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# GARMIN

G1000/G950 Upgrade

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT





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C & L Aviation

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ifeFlight of Maine has been providing critical care transport to patients across its state since 1998, taking requests for its services directly from hospitals, physicians and first responders at a scene of an accident. The nonprofit service is jointly owned by Eastern Maine Healthcare Systems and Central Maine Healthcare Corporation, with a steering committee from both companies providing oversight; SevenBar Aviation – one of the nation's premier air medical transportation operators based in Dallas, Texas – manages, operates and maintains aviation services.

LifeFlight's vision is for the state to be a place in which every person, in every community, has access to critical care and medical transport when they need it. Maine, the second most rural state in the United States based on population density, has a need for LifeFlight's services at small, rural hospitals throughout the state. Since the service began, more than 19,000 patients have been successfully transported. Eighty-five percent of LifeFlight's missions are transporting from rural, community hospitals to one of Maine's three trauma centers, or to specialty centers in Boston. The remaining flights are to transport patients directly from accident scenes.

# **A Greater Requirement**

With bases in Bangor and Lewiston, LifeFlight carried out their services via helicopter and ground ambulances until 2015. With a growing number of transport requests unfulfilled because of high demand or weather grounding the helicopters, LifeFlight decided to add a fixed-wing airplane to its fleet with the following mission-critical requirements:

- Easily reconfigurable cabin for medical evacuation operations
- Improved short runway take-off and landing (STOL) performance
- Better weather capability and efficient endurance to perform the missions LifeFlight's existing rotary-wing fleet was missing
- Dependability a reputation of little to no unscheduled maintenance incidents
- Reliable parts base and support program in place throughout the United States

After months of researching, scouring through aircraft listings and crunching numbers, a pre-owned Beechcraft King Air B200 was found in the U.K. that fit the criteria perfectly. An added bonus was this particular King Air had relatively low time and JSSI engine coverage.

LifeFlight worked with SevenBar to determine what modifications and upgrades would create the safest, most reliable, best-equipped platform. One critical

# SION

Nonprofit Taps Local Resources to Convert King Air into Air Ambulance

addition was the Raisbeck Engineering EPIC Platinum Performance package, which would provide the necessary takeoff, climb, cruise and landing performance needed at Maine's predominantly rural airports. "The faraway rural areas tend to have the shortest runways and, due to their location, are also the areas in the greatest need of LifeFlight, so the Raisbeck package was the first thing we identified as a must-have for our B200," said LifeFlight of Maine's Fixed Wing Manager, Joshua Dickson.

LifeFlight was also counting on the EPIC system improving the overall efficiency of the aircraft, enabling the completion of critical missions in less time while saving on fuel. This capability would be extremely beneficial for critically ill and injured patients relying LifeFlight of Maine chose a King Air B200 as the latest addition to their aviation fleet, which allows the ambulance service provider to operate in more rural areas and in weather that may have grounded their helicopters. (KING AIR PHOTO COURTESY OF C & L AVIATION; OTHERS COURTESY OF LIFEFLIGHT OF MAINE)

on specialized care outside the local area, sometimes as far away as Cleveland; Washington, D.C.; and Toronto.

Due to dense tree coverage, varying terrain and everchanging weather, accurate and reliable navigation is directly tied to LifeFlight's ability to respond during periods of inclement weather. Because of this, they decided to replace the aircraft's current EFIS 84 CRT tube system and right-sided mechanical gauges with dual Garmin G600 flat screen displays and dual Garmin GPS400W navigation systems. Being WAAS-equipped

# One of the first patients saved by LifeFlight's new airplane

W ithin a few short months of LifeFlight launching its new fixed wing program, the airplane had already proven itself as a great asset to the organization and Maine's critically ill and injured patients, including 36-year-old Maine native Aaron Birt.

Born and raised in a small town in Maine, Aaron now lives and works in Massachusetts but returns home often to see his family. He was there one weekend visiting with his mother, sister and nephews when he began to feel dizzy and short of breath. He knew something wasn't right and told his mother he needed to get to the hospital right away. The last thing he remembers is walking into the emergency department at the local hospital.

As it turns out Aaron was suffering from a massive pulmonary embolism. A blood clot was caught in his pulmonary artery, blocking the blood flow and not allowing his blood to become oxygenated. This condition can quickly become serious, often fatal.

The emergency medical staff knew that Aaron was going to require specialized treatment at a major medical center. The hospital made an initial request for LifeFlight to transport Aaron to a regional medical center within 100 miles. While a LifeFlight helicopter was en route, Aaron's condition deteriorated and the emergency physician placed a breathing tube to secure his airway. When the flight crew arrived, they worked with hospital staff to sedate Aaron and hook him up to a special ventilator.

But then Aaron's heart stopped. The flight crew and emergency staff performed CPR for more than five minutes before his heart started beating again. Over the next half hour, Aaron's heart stopped three more times, requiring several more minutes of CPR and full resuscitative efforts.

What started out as a relatively routine critical care transport, best suited to the helicopter, quickly became much more complicated. The flight crew and emergency physicians realized a change of plan was necessary to make sure Aaron received the care he desperately needed. The team determined that a medical center in Portland, roughly 200 miles away, was the best facility to treat Aaron's illness. The added distance, together with the very real possibility that he would need CPR

allows LifeFlight to use LPV approaches, which a number of Maine's airports already support, for increased safety and reduced pilot workload.

In LifeFlight's lifesaving work, clear and instant communication is vital, so a custom internal communications system, consisting of a Technisonic



LifeFlight recipient Aaron Birt with his mother and sister. (PHOTO COURTESY OF LIFEFLIGHT OF MAINE)

again during the trip, also meant that LifeFlight's new King Air was the best way to transport and care for Aaron. The plane was dispatched to meet the team at the local airport.

When Aaron's heart finally began to respond to the treatments and medications intended to stabilize him, he was ready to be transported by ambulance to the airport. LifeFlight's King Air was waiting to carry him to get the specialized care he needed. During the flight, the crew maintained his blood oxygen level and worked to improve his heart rate and blood pressure.

Aaron woke up three days later, groggy and confused and not yet realizing just how traumatic the past few days had been. He was moved to recovery where he worked hard to regain his strength, making great strides in just a few days. He was determined to prove he could walk out of the hospital on his own, which he did 11 days after arriving. Three weeks later, he returned to his job managing supply chains. He takes care to avoid situations that might cause internal bleeding but has returned to his life before his ordeal, with one major exception.

"I've grown much closer to my family, leaving less and less time between visits back home," Aaron said. "This was a total life-changing event. A lot of people worked hard to make sure I wouldn't miss the joys of watching my nephews grow up. I intend to make the most of every moment."

- Story provided by LifeFlight of Maine

TDFM-9100 communication radio and a SkyTrac ISAT-200 phone system was installed. These devices allow reliable communication between the flight crew and the medical transport team onboard the aircraft, as well as with on-ground emergency and medical personnel and LifeFlight's communication center in Bangor, Maine.

# **KEEP YOUR COMPETITION IN CHECK**

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# **A Team Effort**

With funding from a combination of private donations and a tax-exempt, low interest loan obtained through a local municipal bond program, LifeFlight of Maine Executive Director Thomas Judge's goals were to keep the project on budget and to spend the money within the state of Maine, or farthermost the New England area.

