with no control whatsoever. It’s best here to let them coast to a gentle stop on their own.

By the way, do any of you feather first and pull the condition levers second? Believe it or not that was how the checklist procedure was written for many years in the early days of King Airs. Back then, the Environmental Protection Agency (EPA) was not yet in existence and there were no restrictions on turbine airplanes dumping a little fuel out at shutdown. As fuel pressure decreased, a dump valve would return to its spring-loaded open position and allow residual fuel to dump onto the ramp instead of into the hot combustion chamber liner – “burner can” – where it caused smoking and coking problems. (“Coking” refers to leaving deposits of carbon in the fuel nozzles.)

In King Airs, this fuel dumped out of the oil breather tube that terminated just behind the oil cooler … and directly in front of the main tire(s). Prop wash tended to blow this kerosene back onto the tires, leading to their decreased service life. Around 1974 was when King Airs began being manufactured and retrofitted with fuel drain collector systems – usually referred to as “EPA kits” – to prevent fuel from dumping onto the ramp at shutdown. Shortly thereafter checklists were revised to feather after the fuel is cut off.

There is certainly no harm done by doing it the old way. In fact, feathering while taxiing at idle is a great way to keep the airplane quiet and avoid brake usage, especially when on a long, straight taxiway with a strong tailwind. However, there is a very definite momentary increase in thrust as the blades move through the big bite position on their way to feather. You can feel the acceleration for a moment while rolling down the taxiway.

Likewise, if we feather before – or too soon after – we have cut off the fuel at shutdown, there is enough airflow through the
engine that again thrust increases. We won’t feel it as acceleration – unless the brakes aren’t set – but the nose strut will do a noticeable compression bounce. I have found that pulling the condition levers and then waiting for the propeller speed to hit 600 RPM before feathering is both very smooth and yet gets the props stopped in a reasonable, safe timeframe.

Before I wrap this up, I want to emphasize the fact that the propeller feathering itself at shutdown is purely a ground, not flight, phenomenon. Remember when I said the propeller never feathered in the strong Kansas wind? Well, imagine the strength of the relative wind when flying. Unless you are doing slow flight while fuel is cut off in flight, the propeller doesn’t even slow down! In fact, do you know why 140 KIAS is specified as the minimum speed for a windmilling airstart? It’s because that is the airspeed at which maximum propeller rotational speed can be achieved while the prop is being driven by windmilling force only, with no fuel, no exhaust gases driving the power turbine.

Some alert pilots have asked me this question: “How does the oil keep getting supplied to the PPG and its pump? If the engine is shut down and the No. 1 shaft, compressor shaft, is not rotating, then the engine’s oil pump is also not turning. So how does oil get to the prop governor?”

Excellent question. The answer is “Because the N1 shaft usually does not stop rotating.” Unless some bearing jammed and indeed caused the compressor and all of its accessories to not be turning, then eventually the oil to the governor would no longer be supplied and feathering would have to occur. But in a more normal situation of a shutdown due to fuel starvation, the ram air through the engine keeps N1 turning. In my experience, the windmilling N1 in flight, with a windmilling propeller, varies between 5 and 15 percent, based upon altitude and airspeed. That is plenty for the engine’s oil supply and scavenging pumps to circulate the oil to and from the governor.

Get it? Got it? Good!

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

If you have a question you’d like Tom to answer, please send it to Editor Kim Blonigen at editor@blonigen.net.
When World War II came to America in December 1941, the Wichita division of the Boeing Aircraft Company was flooded with orders for thousands of biplanes to train tens of thousands of pilots for the air battles to come.

by Edward H. Phillips

“Get pilots to the front!” That was the cry of Lieutenant General Barton K. Yount, head of the United States Army Air Forces Training Command (AAFTC), as 1942 dawned. He had been hand-picked by General Henry H. Arnold for the job and Yount was doing everything within his power to accelerate flight training at the primary, basic and advanced levels. On Dec. 7, 1941, the surprise attack on America at its Pearl Harbor base in the Territory of Hawaii had united the nation in a determined effort to utterly destroy the Empire of Japan in the Pacific and reduce to rubble Adolf Hitler’s Third Reich in Europe.

In the wake of Japan’s attack a cloak of security quickly descended upon America’s factories producing weapons of war. Although the bombing came as a shock to the nation, the U.S. military high command was not totally caught by surprise. More than three months before the raid the Army Air Corps submitted a plan to the War Department conducting a massive air assault against Germany and Japan. The comprehensive document originally called for 2 million men and 88,000 aircraft.

