A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

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Rocket Ship

Skydivers and operators love the E-90's quick climb

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Flight image courtesy of FlightAware (flightaware.com)







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Courtesy of Skydive KC Photo credit: Brian Poston

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King Air Gathering Postponed

NEW DATE: May 12-15, 2022

by Kim Blonigen

he King Air Gathering (KAG) scheduled for Sept. 23-26, 2021 has been postponed due to the uncertainty associated with the Delta variant of COVID and the challenges it may pose for travel and safety.

The new dates for the KAG are May 12-15, 2022 and have been coordinated and confirmed with the event sponsors and the Beechcraft Heritage Museum at Tullahoma, Tennessee (KTHA). The King Air Academy, who graciously organizes and coordinates the Gatherings, plans to keep the same agenda/schedule presented for this event on the new scheduled date.

For those who registered for the September event, please coordinate with the King Air Academy on what you'd like to do regarding your registration. If you have



hotel reservations that you personally made, please modify them accordingly.

For those who hadn't yet signed up, registration is open for the new scheduled May dates at *kingairgathering.com*.

If you have specific questions regarding the event, you can call (602) 551-8100 or email *info@kingairacademy.com*.

The Travel Air Mystery Ship is one of the highlights of the Beechcraft Heritage Museum. (Photo credit: Bob Burns)





Skydiving operation finds success with the King Air E90 by Grant Boyd



Skydive KC's 1977 Beechcraft King Air E90 takes divers up to 14,000 feet for their launch and makes it back down to pick up another load in about 15 minutes. One of the reasons the operation chose the King Air is for its speed to altitude.



he roll-up door retracted upward as sunlight beamed through the opening. Beacon steady; green. Go, go, go! Thousands of feet of air; around a minute of free fall followed by a graceful drifting back to reality. Another takeoff in an aircraft followed by a biped landing.

Jumping out of "perfectly good airplanes" is something that happens every day across the country. Whether it be tandem with an instructor or any other freestyle solo work, adrenaline junkies enthusiastically hurl themselves from many types of aircraft. Among those aircraft are Beechcraft King Airs, specifically model 90s and a few 200s, flown for skydiver transport.

Skydive KC uses a 1977 King Air E90. Owner Chris Hall is Skydive KC's sole pilot. Having been around the skydiving industry since the early 1970s, he has decades of experience, including 23 years as a "drop zone" owner. His skydiving and aviation careers have been linear, intersecting at times. Seeing his dad jump on the weekends back when the industry was "really casual," Hall awaited the chance to free fall himself and seized the opportunity while in high school once he turned 18. At the same time, he had interests in pursuing a career as a professional pilot, but ultimately opted not to. He continued skydiving as a hobby on the weekends. Being in the Midwest, operations are "seasonal and on



the weekends," but he still managed to make around 2,000 jumps in a five-year period. During that time, he also became a jumpmaster, aerial photographer and skydiving instructor.

As time went on, Hall became interested in the operational side of the industry. He had moved to Chicago and missed his home drop zone in Missouri that had since closed. At 25 years old, he started discussions with his dad and began working on a business plan to open a skydiving center together in the Kansas City area.

Using a King Air enables Skydive KC to advertise some of the region's highest jumps – 14,000 feet MSL. Their jumping season usually begins in April each year and ends in late October.

Airport selection is a key consideration when opening a drop zone. Having pitched their business to more than 25 airports in the area, they landed an agreement with their current field to open their business. Skydive Kansas City, rebranded as Skydive KC, was founded in 1998.

Roughly an hour southeast of downtown, Butler Memorial Airport (KBUM) has one asphalt runway (18/36, 3,999 feet x 75 feet) and is home to primarily general aviation businesses and traffic. This type of relatively quiet airport is good for drop zones, especially on good weather Saturdays and Sundays when parachutes fill the sky.

A common skydiving aircraft amongst operators, even those who also operate larger aircraft, is the Cessna 182 which has been the hallmark of Skydive KC for several years. "We bought a 1956 Cessna 182, which is the best year for this type of jump plane, in my opinion. Sitting at around 1,500 pounds empty and rated to 2,500 pounds MTOW, there are a few hundred pounds more of useful weight than other 182s," Hall said.