Finding partners within budget proved challenging, but LifeFlight and SevenBar found C & L Aviation of Bangor, Maine, and Pro Star Aviation of Londonderry, New Hampshire, who could make the numbers work. For these two aviation companies, the opportunity to work on such a project brought its own rewards – providing needed expertise in the aeromedical industry and having the opportunity to prove the unique benefits inherent in working with local businesses. C & L acted as the primary contractor and oversaw the entire project, while Pro Star acted as a sub-contractor providing avionics and structures expertise.

Crews at Pro Star Aviation installed the Raisbeck EPIC package, performed the avionics upgrades and modified the flight deck, and addressed various structural modifications that were required. Once completed, the aircraft was tested then flown back to C & L Aviation for the remainder of the modifications.

The C & L team started with the interior, outfitting the cabin with a Spectrum Aeromed medical module system and installing all mission-essential medical equipment. The finishing touches – made possible by the generosity of Sherwin-Williams Aerospace Coatings Division, who donated the paint – were made to the newly refurbished B200 by undergoing a complete exterior repaint, branding it with LifeFlight of Maine's company colors and making it an official part of the LifeFlight fleet.

When the LifeFlight King Air was mission-ready, an official ribbon cutting was held to present the B200 to the people of Maine. During the event, people from

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Pro Star Aviation rebuilt the flight deck and replaced the aircraft's current EFIS 84 CRT tube system and rightsided mechanical gauges with dual Garmin G600 flat screen displays and dual Garmin GPS400W navigation systems. (PHOTOS COURTESY OF PRO STAR AVIATION)





The entire King Air B200 was refurbished, which included C & L Aviation gutting the interior and outfitting the cabin with a Spectrum Aeromed medical module. (PHOTOS COURTESY OF PRO STAR AVIATION AND C & L AVIATION)

When the B200 was ready for service, an official ribbon cutting was held to present the King Air to the people of Maine. (PHOTO COURTESY OF PRO STAR AVIATION)

Representatives from the organizations that successfully partnered together to bring this important King Air to life: (L to R) Dan Hodgins, Pro Star Aviation; Kimberly Montgomery, SevenBar Aviation; Sarah Smiley, C & L Aviation; Tom Judge, LifeFlight Foundation; Bill Cadow, Raisbeck Engineering; and Josh Dickson, LifeFlight of Maine paramedic. (PHOTO COURTESY OF PRO STAR AVIATION)

all over New England stopped by to show their support, resembling an atmosphere akin to family gatherings – conversations were many, while hugs and handshakes were frequently given and received. Among the crowd, prior LifeFlight patients stopped by to share their stories and express their ongoing gratitude for services rendered. There is no doubt the positive impact LifeFlight is having on the state of Maine.

It wasn't long before the King Air B200 was in the air, helping LifeFlight fulfill its vision. "This new aircraft means we'll be able to answer hundreds more calls for help every year," Judge said. "We're especially lucky and grateful to have incredible partners like SevenBar, C & L Aviation, Pro Star Aviation, Raisbeck Engineering and Sherwin-Williams who helped make sure LifeFlight continues to be there for the people of Maine."





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# **Engine Temp Sticl**

# by Dean Benedict

King Air owner was waiting for his 200 to be released from the shop after having a phase inspection. It was his first phase since purchasing the aircraft in 2002. The shop refused to release the aircraft to him because the engines did not make book power - they "temped out" before reaching max torque. The owner directed the shop to "jet-cal" the instruments and after they did, the engine gauges were reading correctly. The jet-cal results further bolstered the shop's position that the engines were not airworthy. Both engines were about 100 hours from overhaul, and the shop wanted to have them overhauled or discuss replacement, but the owner wasn't having any of that. He called me and we discussed the situation; I gave him a possible scenario that could make the engines appear to temp-out when, in fact, they were still good to go. He obtained a ferry permit and brought his 200 to my shop. Sure enough, both T1 temp sticks were bad. I ordered and installed new temp sticks on each side. Both engines made book power within allowable temperature parameters. The owner was pleased to say the least. A little later he put the engines on the M.O.R.E. program and ran them another 5,000-plus hours before selling the aircraft.

# **Engine Data Plate**

Not all PT6s are created equal. As I've said many times over the years, every engine is a tad different from the next. I'm fat, you're skinny, the next guy is somewhere in between. It's the same with engines. Every brandnew PT6 is brought to acceptance level in the test cell where it gets a good bit of customized tweaking. One of the last things checked before a new engine makes its way into the world, is measurement of the resistance needed to bring the temperature reading into line. That measurement, stated in degrees of temperature drop (called ITT trim), is stamped on the engine's data plate and the corresponding temp stick is installed. In the future, if the temp stick fails, the correct replacement can be ascertained by checking the engine data plate.

# **Temp Stick 101**

For the PT6 engines in most King Airs, the temp stick is located over the engine inlet (T1) and hitched up to the T5 harness. It can go by many names (trim stick, T1 probe, T5 stick), but there is only one temp stick and it is sensing the ambient inlet temperature of the



engine. It takes that reading, reduces it proportionately, and transfers it to the engine gauges. Other aircraft engines have a similar feature. They call them "pilot pleasers" because somewhere along the line an engine designer thought pilots would be nervous if they knew the real temperature readings inside their engines. Various methods were developed to make the engine gauges read a lower temperature while still preserving accuracy. That is my understanding of it.

In simplistic terms, your PT6 temp stick is a resistor and the electrical signal going from the engine to the cockpit goes through this stick which has been adjusted specifically for that engine. The stick reduces the electrical signal on the way to your temp gauge. In reality, it is a pretty sophisticated resistor, taking OAT into account as you go from ground level to altitude. (FYI, if you're a "sparky" reading this, the stick is wired in parallel, not in series.) The most important thing for you to know is this: The required resistance of the temp stick for that engine was determined "at birth" and stamped on the data plate. The temp stick is taking the real running temperature of the engine and recalculating it into what you see on your engine gauges.

# **Adjustable or Fixed**

Back in the day, temp sticks were adjustable. There was only one type of stick to order, then you consulted the engine data plate, adjusted the new temp stick accordingly, and then sealed and installed it. Although straightforward and handy, these adjustable temp sticks were tempting to a few unscrupulous individuals who sought to mask an engine that was running too hot by lowering the resistance of the temp stick in order to lower the reading on the gauge in the cockpit. This gave the appearance that the engine was making power without temping-out, when in fact it was running hotter than a poker. Temp sticks these days are pre-set. The technician consults your engine data plate and compares that information to a chart in the engine maintenance manual (see next page). The chart tells him/her which temp stick to order for your engine. Temp stick replacement is not

PRATT & WHITNEY CANADA MAINTENANCE MANUAL MANUAL PART NO. 3041195 TABLE 201, Loop Resistance (Post-SB14299) (Cont'd)

the second se			
Class	Limits in Ohms 21°C (70 °F)	Nominal Resistance in Ohms 21°C (70 °F)	Expected Nominal T5 Trim (°F)
04	14.40-14.80	14.6	69 °C (124 °F)
05	15.40-15.80	15.6	64 °C (116 °F)
06	16.55-17.05	16.8	61 °C (109 °F)
07	17.90-18.50	18.2	57 °C (102 °F)
08	19.45-20.15	19.8	52 °C (94 °F)
09	21.25-22.15	21.7	48 °C (86 °F)
10	23.50-24.50	24	43 °C (78 °F)
11	26.15-27.45	26.8	39 °C (71 °F)
12	29.50-31.10	30.3	35 °C (63 °F)
13	33.80-35.60	34.7	31 °C (56 °F)
14	39.50-41.70	40.6	27 °C (48 °F)
15	47.50-50.10	48.8	22 °C (40 °F)
16	59.40-62.60	61.0	18 °C (32 °F)
17	78.90-83.10	81.0	14 °C (25 °F)
18	110.30-116.10	113.2	9 °C (17 °F)
19	222.20-233.80	228	6 °C (10 °F)
20	20M min	00	2 °C (3 °F)

The chart from the PT6 engine manual that governs which temp stick works with the engine data plate information.

something I do every day; I've changed four or five in the last three years. Whenever there is a temperature spike in an engine, one immediately starts to worry about hot section repairs and the inevitable expense that follows. So, if it turns out to be a faulty temp stick, you can breathe a big sigh of relief.