Although production of war materiel in the United States had increased by 400 percent during 1939-1941, the nation’s ability to train military pilots was sorely lacking. According to the Air Corps, the lack of training bases needed to fight a war on two fronts was “wholly inadequate for the job ahead.” As early as 1940, however, the Air Corps established dedicated training bases at Randolph Field, which became the Gulf Coast Training Center supported by the Southeast and West Coast Training Centers located at Maxwell Field, Montgomery, Alabama, and Moffett Field in California, respectively.
As the war in Europe progressed and France fell to the Nazis in June 1940, force planning by the Air Corps changed frequently. Two months before Germany attacked Poland the plan called for creating 24 combat groups requiring a flight training program that could graduate 1,200 pilots each year. After Germany occupied Norway, plans were upgraded to include 41 combat groups requiring 7,000 pilots annually, but in the wake of the Pearl Harbor attack planners called for 84 combat groups and 30,000 pilots.

Before America's entry into the war the AAFTC's pilot training programs graduated 1,244 pilots, but by 1943 that number surged to 65,797. Despite enormous pressure to graduate more and more pilots as the war dragged on, the AAFTC accomplished impressive results across a six-year period: Between July 1939 and August 1945, 768,991 pilots, including women, Americans enrolled in British flight schools,
An aging N2S-2, of which 125 were manufactured, awaits its next flight at a naval air station in 1943. The ship featured a new national insignia that included rectangles flanking the star and circle. (Erwin J. Bulban via Jay Miller)

instructors and other individuals. Of these, 233,198 completed primary training, with a majority of those earning their wings flying the Boeing/Stearman PT-13 or PT-17. Another 202,986 men and women graduated from basic flight training and 193,440 completed advanced courses. Of these, 102,907 eventually flew single-engine fighters and 90,533 took the controls of multi-engine bombers and transports.

Meanwhile, back in Wichita the production of primary trainers for the Air Corps and Navy flight schools accelerated after Dec. 7, 1941. Earlier that year the factory had already delivered the 2,000th Stearman airplane (a PT-17) Aug. 27, only five months since delivering the 1,000th trainer, and national defense plans called for the Wichita Division to build as many as 2,000 trainers annually.

Major George H. Brett, one of the Air Corps’ strongest proponents of air power, commented on the delivery in a letter to Julius Schaefer:

“This is an outstanding contribution to the national defense program. Aug. 27 should be a red-letter day in your company’s production history and a day that you deserve the right to be proud of. We appreciate that it has taken a lot of hard work, effort and time to accomplish this tremendous production, and may I extend my congratulations and the thanks of the entire Air Corps to you and your entire organization for your outstanding production of primary trainers.”

Still, the frenetic pace of the war efforts left no time for future celebration as the 3,000th, 4,000th, 5,000th and 6,000th ship rolled off the final assembly lines like clockwork. In one month alone, April 1943, manufacture of Air Corps PT-13, PT-17 and Navy N2S-series biplanes reached 275 ships, and one of those was the 7,000th built.

In a brief ceremony held that month in the bustling Plant I complex, General Raymond G. Harris, in charge of the Midwest Procurement Division of the Army Air Corps, and Lieutenant Commander R.G. Vaughn, resident military official at the factory, officially accepted the aircraft. Pressure to build more trainers and build them faster was a constant companion of every employee at the Wichita Division. As General Yount constantly preached to his subordinates, the key to America winning the war was getting pilots to the front lines as quickly as possible.

It was impossible, however, to prepare a pilot for every situation he would encounter in the dangerous skies above Hitler’s “Fortress Europe” and the vast Pacific Ocean. Every effort was made to give airmen the best training possible under time constraints, but senior officers of the Air Corps and Navy knew that no amount of training, no matter how extensive, could thoroughly prepare pilots for aerial combat.

After listening to combat veterans complain about inadequate training of replacement pilots, General Yount summed up the situation well: “There is not a thing that you have said that is not true. All we need is about two years to train each one of these pilots to do just what you would like. I wish we had more time. General Arnold is enthused about giving us more time if we can work it out, but to date, the problem has been to get more men to the front! Every criticism you have made we are thoroughly cognizant of; we have done our best to correct it. I am not saying that by way of alibi, because we know the shortcomings that our pilots have.”

In an effort to get those pilots to the front more quickly, by 1943 more than 50 Contract Primary Training Schools were operating in the United States. These schools were administered under the watchful eye of the Civil Aeronautics Authority that provided facilities and personnel while the Air Corps provided textbooks, a standard curriculum and training aircraft including the PT-13 and PT-17. The schools were closely monitored by
the Air training Centers. The flying course itself was 10 weeks and about 40 percent of students “washed out” of the program. Graduates were transferred to basic and advanced training bases within the Air Corps Training Center regions.