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"If I am going to own the aircraft and make payments on it, it would probably be best for me to learn how to fly it ... "

A roll-up door is installed so it can be opened when at altitude and ready for skydivers to exit.

While their first year of jumping was "rough," (the internet is a key advertising tool for the business and had not become mainstream yet) they awaited favorable winds. Those came the following year and Hall began working toward his private pilot certificate. "If I am going to own the aircraft and make payments on it, it would probably be best for me to learn how to fly it, as well," he recalls telling himself.

This philosophy helped him steer the business successfully over the next decade. While personally gaining additional ratings, including instrument and multi-engine, the business added another 1956 Cessna 182 that they modified to a jump plane via FAA 337 Field Approvals. This addition allowed them to continue increasing the number of loads flown each weekend.

With the additional level of traffic, in 2011, a personal connection and airline captain reached out to him with an idea. He owned a Beechcraft Twin Bonanza and thought that it would make a suitable skydiving aircraft, and Hall agreed. They worked to find another Twin Bonanza that could be used for the mission. The agreement was that the airline captain would purchase the aircraft and lease it back to the drop zone, an easy way Skydive KC could increase load sizes and jump altitudes. While choosing the aircraft type over others was not arrived at quickly, it was not the best for the

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Hall, who is also an A&P, does most of the maintenance on the E90 leaving the heavy jobs to a trusted few service centers. There are some differences with a skydiving aircraft in their maintenance needs, for instance Skydive KC's King Air goes through three to four pairs of tires each season and it has heavy gear use of up to 20 cycles per day.

mission and only lasted three months. Hall noted that the twin "was a good plane, just not for [skydiving operations]."

The two men were not deterred by their initial aircraft selection and were determined to find the right aircraft and that's when the King Air was suggested. As it had with the previous twin, the aircraft would be a leaseback and be a low-level risk experiment for Hall as a business owner.

Through extensive research, they determined the "ideal" characteristics of a King Air jump plane candidate:

- A 90 model of some variant
- A corporate aircraft in its previous life (i.e., not currently modified for jump operations)
- Relatively modern instrument panel
- Mid-time with no damage history
- An aircraft meeting most of these needs was located and quickly introduced to the drop zone's run schedule in September 2001. Hall immediately became a tenant in the right seat of the chosen 1976 C90 (serial LJ-701).

The aircraft worked great for the drop zone and enabled them to advertise some of the region's highest jumps (14,000 feet MSL). In 2016, his partner had the chance to lease the King Air to another business for year-round use. Since Hall had collected five years of experience with the aircraft model, he wanted to find another one. This time he added additional criteria to his search for the perfect airplane:

- An E90 model (with roughly only 350 made, the overall pool size is slim). Hall likes this model due to its PT6A-28 engines and the King Air 200's gravity fed fuel system, among other reasons.
- Incorporation of modifications, such as a fourblade Hartzell prop, Frakes exhaust or various Raisbeck modifications, or the ability to do so financially.

The following year, N83FE (serial LW-219) was acquired. A byproduct of years of hard work and planning, the aircraft is Hall's personal pride and joy. As such, all flying and maintenance is held to the highest standards. "I am the sole pilot of the aircraft until the right guy comes along," he said. "All it takes is one bad start or gear up landing to ruin my career, something that runs through my mind on each flight."



And unlike corporate flying, skydiving flights are not taken one or two a day. In 2020, only operating 32 days due to COVID and weather, Skydive KC flew 463 King Air loads. Each load averaged 12.8 jumpers and coupled with the drop zones' other aircraft, took nearly 7,000 people (some more than once) on an unforgettable adventure.

As evidenced by Skydive KC's years of flying King Airs, it is economically viable to operate a twin turboprop in support of skydiving. On a good day with full loads, operating a King Air is more than twice as economically beneficial compared to a Cessna 182.

For Skydive KC, jumping typically begins in April of each year and ends in late October. The down months are when most heavy maintenance is completed. Preventative maintenance and other needed tasks are a year-round affair, and mostly completed by Hall. He has had his A&P license since 2003 and estimates that the aircraft is on jacks every two or three weeks being inspected.