# **Diagnosis and Trend Monitoring**

Successful troubleshooting is impossible without correct information. This is true for any squawk you have, but it is particularly crucial in diagnosing engine problems. Trend monitoring, accurately done, enables your technician to zero in on the problem, saving many hours in labor and thousands of dollars in parts. There's no reason not to keep track of engine temperatures, N1, fuel flow and torque on a regular basis. Let's say that you've been trend monitoring for some time. Both your N1s are close, both fuel flows are pretty close, and the torque is equal on both sides, but you see the temperature jump up on one side. If none of the other parameters have changed, then your temp stick is the first place to look.

Without trend monitoring records, I'd approach a temp spike on one side by calibrating the engine gauges first and verifying the internal probes in the engine. Next, I'd run the engine in question with the stick in and then I'd run it again, to the exact same torque value, without the stick. I'm looking for a difference in temperature. The stick-in temp should be lower than the stick-out temp.



A close-up of the temp stick sensor end at the engine inlet. (The metal mesh protects the inlet from FOD.)

If there is no temp difference, the stick is not doing its job. I'd *ohm* it out to be sure, but that's the sign of an open stick. To replace that stick, I'd check the engine data plate and compare that information to a chart in the PT6 manual which determines the correct class of stick for that engine. If I did have a temp difference between the stick-in run and the stick-out run, I would compare the difference to the data plate information. If running that engine with the stick results in a drop in temperature consistent with the data plate, then the stick is doing its job. That means this hot-running engine has another problem; a borescope inspection would be next.

# To Swap or Not to Swap

A customer called me in a frantic state of mind after seeing a sudden spike in engine temperature on one side while returning from a flight to Mexico. He was worried the hot section was going bad as the engines were past TBO. I quizzed him on the engine's performance: Was the N1 slower? Did the fuel flow jump up? He didn't think so. I told him to bring the aircraft over to the shop and right away I duplicated the discrepancy on the ground



The other end of the temp stick, wired into the T5 harness. The way a PT6 sits on a King Air, this T5 harness is forward of the ambient air inlet, and the temp stick extends aft to the engine inlet.

run. First, I calibrated the temp system and it was fine. Next, I checked the temp stick and sure enough, it was open. When I checked the data plate, I happened to check both sides and found they both had the same ohm reading. So, to illustrate the problem to the pilot, I swapped temp sticks and the problem went to the other side. Then I "un-swapped" the sticks and ordered a new one. We put it in and he was good to go. No issues reported since. Normally, swapping temp sticks from side to side just confuses the issue, because the temp sticks do not match from engine to engine. In fact, quite recently I unraveled an engine temp problem that had been complicated by an earlier troubleshooting attempt where they had swapped the temp sticks. This created problems with both engines. I tested both sticks with an ohm meter. One was good and the other was bad. The class on the good stick married up with the left engine data plate so that's where we put it. The class on the bad stick was not the correct class for the right engine! So they were having problems even before that stick went bad. The wrong stick throws off the engine temp reading. Ultimately, we installed the proper stick on the right side and their engine temp problems went away.

# On the Ground versus in the Air

Remember the 200, mentioned previously, with two bad sticks? Years later, I had a trim stick déjà vu on that King Air and it happened in a rather roundabout manner. A leak had developed with the cabin door that wasn't resolving. It was bothersome to the passengers, so I flew in the aircraft on a short trip in order to troubleshoot the door in the air. I figured out the door seal problem right away, but I was surprised to see the left engine was running hotter than it should. I'd been doing regular maintenance on this King Air for many years and I had never seen this in any ground running. I asked the pilot about it. He had chalked it up to age and time past overhaul (by now, both engines had been on the M.O.R.E. program for some time). The pilot didn't seem too concerned about it, but I couldn't let it go. He wasn't into trend monitoring, so I asked him to perform a number of tests during his next few flights. He didn't really do what I asked, but the information I managed to eke out of him hinted that we were looking at another temp stick problem – this time it was one that didn't show up on ground running. The next time that aircraft was in my hangar, I performed an ice test on the L/H temp stick to fool it into thinking it was at altitude. The stick opened right up. I checked the data plate, ordered the corresponding class of temp stick, and all was well. It's something to think about when everything points to a bad temp stick but your ohm meter doesn't agree. Rub an ice cube along the stick for a bit and see what happens.

# **Moral of the Story**

If an engine is running hot, why split the engine



and jump into hot section sticker shock if it just needs a new temp stick? And the other moral of this story? Trend monitoring, trend monitoring, trend monitoring. Make that your new mantra. As always, fly safely.

After 40-plus years of "turning wrenches" and working on many King Airs, Dean Benedict is stepping down from the dayto-day business of maintenance and closing the doors to Honest Air March 31, 2016. He will continue to be involved in King Air maintenance on a consulting basis to former customers and the inevitable King Air magazine readers with questions. Besides consulting, Dean will also partake in pre-purchase inspections, expert witness testimonies and Director of Maintenance work under the name BeechMedic LLC.

If there is a particular maintenance issue you would like Dean to address in a future issue, please email Editor Kim Blonigen at kblonigen@cox.net.



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# FAA Reauthorization Bill Status & other News

## by Kim Blonigen

n mid-March, Congress passed legislation to extend current FAA programs and funding through July 15, which is needed to give both the House and Senate time to reach an agreement on a long-term FAA reauthorization bill. Currently the House and Senate have two different directions in their bill recommendations.

In early February, a House Committee passed controversial legislation for privatizing the nation's air traffic control (ATC) system. The bill, H.R. 4441, introduced by House Transportation and Infrastructure (T&I) Committee Chairman Bill Shuster, authorizes programs and funding for the Federal Aviation Administration (FAA). The measure calls for the creation of a new, private ATC entity, removed from congressional oversight and governed by a board, in which the airlines have the greatest number of seats, which many in the business community, including the National Business Aviation Association (NBAA), fear that decisions won't be made in the interest of the entire public, but in the airlines' best interest. There were, however, other provisions included in the bill that were welcomed by the NBAA, but the organization states that "while there are good elements to be found in the bill, the privatization plan represents such a significant threat for the future ability of business aviation to fly when and where it needs to, NBAA is left with no alternative but to oppose the legislation."

In early March, the Senate Commerce Committee introduced S.2658, the FAA Reauthorization Act of 2016, for full Senate consideration which they hope to see on the floor in April. The bill rejects a call for privatizing the nation's aviation system which would be funded by new user fees and overseen, according to the NBAA, "by an airline-dominated board of directors."