Student pilots at the primary flight training schools in the Gulf Coast area were fortunate to have a fleet of Stearman PT-13 biplanes at their disposal. By contrast, students at the Spartan School of Aeronautics in Tulsa, Oklahoma, had to alternate between aging PT-3 ships and the PT-13. Gradually, however, as the Wichita Division increased production rates, Stearman biplanes began replacing the trusty but obsolete Consolidated machines. The contract schools eventually earned a reputation for turning out competent airmen, not only for the United States but also for Great Britain, China, Canada and other allied nations.

The U.S. Navy, too, was desperate to train new pilots for combat,
particularly in the vast Pacific Theater of Operations. Before the war training at Pensacola and Jacksonville, Florida, was accelerated, along with instruction at Corpus Christi, Texas. Pensacola became a major training hub for naval aviators, graduating as many as 1,100 pilots each month by the time America entered the war. The Navy’s flying course was similar to that of the Army Air Corps, but the Navy did not use contract flight schools. Instead, Navy officials continued flight instruction at Naval Reserve Bases and later a series of training facilities that operated under the Air Primary Training Command.

It is interesting to note that during the war years the rugged biplanes built by the Wichita Division drew praise from senior officers of the United States Army Air Forces for their reliability and ease of maintenance. General Harper, assistant chief of air staff for training, told the joint Aircraft Committee that the Army Air Forces Training Command thought highly of the Stearman trainers, but cast dispersions on the monoplane Fairchild PT-23: “The PT-17 has proven to be a most satisfactory type and maintenance difficulties negligible compared to the Fairchild wooden types. The wood aircraft will not stand up in the hot, dry climate where many of our schools are located, and much difficulty is being experienced with the PT-23 due to vibration trouble.”

By early 1945 World War II was entering its final phase of bloodshed. Germany’s military machine and war production were slowly disintegrating under the combined weight of relentless bombardment by the U.S. Eighth Army Air Force and Great Britain’s Royal Air Force, while American, British, Canadian and French forces drove the Nazis back into the Fatherland and the Soviet juggernaut crushed Hitler’s Wehrmacht on the Eastern Front. Germany surrendered in May but the Japanese fought on until September when Emperor Hirohito brought an end to hostilities.
When the fighting finally ended and the world again embraced peace, the city of Wichita could be proud of its contributions to the Allied victory. It is estimated that during the war the Wichita Division, Boeing Aircraft Company, Beech Aircraft Corporation, Cessna Aircraft Company and the Culver Aircraft Company had manufactured 25,865 aircraft, plus sufficient spares to build another 5,000. Boeing was the largest employer with 29,795 people on the payroll. The Wichita Division built 8,584 primary trainers, or about 44 percent of all primary training aircraft built during the war. These accomplishments were a testimony to the strong work ethic and patriotism exhibited by thousands of men and women of the Wichita Division of the Boeing Aircraft Company. For many of the employees, their service had begun in 1927 when they went to work for a native Kansan named Lloyd Carlton Stearman and the company that bore his name.

On Jan. 11, 1945, PT-13D (Serial No. 75-5963), Army Air Corps serial No. 42-17800 rolled of the final assembly line. After the war parent company Boeing applied a sign to the fuselage stating that the trainer was the last of 10,346 built by the Wichita Division. Years of research by aviation historian Kenneth Wilson, however, eventually disproved that claim when he verified that another PT-13D, serial No. 75-6026, Army Air Corps serial No. 42-17863, was the final aircraft produced.

As of 2018, the airplane is on static display at the United States Air Force Museum in Dayton, Ohio.

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.
FAA Awards STC for ThrustSense® Autothrottle on King Air

Innovative Solutions & Support, Inc. (IS&S) has received the first Federal Aviation Administration (FAA) Supplemental Type Certification (STC) for its patented ThrustSense® Autothrottle for retrofit on the King Air. ThrustSense, which provides FADEC like engine protection, is a full regime autothrottle from takeoff to landing phases of flight, including go-around that allows the pilot to automatically control the power setting of the engine. ThrustSense computes and controls appropriate power levels reducing pilot workload providing a new level of convenience and safety for the King Air.

ThrustSense computes thrust, holds selected speed/torque and implements appropriate limit protection. When engaged by the pilot, the autothrottle system adjusts the throttles automatically to achieve and hold the selected airspeed guarded by a torque/temperature limit mode. Protection modes will automatically activate, regardless of autopilot engagement state in an attempt to keep airspeed, torque and temperature from exceeding pre-defined targets.