For larger tasks, such as hot section inspections and avionics upgrades, a trusted few have worked on the aircraft in the past decade. Among these companies are Higdon Aviation (Griffin, Georgia), Precision Avionics (Griffin, Georgia) and Clemens Aviation (Benton, Kansas), all of whom Hall gives positive reviews. "As evidenced by Skydive KC's years of flying King Airs, it is economically viable to operate a twin turboprop in support of skydiving."

Flying a different mission profile than most King Airs, there are some maintenance differences between this aircraft and its more "straight and level" counterparts. Among these are the aircraft going through three to four pairs of tires a season, and heavy gear use, seeing 20 cycles (five hours) added during a good day of jumping.

And while many skydiving aircraft are not aesthetically pleasing or "updated," this 44-year-old bird is up to 21st century standards. As Hall notes, he is "only the current caretaker of the aircraft; ensuring it's well taken care of until it's time to go to a new owner." The aircraft previously had a basic King Air instrument panel and Garmin 500 PFD (TAS/WAAS), prior to the ADS-B mandate, that has since been updated with a new center stack, brand new Garmin GTN750XI and Garmin 345/355 dual ADS receivers, all installed by Precision Avionics in 2020.

Operationally, the aircraft is loaded with the left side engine idle and feathered, with the right still turning (commonly referred to as a "hot load"). The aircraft is normally shut down fully after four loads, or around one hour of flight time. From ground to jump altitude, it takes an average of eight to nine minutes.

As the King Air nears 14,000 feet MSL, Hall, who hand flies the airplane roughly 98% of the time, reduces power back to around 1,900 RPM. He will typically reduce the right engine to around 700 pounds of torque and the left to around 450, so that prop blast is reduced for jumpers exiting. Throughout the climb, he is monitoring CTAF and speaking with Kansas City Center, which is interested in knowing once jumpers are underway. As he gets closer to leveling out, the jumpers will open the retractable door when the light is red. Soon thereafter, the green light will turn on signaling jumpers they are free to proceed.



"... loading and subsequent inflight unloading is an important aspect of the mission."

The interior of the King Air is modified for skydiving use. Notice the red and green lights (upper right) which are used to notify divers when it's time to open the door and jump.

Hall notes that loading and subsequent inflight unloading is an important aspect of the mission. Careful not to load the aircraft aft – a common denominator in some King Air skydiving accidents – he ensures that all skydivers are seated within their noted spots.

Outside the aircraft, above the door, there is a 5-footlong grab bar that jumpers can hold onto if they desire. Three or four jumpers can use this grab bar (there is also a step they stand on) at one time. If more than a few skydivers are out there holding on, it is even more critical for the pilot to carry more airspeed and pitch slightly downward.

Once all jumpers are out of the plane, verified by looking at the fisheye mirror above the compass, the aircraft begins its aggressive descent. The King Air heads toward terra firma at roughly 4,000-5,000 feet a minute at 180 to 200 knots when in smooth air. Entering the traffic pattern and aware of jumpers, Hall completes another few "GUMPS" checks to ensure the gear is down. If there were tandem jumpers on the flight, he typically beats them back to earth. They usually land once he's already back at the hangar picking up the next load. All in all, the trip takes about 15 minutes from door to door.

As Hall sums up, "The King Air works great for us as it's fast to altitude, comfortable for the ride up and is relatively low-cost versus other more expensive aircraft used in the industry. Having two big PT6 engines gives me peace of mind compared to single engine planes."

For more information go to: https://skydiveke.com/

Grant Boyd is a private pilot with seven years of experience in general aviation business from marketing to customer service. He has written more than 85 articles for aviation publications and enjoys learning about aircraft/pilots with unique missions. Grant can be reached at *grantboyd2015@gmail.com*.

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Mechanical Breakdown

by Kyle White

n insurance policy should provide peace of mind when putting capital at risk. However, when operating your King Air, you should be aware there are some perils that may not be covered, thus, giving you a false sense of security. A well-constructed aircraft hull and liability policy can, and should, provide a broad array of coverages to protect you. This includes "buying back" some of the standard exclusions found in aircraft policies covering turbine aircraft. Adding "Mechanical Breakdown" or another version of a limited write back endorsement, may be something you want to consider.