An amendment introduced ensures the real-time location of general aviation aircraft is not disseminated or displayed, protecting the privacy and security of flight information. The bill also calls for measures to streamline the certification process for aviation technologies, raising the bar on aviation safety, integrating unmanned aircraft systems, accelerating implementation of a NextGen aviation system and provides a plan for the U.S. Department of Transportation to modernize thirdclass medical requirements for small aircraft pilots.

Obviously, there is much more to be worked out on this matter and it will be reported as it becomes available.

# New CO2 Standard Set by ICAO Group

A new United Nations standard for aircraft carbon dioxide emissions was recommended in early February by the International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP). Business aviation groups welcomed the ICAO's agreement, which also had the endorsement of the U.S. Federal Aviation Administration (FAA).

The recommendation would cover all but the smallest of new-production business jets and most new-production large turboprops with an applicability date for affected aircraft with fewer than 19 seats beginning in 2023. The CAEP also recommended a phase-out of producing aircraft that do not comply by 2028.

GAMA, one of the business aviation groups in support of the recommendation, explained that the standard considers an aircraft's performance in cruise, along with size and weight, and recognizes that CO2 reductions can be achieved through new technologies affecting structural, aerodynamic or propulsion systems. It has been designed with the idea that periodic reviews will allow the stringency of its standards to be tightened for alignment with the development of new technologies.

The FAA cited its own Continuous Lower Energy Emissions and Noise (CLEEN) Program, through which the administration works with industry on accelerating the maturation of new aircraft and engine technologies to reduce fuel burn. It also pointed to its broader modernization efforts, including the installation of more than 7,000 GPS-based NextGen procedures, the majority of which it says result in more efficient routing, thereby reducing fuel consumption and emissions.

The CO2 standard recommendation will move on to the ICAO Governing Council and the General Assembly later this year for final adoption.

## NBAA Offering Guide on Runway Excursion Prevention

The NBAA Safety Committee has produced a new 16page guide to help reduce the risks of runway excursions, the most common type of accident in business aviation, according to the International Business Aviation Council's (IBAC's) 2013 Business Aviation Safety Brief. The guide – *Reducing Business Aviation Runway Excursions* – explains how to identify potential causes of runway excursions and how to lessen those risks, beginning with an assessment of a flight department's risk exposure. It provides real-life examples of runway excursions and offers suggestions for learning from them. It also outlines a set of protocols to enable operators to benchmark their runway excursion prevention efforts.

The guide states that "it is written primarily to facilitate thought and discussion surrounding runway excursions, and therefore is a useful tool for flight department leadership; however, anyone can gain a better understanding of the latest runway excursion prevention methods by reading this guide."

According to Ben Kohler, head of the NBAA Safety Committee's Technical Excellence Working Group, "This new resource can help overcome misconceptions about runway excursions. For instance, some pilots may believe that using a stabilized approach while landing will always prevent an excursion, but that is not the case, as problems can surface after the approach is established. Also, some pilots may be unaware of all the hazards that can lead to an excursion."

To access the guide, go to: www.nbaa.org/ops/safety/ in-flight-safety/runway/runway-excursions/Reducing-Runway-Excursions.pdf  $\mathbb{K}$ 



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# Ask the Expert

# Hot and High Starts ... When High Idle Is Not Enough

### by Tom Clements

N ow that summertime is arriving again, I thought it would be timely to present a simple PT6 starting modification that you should probably be making during some of your upcoming starts. As I have often said, when a Ground Power Unit (GPU) is conveniently available, that's the way to go, especially on very hot days. It saves workload on a generator and allows both engines to receive the benefit of a 28-volt assisted start. N1 will likely stabilize at least three to four percent higher than with a battery start alone and the resultant ITT peak may be as much as 100°F cooler. However, since GPUs are not always conveniently available, you'll be doing plenty of battery and generator-assisted starts, which is where a problem often surfaces.

Before continuing to address hot and high starts, I should mention that it is also a great idea to use a conveniently available GPU in the dead of winter, too. Now it's not cooler ITTs we are after, but instead the goal is to supply help for our poor little frigid battery. Also, realize that most King Airs allow for preheating the cabin with a GPU ... nice!

The actual power available from a PT6 to drive both the propeller and various accessories depends not solely on N1 but also on pressure altitude and OAT (Outside Air Temperature). Just as power decreases as you climb without moving the power lever - and thereby maintaining a constant compressor speed, N1, in that climb - so also does power decrease at idle when moving from Sea Level to higher altitudes. Even the best of PT6s does not have sufficient power at Sea Level, when spinning near a 50 percent minimum Low Idle N1 speed, to handle the load demanded when using the generator to assist with the opposite side's start. In fact, even a 60 percent Low Idle setting - the Low Idle speed associated with all four-blade propeller King Airs - rarely supplies sufficient power to drive the generator during an assisted start at Sea Level. That's why Beech specifies going to High Idle on the operating engine before activating its generator.

As we move to the thinner air associated with higher altitudes and hotter OATs, power decreases so dramatically we find that even our 70 percent, High Idle setting is oftentimes not enough to handle the opposite side's starting task without experiencing difficulty.

What is this "difficulty?" It is compressor bog-down, accompanied by highly elevated ITTs. When the generator is turned on to assist with the opposite start, the large electrical demand makes it harder to spin the generator. The additional drag on the compressor shaft causes it to slow down. Since the Fuel Control Unit (FCU) is merely a governor for compressor speed, N1, it should respond to the slow down by adding more fuel and returning the speed to its original value. But on the hot, high situation, when the power at 70 percent is not enough, the FCU will be incapable of restoring the lost compressor speed and it will remain below the 70 percent target. In fact, it is likely to keep decreasing almost without end, since each bit of slowing down leads to less available power. In extreme cases, the Low Idle ITT limit will be exceeded.

If the pilot notices the decreasing N1 speed and decides to remedy the situation by pushing the power lever forward to accelerate the engine and to get more power with which to run the generator, he finds that it is impossible – the engine will not accelerate. You see, if there is insufficient power to even maintain the selected High Idle, N1, there certainly is a lack of the additional power needed to spin the shaft even faster.

Sadly, this is usually a case of needing to see it to believe it. Although you have read this article, to remember to do what I am about to advise before you see the evidence of the bog-down, is the exception to the rule. And if serious bog-down is observed – and since advancing the power lever won't work, it's too late – the only solution is to turn off the operating generator and finish the second start as a battery start only ... with the associated higher-than-desirable ITT peak, but nevertheless a peak well within limits.

So what's the advice? I know that's what you are asking about now. Here it is: Before initiating the second start, take the power lever and push it up until you see between 75 and 80 percent N1.

Noisier? Yes. More fuel consumption? Yes. More prop wash blowing that Bonanza tied down behind you? Yes. But now there is enough power to handle the electrical demand without excessive bog-down. Oh sure, the N1 may fall back one or two percent before the FCU catches it, but the ITT rise will be nearly insignificant compared to rolling back well under 70 percent.

Here's the bottom line: Consider High Idle to be the minimum speed you want when conducting a generator-

assisted start. In those situations, when you know that power will be significantly down – in round numbers, above a Density Altitude of 5,000 feet – then use the power lever to set the operating engine speed up to 75 percent or a bit more. You will be amazed at how much cooler the operating engine remains!

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.







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# The Air Capital of the World: The "CRASH"

The financial debacle that struck Wall Street in October 1929 not only set America on a downward path to economic ruin, but threatened to swiftly clip the wings of Wichita's thriving aircraft industry.