The IS&S ThrustSense Autothrottle ensures stabilized approaches by controlling speeds in the descent. During high pilot workload the autothrottle prevents the airplane from getting dangerously slow or fast and protects against overtorque and overtemp enhancing the safety and capability of the King Air.

Control of the revolutionary autothrottle is housed in an easy to install Autothrottle Control Panel (ATCP) that provides autothrottle control interface. The optimized design for retrofit allows for no structural modifications to the existing throttle quadrant and can be installed in four days.

This year IS&S will offer a certified software upgrade for King Air Vmc Mitigation. ThrustSense will continually monitor multiple engine parameters and will detect the loss of an engine then compute the amount of rudder authority loss due to the reduction of airflow over the rudder. It uses this to calculate the reduction in thrust from the remaining engine to prevent hazardous yaw. Real-time monitoring of YAW provides additional safety in engine-out conditions.

ThrustSense is also the first and only certified autothrottle for the PC-12 Platform and is offered as a standalone installation integrated with the Company’s Integrated Standby Unit (ISU) or with its PC-12 NexGen Flight Deck.

Innovative Solutions & Support, Inc. (innovative-ss.com) is a systems integrator that designs and manufactures flight guidance and cockpit display systems for original equipment manufacturers and retrofit applications. The company which is headquartered in Exton, Pennsylvania, supplies integrated Flight Management Systems (FMS) and advanced GPS receivers for precision low carbon footprint navigation.

Garmin Offers New Upgrades for G1000 NXi-equipped King Airs

Garmin announced that it has received Supplemental Type Certificate (STC) for new features and upgrades for the G1000 NXi integrated flight deck in the King Air 200/250/300/350 series aircraft.

A new, Bluetooth-enabled audio panel for the G1000 NXi integrated flight deck in the King Air offers an expanded feature set alongside innovative sound quality. Home theater-like music effects add to the rich audio characteristics provided by the audio panel, allowing pilots to select bass boost levels, as well as equalizer effects, including rock, classical and pop. Advanced auto squelch automatically adapts to the noise level within the cockpit and allows for natural conversation through headsets. It includes a six-place stereo intercom and support for up to three stereo music inputs. Split-COMM mode allows the pilot and co-pilot to broadcast independently on two separate frequencies and contains dedicated pilot and co-pilot music and intercom volume control knobs. Additionally, a built-in digital clearance recorder can record up to 60 seconds of selected COMM radio transmissions so pilots can easily play back difficult clearances.

The first to introduce 3D audio, Garmin incorporates 3D audio processing into the audio panel. With stereo headsets, incoming audio is spatially separated to reflect how people naturally process sound and conversation by differentiating audio sources by their unique locations...
or seat position. For example, sound from COMM 1 will come from the left, whereas sound from COMM 2 will sound as though it’s coming from the right.

As a standard feature of the audio panel, pilots can connect a smartphone or tablet via Bluetooth to easily make or receive phone calls, stream audio entertainment or wirelessly connect to select Garmin high-definition (HD) action cameras. Offering a seamless upgrade path, pilots and aircraft owners can easily upgrade (or select it as an option with a new G1000 NXi installation) to the new audio panel because it’s slide-in replaceable and only requires minor wiring modifications.

The GWX 75 weather radar is also compatible with the latest upgrade for G1000 NXi-equipped King Air aircraft, which offers exceptional
range and a new, enhanced color palette that features four-times more color contouring than traditional weather radars on the market. The Doppler-based, solid-state GWX 75 offers a range of 320 nautical miles, horizontal scan angles of up to 120 degrees and to focus on an area of interest, pilot-adjustable sector scanning. The GWX 75 also retains vertical scan capabilities, which allows the pilot to focus on storm tops, gradients and storm cell buildup at various altitudes. Optional features such as Doppler-enabled turbulence detection and ground clutter suppression are also available with the GWX 75.

Also included as part of this upgrade:

- Split-screen view is available on the MFD, offering a simultaneous view of maps, charts, checklists, flight plans and more on a single screen.

- Pilots can view decoded Terminal Aerodrome Forecasts (TAFs) on the primary flight display (PFD) and multi-function displays (MFD).

Additionally, Garmin has recently completed a King Air G1000 NXi integrated flight deck testimonial video, where owners and operators explain why they selected the G1000 NXi and how it reduces operating costs, improves payload and enhanced reliability. The testimonial video can be viewed at: youtube.com/watch?v=XngoEec9DRc

For current King Air owners and operators, the latest features are available immediately from select Garmin Authorized Dealers as a free upgrade (installation and hardware charges may apply). Optional equipment upgrades are also currently available. King Air owners and operators may contact a Garmin Authorized Dealer for pricing information. For more details regarding the G1000 NXi upgrade for the King Air, contact Scott Frye at (913)-440-2412. For additional information, visit: garmin.com/kingair.