Within your policy, under the exclusions section you will find multiple paragraphs on what is not covered. To some extent, the following two policy exclusions can be added back:

Under all Section Three – Physical Damage Coverage, to any loss, damage, claim or expense:

- Which is due and confined to wear and tear, rust, corrosion, deterioration, freesing, mechanical or electrical breakdown of the insured property, its equipment, components or accessories, or to tires, unless the damage is caused by fire, malicious mischief, vandalism or theft or unless the loss or damage is the direct result of other Physical Damage, including Ingestion, covered by this policy. Damage resulting from the breakdown, failure or malfunction of an engine component, accessory or part (as noted on the manufacturer's parts list for the engine or accessory) is considered "mechanical breakdown" of the entire engine.

- To any of the Aircraft's turbine engines (including its turbine powered auxiliary power units) caused by heat resulting from starting, attempted starting, operation or shutdown thereof.

Aircraft insurance policies have been around for over a century. Over time the content of the insurance contract has expanded dramatically to be more explicit in what they intend to cover, varying from just a few pages to as many as 80. We've all heard the popular television commercial stating, "we know a thing or two, because we've seen a thing or two," (trademarked by Farmers Insurance Exchange). This is an accurate summation of how the aviation insurance industry feels. Policies have evolved so carriers can manage their claim exposure, using actuarial data to assess their risk. The carrier must have objectivity when determining what is considered a covered claim, as they move forward with you, the King Air owner, to make the aircraft airworthy again.

The King Air family of aircraft has been around for over 50 years now. When insuring a new King Air, the exposure to exclusions outlined are minimal. Although when insuring a 1971 King Air, those exclusions may be very important. One exclusion not mentioned, but is listed in the policy, is the "Asbestos" exclusion. Even in a policy covering a new King Air this exclusion exists, but it exemplifies the extent the carriers go to in their efforts to manage exposure to potential claims.

Some scenarios that have come up over the years where these exclusions apply, resulting in denied coverage:

In my article "The Hard Market of Aviation Insurance," published in the December 2020 issue of *King Air* magazine, I mentioned the hot start situation and a brief story of the "freezing exclusion" resulting in an uncovered claim. To recap, a pilot landed at a remote airport during liquid precipitation. While on the ground the temperature dropped below freezing, but the precipitation also quit. When the passengers arrived, the pilot walked around the aircraft, got in and went to start the engines. He noticed one engine wasn't operating normally during the start phase and aborted the start. Upon investigation, it was discovered the fan blades had frozen in place, prohibiting the air flow for a normal or cool start. This occurrence was not covered by the policy under the "freezing exclusion."

King Airs are an extremely well-built aircraft and offer a great deal of efficient utility in the modern age. That makes it easy to justify an investment of the latest avionics and engine upgrades. However, when the aircraft is stripped down, a lot of surface area that hasn't seen the light of day for decades is now visible. What you see may be bittersweet. "Sweet" because you found "*wear and tear, rust, corrosion, or deterioration*" before it caused structural failure of the aircraft, but "bitter" because of the unbudgeted repair costs not covered by insurance.

Damage to engines due to excessive heat is also not covered. Have you ever flown a King Air 200 with the -41 engines that are around TBO? The one I flew was a hangar queen and I have vivid memories of being ITT limited in the climb at a very low altitude. When starting the engines, we were always on high alert for a potential hot start, just like being in the simulator waiting for the instructor to toss that one at you! Again, an uncovered occurrence.

Compressor stalls can be difficult to determine if there is coverage under the policy, primarily because first it must be determined *what* caused the compressor stall and what is the resulting damage. If the engine experiences a compressor stall and resulting damage is determined to be the result of normal wear and tear or mechanical breakdown, then it isn't covered. If the compressor stall occurred because the engine was already damaged by undetected FOD, then it would be covered because there was an "occurrence" in which ingestion was the direct correlation of the resulting damage.