### by Edward H. Phillips

A s the "Roarin' Twenties" came to a close, the United States was riding what appeared to be an unstoppable wave of prosperity. By 1929, Americans were earning more money and spending it freely on everything from radios, automobiles, new houses, bootleg whiskey and airplanes. A look back in time reveals that the annual average income for a blue collar worker was about \$1, 221, a new house cost \$3,900 and new cars rolled off the showroom floor for as little as \$750. A gallon of gasoline was only twenty cents, and a ticket to the "talkies" was only one cent more. For the first time, electricity was illuminating millions of rural homes across the country. Unemployment seemed like a thing of the past.

The sound of Jazz was all the rage. William Faulkner's "*The Sound and the Fury*" was published and Earnest Hemingway penned "*A Farewell to Arms*." Ex-lawman Wyatt Earp died in his sleep at age 80. Albert Einstein revealed a new, revolutionary theory about gravity and electromagnetism, and Universal Airlines offered inflight movies to passengers. As with many good times, there was a dark side to America's prosperity. As millions of Americans sat down to breakfast on February 15, many were horrified to read in the newspapers about the bloody St. Valentine's Day Massacre that had occurred the day before. In the public conscience, organized crime had gone too far, and society began to deplore

the "tommy gun" exploits of gangsters such as Chicago's Alfonse Capone and "Bugs" Moran.

Regardless of how it was measured, 1929 was a fastpaced time and Wall Street was largely responsible for the surge of good fortune that benefitted the masses. Everyone who had some spare cash was playing the stock market, which was no longer a bastion of the wealthy and the intellectual. Since 1925, it had become all the craze to buy and sell stocks like a professional in the pit. "Buying on margin" made it all possible. Someone could go to a broker and purchase a certain amount of stock by plunking down some greenbacks and making monthly payments. Collateral for the deal was ownership of the stock.

As "playing the margin" became increasingly popular, millions of people got into the game and prices began to soar. There were profits to be made and it seemed as though nobody could lose. All of that activity on Wall Street and within the walls of broker's offices had been good to Wichita, too. People had money, and those with a thirst for flight were buying and flying airplanes. For example, by the end of the "Lindbergh boom" year of 1927, Wichita boasted seven airframe companies: Travel Air, Cessna Aircraft, Stearman Aircraft, Swallow, Swift, Lark and Laird. Of these, however, only the first three were major factors in the city's aircraft industry, and



By the summer of 1929, the Travel Air factory on East Central Avenue had expanded from one building in 1927 to five to keep pace with growing demand. As of 2016, the factory campus still stands and houses back shops and production support. (TEXTRON AVIATION)

The 1929 Travel Air Type E-4000 was a popular choice for sportsman pilots and air taxi operators, thanks chiefly to its thrifty Wright Aeronautical J6-5 radial engine that produced 165 horsepower. (TEXTRON AVIATION)

by late 1928 these three major airframe companies had built and delivered more than 800 airplanes. As if that were not sufficient good news for investors, leading aviation businessmen such as Walter H. Beech were predicting that production would double to more than 1,600 airplanes.

Travel Air's secretary and office manager, Miss Olive Ann Mellor, reported that the company order books were not only fat, they were bulging at the seams as customers sent in deposits to secure a delivery position. According to company records, Travel Air was averaging about \$12,000 per day in new sales – a clear indication that the dealers and distributors were doing a good job of drumming up business in the field. In June 1928, sales for that month alone hit \$350,000 and by the end of the year, total sales stood at the astounding sum of \$2.1 million. Although the factory was swamped with orders, the workforce still struggled to build five airplanes per day using two shifts, six days a week.

Across town at Clyde V. Cessna's company, construction workers were laboring overtime to complete a new factory complex and equip it to manufacture the Model AW, and north of the city, Lloyd C. Stearman was overwhelmed by demand for the C3B biplane and the M-2 "Speed Mail." It was a great time to be in the airplane business. The potential for profits drew more and more wouldbe airframe manufacturers into the marketplace in an attempt to reap the benefits of a booming economy. Just how "booming" the economy truly was is reflected in the recorded minutes of a stockholder meeting held at the Stearman factory in May 1929. Not only did shareholders reelect Lloyd Stearman as president of the company, but they must have had smiles on their faces when Lloyd reported sales for the past fiscal year totaled more than \$1.1 million, yielding a healthy profit of more than \$65,000.

By early 1929, Travel Air's management was in the process of expanding the factory from two to five buildings, while Lloyd Stearman was barely keeping pace with demand at the small Bridgeport facility. Clyde Cessna's factory at First Street and Glenn Avenue on the west side of Wichita was proving totally inadequate. The tiny workforce and the facility's lack of square footage restricted production to only one monoplane per week. Demand for Cessna airplanes was high and growing stronger every day, but without adequate financing Clyde could not hope to build the 10 airplanes per week he needed to meet existing orders.

After a lengthy search for funding, in March 1929 financing was secured to construct a new, much larger factory on an 80-acre site that was part of the "California Section" east of the city. Cessna and his associates had inspected 19 different airframe facilities before plans for the factory were finalized. Clyde's highest priority was to build a production line that could complete monoplanes as fast and as efficiently as possible. Six buildings would be constructed totaling 55,000 square feet of manufacturing space, all at a cost of about \$220,000.

Meanwhile, back at the First Street and Glenn Avenue site, 50 workers continued to build the Model AW and prepared to begin production of the six-place DC-6 cabin monoplane. Thanks to hard work by Cessna's employees, they had managed to increase production of Warner-powered Model AW from one ship per week to five by June 1929 when a mass exodus of men and equipment began as manufacturing was relocated from the old facility to the new one on Franklin Road. If plans worked as Cessna hoped, production would begin at two monoplanes per day and increase to four by late summer when as many 25 ships would roll off the assembly line.

Clyde would need all the production capability he could muster, chiefly because he was not meeting his contractual obligations to supply the Curtiss-Wright Flying Service with 545 airplanes, chiefly Model AW ships, worth more than \$5.5 million! The Model AW was so popular that Curtiss-Wright salesmen were selling the airplanes much faster than the factory could build and deliver them. It was not until August that Cessna Aircraft Company's Franklin Road factory was able to boost production to 25-30 ships per week – still short of the 45-50 per week required to meet demand from Curtiss-Wright.





While Clyde's company was struggling to meet customer demand, over at the Travel Air Company, Walter H. Beech and the entire workforce of more than 600 men and women were celebrating a victory. In September 1929, the company's so-called "Mystery Ship" (formally known as the Type "R") had whipped the competition at the National Air Races (NAR) held in Cleveland, Ohio. Designed by engineers Herbert Rawdon and Walter Burnham, the Type "R" was a lowwing monoplane with fixed landing gear, powered by a specially-built R-975 (J6-9), nine-cylinder static, aircooled radial engine producing 420 horsepower. It is important to note here that in August 1929, Travel Air became a part of the Wright Aeronautical Corporation's group that already included the Keystone and Loening aircraft companies. The Type "R" easily took first place in Event No. 29, the free-for-all race, beating the best biplanes the United States Army and Navy could offer. Pilot Doug Davis flew the sleek red racer at an average speed of 194 mph and easily exceeded 200 mph on the straightaways between pylons.