Raisbeck Names Baker Aviation as Authorized Dealer

Raisbeck Engineering, Inc., a leading provider of performance enhancement systems for the King Air, has added Baker Aviation of Fort Worth, Texas, to its global network of Authorized Dealers.

Established in 2008, Baker Aviation is a full-service aircraft maintenance, management and charter company headquartered at Meacham International Airport (KFTW) in Fort Worth. FAA Part 145 maintenance services are provided for Hawker, King Air, Beechcraft, Citation, Learjet, Falcon, Challenger and Gulfstream aircraft. Baker is a dealer for BLR Aerospace King Air performance upgrades, a stocking distributor of PMA Parts from Omega Aircraft Articles and a dealer for Aircraft Lighting International. It is also the exclusive master distributor of the HOT-STOP® ‘L’ Fire Containment product line. To learn more or to schedule service, please visit baker-aviation.com or call (972) 248-0457.

PWI Announces New Installation Centers

American Aviation of Brooksville, Florida, B & G Aviation of Georgetown, Texas, and Fieldtech Avionics and Instruments, Inc. of Fort Worth,
Texas, have all been designated Authorized Installation Centers for all of PWI’s LED lighting products.

PWI manufactures several interior lights for Beechcraft King Air aircraft and has in-house ability to design, engineer and manufacture all types of electrical assemblies, electronics contract manufacturing, magnetometers and customized LED lighting solutions.

American Aviation is a family owned and operated company that has provided quality service to its customers since 1979. As an FAA Certified Repair Station, they offer services for a wide range of aircraft such as Learjet, Citation jets, Westwind, King Air, Cheyenne and Caravan. American Aviation prides themselves on being a “one-stop-shop” with services including aircraft sales, avionics, FBO services, flight school, interiors, maintenance, paint and parts. For more information, go to the company’s website at americanaviation.us/ or call (352) 796-5173.

For 12 years, B & G Aviation has been offering their services to a wide range of piston engine and turboprop owners. The company provides maintenance and repair services for the Cessna, Beechcraft and Piper aircraft line, specializing in King Air. B&G Aviation has a huge facility that offers 25,000 square-feet of hangar space for quality repairs and maintenance to their customers. For more information, call (512) 864-7632.

Fieldtech Avionics and Instruments, Inc. has been servicing the aviation community for over 40 years; it specializes in repairs as well as aircraft and avionics sales. They are an FAA/EASA-approved repair station ensuring all repairs meet mandated requirements. The company has an extensive parts list boasting over 35,000 different parts and a trusted dealer for Rockwell, Garmin, Telephonics, Freeflight Systems and Avidyne. For more information, go to ftav.com/ or call (817) 628-2719.

For more information on PWI’s LED King Air Upgrades, go to pwi-e.com/king-air-led-lights/ or call the company at (316) 942-2811. K

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KING AIR MAGAZINE - 37
From Mandatory Service Letter MTL- 76-01

Engine Controls – Power Control Cable Inspection

Date: May 2019

Effectivity: Super King Air B300, Serial Numbers FL-1071 through FL-1078, FL-1084 and FL-1086 through FL-1089; Super King Air B300C, Serial Numbers FM-68 and FM-69

Reason: To inspect the power control cable for corrosion under the deice boot.

Description: This service document provides instructions to inspect the power control cable for corrosion and repair the power control cable if corrosion found is under the deice boot.

Compliance – Recommended: This service document should be accomplished at a scheduled maintenance period or inspection.

A service document 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 document, including the intent therein.

2. The mechanic must correctly use and install all applicable parts supplied with the service document 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 document only as approved and published.

4. The mechanic or airplane owner must apply the information in the service document only to aircraft serial numbers identified in the Effectivity section of the document.

5. The mechanic or airplane owner must use maintenance practices that are identified as acceptable standard practices in the aviation industry and governmental regulations.

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Textron Aviation is not responsible for the quality of maintenance performed to comply with this document, unless the maintenance is accomplished at a Textron Aviation-owned Service Center.

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

Pilots N Paws® is an online meeting place for pilots and other volunteers who help to transport rescue animals by air. The mission of the site is to provide a user-friendly communication venue between those that rescue, shelter, and foster animals; and pilots and plane owners willing to assist with the transportation of these animals.

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