While you can't buy back or buy out the entire exclusion around mechanical breakdown and heat damage to engines, some carriers allow you to purchase some of it back. The write back can be very specific and detailed. A recently reviewed endorsement for adding some of this coverage back is three pages long. To summarize: "Coverage is extended to apply to physical damage caused by and confined to mechanical or electrical breakdown, failure or malfunction to an insured engine." Additional language also states that the damage had to be a single incident during the policy period that requires immediate repairs due to the severity of the breakdown. Also, the buyer needs to be aware that if they have a separate contract or warranty that covers such incidents, then that contract shall pay and not the insurance coverage. For example, an engine service or pay by the hour engine maintenance contract.

There are also conditions within the add back that should be understood, such as: "If the failure of the part was a result from not complying with an Airworthiness Directive issued by the FAA or the failure of the insured to conduct other required maintenance as outlined by the engine manufacturer, then there is no coverage." The amount the policy will pay is also reduced based on the cycle-life or time-life limit of the components, parts or accessories at the time of the loss. With this in mind,



meticulous maintenance records are imperative. And if you are operating your engines on a MORE program, this coverage may not be applicable at all based on the interpretations of the cycle or time-life wording. The particular endorsement reviewed for this article defines *Time-Life Limited* as "that component, part or accessory is subject to replacement or overhaul requirements of a manufacturer based on a specified number of hours of operation."

Underwriters are trying to manage their exposure to the older aircraft and the expense to adjust or deny claims. During this current hard market, underwriters are taking into consideration the age of the airframe and the total flight time on the airframe when determining whether or not they will provide a proposal to insure. Each carrier is different in their underwriting guidelines. One particular leading King Air insurance carrier has implemented a 10,000-hour ceiling. If you are a potential new customer to this underwriting company and your King Air has 10,000 or more hours, they will not offer terms. However, they are still renewing customers who were with them before 10,000 hours. This new guideline is not exclusive to the King Air market, this is for all aircraft, including the business jet. Aircraft insurance policies can be complicated to follow. The best preflight is a comprehensive review of your policy leading up to your renewal. Your broker should be willing and able to walk you through the policy, clarifying what is covered, not covered, or is a coverage that can be purchased either via endorsement or through a different carrier.

Kyle P. White is an aviation insurance specialist for a global insurance brokerage company. He has professionally flown King Air 90s and B200s and holds an ATP and multi-engine instrument instructor license. You can reach Kyle at *kpwhite816@gmail.com*

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Icing in Flight Part 2

by Tom Clements

ast month in my article regarding how to configure your King Air for in-flight icing encounters, I started reviewing the number of switches or push-pull controls that must be activated in icing conditions according to your POM/POH.

To review, there are two or four switches to the left of the pilot's control wheel: Two Engine Auto-Ignition switches and, for the later models, two Engine Anti-Ice switches. On the subpanel to the right of the control wheel we find a bunch more: Two Pitot Heat switches, two Fuel Vent Heat switches and a single Stall Warning Heat switch make up five of the switches on the right subpanel. These five switches have become known as the "Hot Five" and many King Air pilots operate them all the time when airborne, turning them on at "Runway Lineup" and off in the "After Landing" procedure. I have no complaint whatsoever with this process. However, I personally don't do it. It's not a POH procedure but rather comes from FlightSafety and U.S. Army training tradition. Wrong? No way! Maybe it's because I have resided in Arizona for the last 34 years, but I just don't see the need for running the Hot Five when it's warm and clear, so typical of the United States' southwestern states. My technique isn't more "right" than running the Hot Five always, it's just my habit/preference.

As we continue counting the switches on the right side of the pilot's control wheel, we come to the ones that use significantly more electric power than all of the Hot Five combined: Windshield Heat, Prop Heat and Lip Boot Heat (if applicable). In fact, for the C90-, E90-, F90- and 100-series, these switches constitute the "lockout" items. Since the electric heater is only a comfort item – not a safety-of-flight item like ice protection – the designers never wanted the less-important components to rob power from the more-important components. Whenever any one of these lock-out item switches are on, all grids of electric heat become inoperative. Let's discuss each of these anti-ice items individually.