The six-place DC-6 cabin monoplane was developed by the Cessna Aircraft Company in 1928 as a response to market demand for a larger, more powerful aircraft than the smaller, four-place Model AW. (KANSAS AVIATION MUSEUM)

Walter Beech had always had racing in his blood, but his early experiences with "stunt" flying while working for E.M. Laird were necessary to help spur sales of the "*Swallow*." By 1929, his views of "stunting" had changed from that of an asset to a liability. While attending the NAR, he disapproved of all the stunt flying that occurred between race events. His displeasure was reflected in a letter he wrote in August to a respected aviation magazine:

"If aviation is to become a means of transportation and is to be taken out of the realm of the spectacular so that the businessmen of the country will have an appreciation of its

In September 1929, Walter Beech's "top-secret" Type "R" racing monoplane shocked the aviation world by winning the free-for-all event at the National Air Races. Capable of speeds above 200 mph, the red racer represented the way of the future for airframe design and influenced development of military fighters such as the Boeing P-26. (TEXTRON AVIATION)



possibilities and an acceptance of it as a means of safe and quick transportation, it seems to me that all manufacturers who are honestly interested in the furtherance of aviation will be very much against any stunting and circus flying at future aeronautical expositions. Although we are often asked to take part in acrobatic demonstrations and races and meets, we turn down these offers because we do not believe them to be [in] the best interests of aviation. We will not enter competition of this kind, and if necessary to continue with the airplane business to keep in step with programs of this nature, I am looking forward to the day when I can resign from airplane activities. The writer believes that the airplane circus days are over, and these competitive races should be put on with the thought in mind that we are selling aeronautics to the general public who must be sold on the safety of aircraft, and not to a few who want nothing but speed. If you agree with the position we have taken, we know that you can, through your good magazine, help foster the cause of sanity and safety in aviation, and we will be very grateful to you for anything you can do to promote this cause."

As the sizzling summer of 1929 continued to bake Wichita, back east in New York City the stock market was hotter than ever. It was a raging bull market; the likes of which nobody had seen before. The frenzy to buy low and sell high fueled profits, but also blinded would-be investors to the fact that a day of reckoning was coming. There were people who realized the "crash" was fast approaching, but did nothing to sound the alarm, preferring to fatten their bank accounts while they could and leave the ignorant to suffer the losses. It was becoming increasingly clear, however, that the value of stocks inevitably had to drop - the bubble had to burst sometime. As for the federal government, President Calvin Coolidge rigidly maintained a position of laissez-faire and did nothing to intervene.

About the same time that Travel Air was absorbed into the Wright Aeronautical Empire in August 1929, the Stearman Aircraft Company was ripe for the taking by eastern financiers. The National City Bank of New York had expressed interest in bringing Lloyd Stearman's company into the fold of United Aircraft & Transport Corporation (UATC). The giant conglomerate was created in 1929 as a holding company. It controlled the stock of key aeronautical enterprises including Boeing Airplane Company (manufacturing commercial airframes), Pratt & Whitney (radial engines), Chance-Vought Corporation (military airframes), and the Hamilton Aero Manufacturing Company (propellers).

One month earlier UATC acquired the Sikorsky Aircraft Corporation and quickly set their sights on Stearman Aircraft. Following a series of negotiations between Stearman company officials and the bank, Lloyd Stearman announced that the company would exchange stock with UATC, but control would remain in the hands of Stearman's existing management team. A press release read:

"The desirability of the merger on the part of the United group was that it wanted a strong, strictly commercial-producing company. It especially desired Stearman because of the belief that Lloyd Stearman and Mac Short, in their respective abilities, stand at the top in aircraft production circles. On the Stearman side, there was a desire for a combination with the strong financial, technical and manufacturing power found in the United Group."<sup>2</sup>



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During the merger between Stearman's company and UATC, work at the Bridgeport factory continued unabated throughout the summer of 1929. In September, the first example of the next-generation Stearman biplane was revealed – the Model 4 "Junior Speed mail." The Model 4 series was designed to fill a gap in the company's product line between the M-2 and LT-1 transports and the smaller C-3 series biplanes. The handsome three-place C4A was powered by a nine-cylinder, Wright Aeronautical R-975 radial engine rated at 300 horsepower.

As the end of 1929 approached, Walter Beech, Clyde Cessna and Lloyd Stearman were proud of their company's achievements. Thanks to a strong stock market and an abundance of available cash, Wichita's three major airframe manufacturers sold and delivered nearly \$6 million worth of new airplanes. Travel Air, for example, reported total sales of \$3.5 million (biplanes and monoplanes), fulfilling Beech's prediction that sales would double from 1928 levels. Stearman Aircraft Company delivered airplanes worth \$1 million (an increase of \$100,000 from 1928). Workers in Clyde Cessna's new factory managed to build more than \$500,000 worth of cabin monoplanes (chiefly the Model AW), and the venerable Swallow Aircraft Company managed to sell \$560,000 new ships (an increase of 15 percent compared with 1928). In addition, start-up companies Lark, Swift and Sullivan reported building experimental aircraft during 1929 that were estimated to be worth about \$150,000.3

Back on Wall Street, however, black clouds were forming on the horizon. As early as March there were signs that the bull market was finally reaching its height of success. Soon after President-elect Herbert Hoover's inauguration, the Federal Reserve Board conducted meetings behind closed doors to discuss what should be done if the stock market suddenly collapsed. They In 1931, the Stearman Aircraft Company built 12 Model 4CM-1 biplanes for American Airways to operate on the company's air mail routes. The airplane shown above was restored by Stearman enthusiast Addison Pemberton and caught on film flying at 7,500 feet near Mount Spokane in Washington. (ADDISON PEMBERTON)

did not have long to wait, because late in March the market suffered a series of tremors as stock values began a downward slide, recovered, then fell, but again rebounded. The Wall Street "roller coaster" continued throughout the summer months, inflicting great anxiety on investors and shareholders alike.

Everyone breathed a sigh of relief in August as stocks seemed to stabilize, but without warning it took another plunge in September as the bear market took control. The beginning of the end came on October 24, when nearly 13 million shares changed hands in one day. The Dow Jones Industrial Average plummeted 20 percent. Ticker tape machines were unable to keep pace with the phenomenal volume of trade and gradually fell behind by as much as one hour. Telephone lines were jammed as thousands of investors panicked, ordering their brokers to sell, sell! Brokers did exactly that. They sold so much that the market took a nose dive. Across the nation people held their breath to see if the bargain hunters would move in and halt the descent. To the deep relief of everyone involved, Wall Street did recover a majority of its losses and on October 25 about six million shares were traded. Out west in Wichita, Walter Beech, Lloyd Stearman and Clyde Cessna monitored the situation carefully and hoped the crisis would quickly pass.

Unfortunately, on October 29, the day of reckoning hit Wall Street with hurricane force. Stock values imploded as more than 16 million shares were traded, driving down the Dow Jones average another 11.5 percent. A mass panic set in across America as stockholders tried in vain to dump their shares whose value was decreasing by the hour. The bloodbath of what came to be known as "Black Tuesday" continued all day until the bell mercifully brought an end to the worst debacle Wall Street had ever experienced. The market had crashed and burned. By the closing bell, it had lost about 40 percent of its value and during the coming weeks there was little or no improvement. The public watched in stark disbelief as the Dow Jones average slid deeper and deeper into the unknown.<sup>4</sup>

The fiscal ramifications of the "crash" were not only inevitable, but truly cruel. Gradually, banks began to fail, business were forced to close their doors and lay off employees. Unemployment skyrocketed. Worst of all, however, the American people had suddenly lost their purchasing power. Consumers hoarded every cent and hunkered down to hope for better days ahead. The leaders of America's commercial aviation business grew increasingly worried as the stocks continued to fall during the last months of 1929. The future of the Air Capital of the World was about to become darker than anyone could have imagined. KA

#### NOTES:

- 1. Phillips, Edward H.: "Travel Air—Wings Over the Prairie;" Flying Books, 1982.
- 2. Mac Short was Stearman's chief engineer, and was highly regarded by his contemporaries for his skill to engineer new airframes. Short, who as with Stearman was a native Kansan, held a degree in aeronautical engineering from the Massachusetts Institute of Technology.
- Despite having good designs, these three companies quickly fell victim to the financial collapse on Wall Street in October 1929, never to reemerge.
- 4. During the next three years, the stock market lost 89 percent of its value, falling from a high of 350 to a low of about 50 by July 1932. The "crash" was truly a nightmarish event that would alter the American financial landscape for the next 10 years.

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



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# VALUE ( KA) ADDED

### Fusion-equipped Beechcraft King Air 350i/ER and 250 earn EASA certification

Beechcraft Corporation, a subsidiary of Textron Aviation Inc., announced that it has received European Aviation Safety Agency (EASA) certification for its new Pro Line Fusion-equipped Beechcraft King Air 350i/ER and 250 turboprop aircraft with cabin enhancements, paving the way for deliveries throughout Europe.

The Fusion-equipped King Air 250 earned Federal Aviation Administration (FAA) certification in July 2015 and the 350i/ER earned the certification in November 2015.

The new avionics system changes how operators fly through a one-of-a-kind intuitive flight deck interface. Its three 14-inch displays are interchangeable, highresolution and touch controlled. Other performanceenhancing capabilities include:

- Integrated touchscreen checklists
- Intuitive graphical touchscreen flight planning
- High-resolution Synthetic Vision System (SVS) with patented airport dome graphics
- Convenient presets to reconfigure all three displays with a single touch
- Full multi-sensor flight management system



- 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 will be offered at TRU Simulation + Training's new ProFlight training center near Tampa, Florida. Additionally, TRU will offer aircraft maintenance training for the new models in its newly renovated Wichita, Kansas facility.

In addition to new Pro Line Fusion avionics, the cabin now offers an enhanced passenger experience.



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With Wi-Fi capability standard on the King Air 350i/ER and King Air 250 aircraft, the personal device-centric cabin environment allows customers to stay connected and productive throughout their flight experience. Also standard are electronically dimmable window shades, offering a simple interface that provides more effective shading and faster dimming at the touch of a button.

### TechnicAir Adds King Air 350 Fusion Cockpit Upgrade

BBA Aviation's Signature TechnicAir is now upgrading Beechcraft King Air 350s equipped with Rockwell Collins Pro Line II avionics to the new Pro Line Fusion touchscreen flight deck. The TechnicAir facility in Winston-Salem, N.C., worked with Rockwell Collins to obtain the FAA supplemental type certificate for the upgrade.

The Pro Line Fusion package is basically the same as the avionics suite on new Fusion-equipped King Air 350s and includes three 14.1-inch displays with configurable windows and touchscreen control. Also included are NextGen features such as ADS-B OUT, SBAS-capable global navigation satellite system, LPV approach capability, radius-to-fix legs and more.

Signature TechnicAir is co-located with Signature Flight Support FBOs at 18 U.S. airports, including bases recently added from the Landmark Aviation acquisition. According to a company spokesman, most of the TechnicAir locations can install the King Air 350 Pro Line II to Fusion upgrade.



## Textron Aviation Launches PowerAdvantage engine maintenance program for Beechcraft King Air

Textron Aviation announced it has expanded its PowerAdvantage engine support program to include the Beechcraft King Air. Part of the company's ProAdvantage suite of support programs, PowerAdvantage offers owners and operators comprehensive PT6A engine coverage with



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predictable costs for both routine and most unscheduled engine maintenance events.

Customers enrolled in PowerAdvantage pay a competitive hourly rate per engine operating hour and receive coverage for line maintenance parts, scheduled and most unscheduled engine events, all parts and shop labor for Hot Section Inspection (HSI) and overhaul, and can include coverage for life limited components and repairs by Textron Aviation's industry leading mobile response teams. The program also provides rental engines for overhauls and most unscheduled events.

Find additional information about Textron Aviation's ProAdvantage programs, visit http://txtav.com/en/service/proadvantage-programs.

## Pratt & Whitney Offers New Engine Rebate with Blackhawk XP Upgrades and Fixed Rates for Overhauls with Standard Aero for a Limited Time

From March 1, 2016 to May 31, 2016, aircraft owners and operators who purchase a Blackhawk XP New Engine Upgrade for the Beechcraft King Air 200 or 90 series aircraft will receive up to a \$65,000 rebate from Pratt & Whitney Canada. The installation of the new engines can be delayed through the end of July which allows more time to schedule the upgrade along with other maintenance items to reduce downtime.

Aside from the substantial performance boost new and more powerful engines deliver, another advantage of the New Engine Rebate program is a relaxed core engine exchange condition. There are no extra charges for corrosion, sulphidation, expired life limited parts, non-genuine P&WC parts, FOD or missing logs. Any core engine will be accepted as long as it was not removed for unscheduled reasons. Resetting the engine logs back to zero time and cycles will restart the pedigree of your engines which increases resale value and peace of mind.

Details of the New Engine Rebate program and specific amounts by engine model can be found at www. blackhawk.aero/pwc-rebate.

StandardAero and Pratt & Whitney Canada are offering fixed rate pricing on PT6A small engines overhauls, valid for engines inducted between March 1, 2016 and December 31, 2016. The offer applies to PT6A turboprop engine models -114, -21, -27, -28, -41 and -42.

As with the above rebate program, the fixed rate offer will not charge extra for typical corrosion, sulphidation, expired life-limited parts and non-genuine P&WC parts. The offer also includes no extra charge for foreign object



# VALUE ( ADDED

damage (FOD), providing FOD was not the cause of an unscheduled removal.

Conditions for the offer require that the engine does not have any missing parts and is a normal time expired core operated in accordance with P&WC approved documentation and removed for scheduled reasons and not for a significant basic unplanned removal (BUR). Engines operated under an extended time between overhaul (TBO) are accepted. This offer extends to all eligible users worldwide. Certain conditions apply.

For more information, please contact your Standard-Aero Regional Sales Manager, or visit http://standardaero. com/Engines/PrattWhitney/PT6A/SalesContacts.aspx.

### **Android and iOS Enhancements from Garmin Pilot**

Garmin is pleased to announce an updated version of the Garmin Pilot app for both Android and iOS versions.

The **Android updates** include integration with the new GTX 345 ADS-B In/Out transponder, as well as additional trip planning enhancements and more. Regardless of existing avionics configuration, the new GTX 345 ADS-B In/Out transponder pairs with Garmin Pilot for Android to wirelessly display the following benefits:

 Subscription-free Flight Information Service-Broadcast (FIS-B) weather

- Complete picture of ADS-B equipped traffic, leveraging exclusive TargetTrend and TerminalTraffic
- GPS position information
- Back-up attitude information powering the rich, SVX synthetic vision and Garmin panel

Pilots can more easily select the best suitable altitude for their intended route of flight using the Altitude Selector Guide. The Altitude Selector Guide can be accessed within the Trip Planning form, which displays fuel burn, estimated time enroute, as well as headwind

or tailwind components. Pilots can then select IFR/VFR and an East/West heading to derive the correct altitude for their flight. Further aiding in fuel and trip planning, a Minimum Flight Requirement warning will populate when the TAF for the departure or destination airports is at or below IFR minimums. This warning populates as a yellow triangle in the areas of:



 Trip Planning icon on the main menu





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# TEXTRON AVIATION

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- Departure/destination airport on the Trip Planning form
- Within the Upcoming Trip page

For IFR flights, the Alternate Airport Selection Guide displays airport information along with ceiling and visibility. Pilots can simply select an airport to easily file it as an alternate airport.