First, Windshield Heat. Until the 200 model appeared, all previous King Airs had a single Windshield Heat switch with three positions: Up, labeled "Both," to heat both pilot and copilot windshields; Center, the Off position; and Down, to heat only the pilot's side. The down position is virtually never used. It would only be considered when one generator were inoperative causing total electric capacity to be half of what it normally would be. Be careful when moving the switch to Off from the Both position. Push down too hard and you will put it in Pilot Only. That increases the chance of blowing a current limiter during your next start.

For the 200-, F90-, C90A- and 300-series, there are separate switches for left and right windshields. Again, three positions exist: Up for Normal heat; Center for Off; and Down for High heat. Unlike the windshield on the other earlier King Airs, now nearly the entire windshield's surface is heated, not just a horizontal strip across the lower third. Additionally, the heating elements embedded in the inner windshield layer run vertically, not horizontally as before. Surprisingly, when high heat is selected, the windshield's thermostat control does not reset to a higher value. It still tries to keep the windshield's middle ply at about 100°F. What changes is that about a 6-inch piece closest to the cockpit center post no longer receives any heat at all. By concentrating the available heat energy in a





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Whereas the switch on the earlier models was a simple three-position switch that required only one finger to operate, the switches on the later King Air models have the same appearance as the Auto-Ignition or Starter switches: a Lever-Lock design. The knob on the end of the switch allows it to be grasped so that it can be pulled out over the "lock" that prevents inadvertent activation. But wait! In truth, that is only correct when it is desired to move it down to the High Heat position. No pulling is required to go from Off to Normal or vice versa. I strongly encourage you NOT to use the grasping action you use on the starter switch. Instead, by using one finger only, you will avoid the mistake of leaving the switch in High when you meant to turn it Off. Again, you are asking for a blown current limiter when starting with the switches in High.

The Prop Heat switch, like Windshield Heat, may be one or two switches depending on the King Air model. When the 100-series appeared, they had both a Normal and a Standby Prop Heat switch. The weaker link in the Prop Heat system is the timer that directs the electric current to be applied to the different heating elements in sequence. The Normal and Standby systems use different timers. Similar to inverter usage, I suggest you use each system half of the time. There is no advantage of sticking with Normal over Standby.

In the 200- and 300-series, the Automatic Prop Heat switch - the one that uses the timer to direct where the current will flow - is accompanied by a Manual Prop Heat switch beside it. This switch is spring-loaded to the center, off-position and can be held up or down to activate the inner or the outer propeller blade heating elements. When the "Hot Prop" B.F. Goodrich design came out with only a single heating element per blade replacing the inner and outer elements, this manual switch became a two-position switch, spring-loaded to the down position and held up against spring tension to the manual position which heated both left and right props simultaneously. Remember that the current being used by the manual system - either the earlier inner/ outer type or the later manual type – is more than can be displayed on the Prop Heat ammeter. Thus, the ammeter, in addition to the timer, is bypassed when the backup heat mode is used. Instead, a significant increase on the generator's loadmeters verifies that current is flowing.

The original engine cowling on King Airs – generally called the "Chin-type Cowl" or just "Chin Cowl" – uses a rubber boot with an electric element inside to prevent ice formation on the cowling's inlet lip by melting any ice that tries to form. Good airflow is necessary to transport that heat energy away to prevent the rubber from becoming so hot as to melt. If the heating boots were operated on the ground for any significant length of time, kiss the system goodbye. To eliminate this possibility, the Lip Boot heating circuit is wired through one of the landing gear "Squat switches" (also known as a WOW switch; Weight On Wheels). Not until the airplane lifts off does the circuit allow operation. It cannot be tested on the ground.