Additional Android enhancements are:

- When paired with the GDL 39, GDL 39 3D, GDL 88 or Flight Stream 110/210, Garmin Pilot incorporates visual and aural ADS-B traffic alerts
- Airports can optionally be viewed in Google Maps
- Enhanced airport widget provides quick access to information including elevation, frequencies, runway and traffic patterns
- Support for multiple latitude/longitude formats when adding custom user waypoints
- Chart search is improved to display all charts for an airport and are sorted and color-coded by chart type

The latest version of Garmin Pilot for Android is available immediately in the U.S. as a free update for existing Garmin Pilot subscribers. For new customers, Garmin Pilot is available in the Google Play store as a free trial for the first 30 days.

The **iOS version** also integrates the new GTX 345 all-in-one ADS-B transponder, as well as a new flight profile view, airspace altitude labels, trip planning enhancements, United Kingdom VFR charts for international pilots, support for X-Plane 10 and more.

The new GTX 345 ADS-B In/Out transponder pairs with Garmin Pilot for iOS to wirelessly display the following benefits:

- Subscription-free Flight Information Service-Broadcast (FIS-B) weather
- Complete picture of ADS-B equipped traffic, leveraging exclusive TargetTrend and TerminalTraffic
- GPS position information
- Back-up attitude information powering the rich, SVX synthetic vision and Garmin panel

The flight profile view gives a vertical cross section of airspace, terrain, obstacles and weather display to give pilots a more detailed look at their intended route of flight. When selecting a desired altitude, terrain is colorcoded so it's easy to identify potential conflicts. Airspace and weather can also be selected within profile view





to display additional information. Pilots can optionally pinch-andzoom within the flight profile view to receive a more detailed view of their flight plan ata-glance. In addition to departure and destination airport pairs, waypoints within a flight plan are denoted as white dashed lines within the flight profile view for easy reference. Flight profile



view is only available on iPad mobile devices.

Similar to airspace labels found on a sectional chart, Garmin Pilot's rich, interactive maps now display maximum and minimum airspace altitude labels. Altitude labels offer pilots added situational awareness in congested airspace and allow for easier identification in unfamiliar airspace segments.

Garmin has partnered with NATS to bring new and enhanced optional VFR chart coverage within the United



Kingdom. Chart coverage includes Scotland, Northern England, Northern Ireland, Southern England and Wales. Additionally, VFR chart coverage throughout France is expected to be available in April within Garmin Pilot for iOS.

Pilots can more easily select the best suitable altitude for their intended route of flight using the Altitude Selector Guide. The Altitude Selector Guide can be accessed within the Trip Planning form, which displays fuel burn, estimated time enroute, as well as headwind or tailwind components. Pilots can then select IFR/VFR and an East/West heading to derive the correct altitude for their flight. Further aiding in fuel and trip planning, a Minimum Flight Requirement warning will populate when the TAF for the departure or destination airports is at or below IFR minimums. This warning populates as a yellow triangle in the following areas:

- Trip Planning icon on the main menu
- Departure/destination airport on the Trip Planning form
- Within the Upcoming Trip page

For IFR flights, the Alternate Airport Selection Guide displays airport information along with ceiling and visibility. Pilots can simply select an airport to easily

file it as an alternate airport.

X-Plane Support Garmin Pilot now supports X-Plane 10 or higher. Customers may launch X-Plane and connect Garmin Pilot to the simulator via Wi-Fi. Once the connection is made, Garmin Pilot conveniently sends AHRS and GPS information to display flight plan information within the application and the simulator.

The airport widget tab has also been enhanced to provide easy access to pertinent airport information, including elevation, frequency, runway and non-standard traffic pattern.

The latest version of Garmin Pilot for iOS is available immediately in the U.S. as a free update for existing Garmin Pilot subscribers. The new United Kingdom VFR charts are available starting at \$34.99. For new customers, Garmin Pilot is available in the Apple App store as a free trial for the first 30 days.

For more information, visit www. garmin.com/aviation.



RECENT SERVICE BULLETINS, ADVISORY DIRECTIVES AND SAFETY COMMUNICATIONS

# From King Air Communiqué 2016-03

Issued: March 2016

# ATA 05 – Flammable-Liquid-Carrying Hoses Replacement Clarification

#### All

The King Air Inspection Program calls for the flammable-liquid-carrying hoses in the engine compartment to be replaced every five years. The Inspection Guide clarifies which hoses are to be replaced by stating: "Beechcraft Corporation-supplied hoses only." The intent of this statement is to differentiate the Beechcraft designed hoses from the Pratt & Whitney Canada hoses found in the engine compartment, which are not included as part of this requirement.

Some operators are interpreting this note to read, that if a particular airplane has hoses from a supplier other than Beechcraft, then this replacement requirement does not apply. That is not the case if the airplane is being maintained under the Beechcraft Phase Inspection program, unless the hoses were installed under a Supplemental Type Certificate calling for a different replacement interval.

# ATA 34 – Pro Line 21 King Air Reduced Vertical Separation Minimum (RVSM) with Automatic Dependent Surveillance-Broadcast (ADS-B) Out Transponders Installed

Textron Aviation has released Kit 101-3416-0001 to add ADS-B Out capability to the B200/B200C/B200GT/B200CGT and B350/B350C model King Airs with Pro Line 21 avionics. This kit requires the installation of a Collins TDR 94D transponder part number (P/N) 622-9210501. This transponder part number is not currently listed in the required RVSM equipment lists in the airplane maintenance manuals or the RVSM Supplemental Type Certificate Initial and Continued Airworthiness documents. These documents may be updated in the future to include the new part number, however in the interim these transponders are still approved for use in RVSM-capable airplanes through the notes provided at the bottom of the required equipment tables. As shown below, the note allows alternate transponders to be installed as long as they meet or exceed one of the Technical Standard Orders (TSO) listed.

\* - Transponder units may differ from those listed in Table, provided the configuration meets or exceeds the requirements of one of the following Technical Standard Orders (TSO): TSOC66A or TSO-C74C (Mode C) and TSO-C112 (Class 2a; Mode S). If only one transponder is installed in the airplane, it must be capable of reporting from both the pilot's and copilot's air data systems.

The Collins 622-9210-501 transponder does exceed these requirements as stated in an excerpt released from the Collins TDR94/94D ATC/Mode-S Transponder System (-5xx) Installation Manual, P/N 523-0821492 (example shown in original Communiqué). If you have any questions concerning the





transponder or RVSM capability, please contact Textron Aviation customer support at (800) 429-5372, (316) 676-3140, or by email at *kingair\_support@ txtav.com*.

# ATA 32 – Nose Landing Gear Wheel Well Under-Coating

#### All

The King Air nose landing gear wheel well area is coated with an under-coating protection material (refer to the photo) and then the area is painted white. This product, Tectyl 351S, can be obtained from many sources online.

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



Nose Landing Gear Wheel Well

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