Every time the lower, forward cowling is removed for maintenance, the wiring to the Lip Boot must be disconnected. A quick-disconnect fitting is installed to make the job easier. Obviously, it is important that the disconnect be hooked back up correctly when the cowling is reinstalled. The mechanic, however, cannot verify operation on the ground. As the pilot, remember to turn on the Lip Boot heat switches when airborne on the first flight after maintenance. Then verify that each side, individually, causes a rise on the loadmeters - each boot pulls about 20 amps. The 100 and A100 models have a switch labeled Left and Right (although it operates Up and Down) that allows getting an actual readout of the current going to the respective lip boot. Instead of adding another dedicated ammeter gauge in the cockpit, however, they "Rob Peter to Pay Paul" and use the Prop Heat ammeter instead. The meter's face is marked with separate green arcs for Prop and Lip Boot current, one on top of the meter's white arc line and one on the bottom. Similarly, the F90 model has a voltmeter/ammeter selector position that allows lip boot current to be read on the overhead ammeter.

Probably more important than any other ice protection item are the engine Ice Vanes. I referred briefly to these when I stated that some models had four instead of two Ice Protection switches on the pilot's left, not right, subpanel: Engine Anti-Ice. That is the "modern" name for ice vanes. No King Air is still in production that requires or allows manual Ice Vane operation. Yet from the mid-A90 production up through the B90, C90, C90-1 E90, F90, 100, and A100 the ice vanes were operated manually. T-handles are located beneath the pilot's subpanel. When pulled, they extend the ice vane (there was only one movable part per side for many years, no bypass door existed) and an over-center action locked it in the extended, down position.

I used the following "laugh line" hundreds of times in the old days: "You can tell a new King Air pilot from the blood on his knuckles. You can tell a high-time King Air pilot by the fact his fingers are shorter than most."

The "blood on the knuckles" comes from having difficulty in pushing hard enough to get the ice vane linkage to break back to the other side of center. In frustration, the pilot makes the big no-no of pushing harder on the T-handle while having his palm facing to the floor, not up to the overhead. Suddenly the mechanism releases, the handle slams forward, and a



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layer of skin from the pilot's knuckles is now decorating the bottom metal edge of the subpanel. Ouch! Palm up is the only way to go!

(As for the shorter fingers? That follows all of the tapping we must do to get proper readings ... on fuel gauges, loadmeters, prop ammeters, etc. Why are you nodding in agreement?!)

I have written entire articles in the past concerning the criticality of ice vane usage. Yes, many pilots have not yet been convinced of their importance and they are reluctant to extend them until ice starts forming on the wing. But I believe strongly that technique is misguided and is asking for an expensive repair to the ice-damaged PT6 compressor. I'm a lucky guy but I won't tempt fate when it comes to engine ice vanes. "When in doubt, get 'em out!"

Let's review and count the various anti-ice protection items on your King Air:

- Auto-Ignition switches 2
- Engine Anti-Ice switches or Ice Vane handles 2
- Pitot Heat switch 2
- Fuel Vent Heat switch 2 (or none)
- Stall Warning Heat switch (if installed)
- Windshield Heat switch 1 or 2

- Prop Heat switch
- 1 (at a time)
- Lip Boot Heat switches (if installed) 2

This adds up to a total number of switches/handles ranging from 10 to 13, depending on the exact King Air model. In fact, some early long-range navigators included a heated probe as part of their air data system and a switch was placed on the pilot's left subpanel labeled "Probe Heat." Including that one, our count can reach 14.

"Wait a minute, Tom! You left out a couple that are on my King Air. I have left and right Fuel Control Heat switches, too."

Of course, you are correct. Incorrectly, many pilots think these switches heat fuel. No, they're not Fuel Heat switches but are Fuel Control Heat switches. They send current to heat the P3 air being supplied to the Honeywell (nee Bendix) Fuel Control Unit (FCU). Originally, the Beechcraft and Pratt & Whitney engineers believed that obstructing this line with ice would only be a possibility when flying in cold visible moisture. Hence, they located the switches on the pilot's right subpanel right along with all of the other ice protection switches. However, it was found that, somewhat akin to carburetor ice, the blockage could occur even in clear air. When this occurred, the engine would lose all useful power as the fuel flow rolled back to Minimum Flow. Not good! The POM/POH procedure was



amended to have these switches always on whenever the PT6s were running.

When the 200 made its appearance – and realizing that Fuel Control Heat should always be on when the engine was running – they were located inside the power quadrant activated by moving the Condition Lever from Fuel Cutoff to Low Idle. This became the norm for later models: F90-series and C90A and after series. (The Woodward FCUs on the 300-series, as well as on the PT6A-52 and -61 found on some 200s have no heating jackets on their P3 lines.)

A common question I am asked by pilots of earlier models that still have the switches is, "Why not just leave them on all the time?" The problem with this technique is that the heating element has been known to burn out when operated for too long without the flow of P3 air through the tube. This would be most likely during prolonged use of a ground power unit (GPU).

The majority of newer King Airs have 12 anti-ice items. Whenever I encounter "visible moisture with OAT at 5°C or below" then I count out the number of switches that I have activated. If I cannot find a dozen switches, I've missed something.

It is obvious that ice vane extension leads to a significant loss of engine power. When going into and out of icy clouds, my procedure is to immediately retract

the ice vanes and turn off Prop Heat when in the clear (if it looks like we'll stay in the clear for a few minutes) and re-extend them before penetrating the next cloud. Why kill only Prop Heat, not Windshield Heat also since they use similar amounts of current? My belief is that once the windshield has reached its proper internal operating temperature it is asking for trouble to allow it to cool and then reheat it again. A lot of windshields have cracked or shattered when heat is first applied. In fact, I always try to turn the windshield heat on before the OAT drops below freezing. Required? No. A good technique? I think so.

To conclude, be very conscientious and faithful about activating all of your ice protection items when in icing conditions. Failure to do so makes you noncompliant with the POH's procedures. More importantly, however, it exposes you to needless risk.

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" and "The King Air Book II." 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 books, contact Tom direct at *twcaz@msn.com*. Tom is actively mentoring the instructors at King Air Academy in Phoenix.

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



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Beechcraft's "Flexible Flyer"

For more than 30 years the Model 200-series King Air and its predecessors have carved out an impressive niche in the demanding and increasingly competitive market that characterizes Special Mission aircraft.

by Edward H. Phillips





Beech Aircraft Company's initial foray into the relatively untapped special mission market occurred in 1976 when the Model 200T was introduced. The Super King Air's highly adaptable airframe and spacious cabin offered a wide variety of configurations for customers. (Special Collections and University Archives, Wichita State University Libraries)

he term "Special Missions" had its origin as early as World War I and has evolved during the past 50 years to encompass a plethora of unique aerial applications, ranging from routine photographic reconnaissance of the battlefield to highly-classified surveillance and intelligence gathering operations.

During the past 35 years*, more than 1,500 Beechcraft King Airs designed for Special Missions have been delivered to customers worldwide, according to Hawker Beechcraft Corporation.

In 1964, the advent of the Model 90 King Air opened new possibilities for the infant Special Missions market in part because of increased overall performance provided by its two Pratt & Whitney Canada PT6Aseries turboprop engines. Realizing these advantages, in 1968 the U.S. Army ordered 14 Model A90-1 King Airs designated RU-21A and RU-21D for Special Missions applications, as well as the RU-21E (Model A90-4) configured with special wing-mounted antennae for "Guardrail" electronic countermeasures and communications operations. In addition, the Army acquired three early production Model 200 King Airs in 1974 that were converted to A100-1 configuration and equipped for "Guardrail" duties.

In the wake of the Model 200's stellar success in the business aircraft marketplace, in the mid-1970s Beech Aircraft Corporation officials recognized the airframe's potential for commercial, governmental and Para-public Special Missions applications. As a result, in 1976 Model 200 constructor number (c/n) BB-186 was converted to the prototype Model 200T and given c/n BT-1. Designed for maritime patrol operations, the



The Model A200/C-12 series proved to be popular with all three branches of the United States military. Basically off-the-shelf Super King Airs, these airplanes were (and remain) versatile workhorses for the Army, Navy and Air Force. (Special Collections and University Archives, Wichita State University Libraries)

airplane was equipped with 50-gallon wing tip tanks to increase range but particularly endurance and loiter time. Special large, bulgetype observation windows were installed on both sides of the aft cabin and a powerful, surveillance radar designed to sweep the seascape was housed under the fuselage.

To complete the external transformation, a large fairing, also located beneath the fuselage cabin section, accommodated various photographic and reconnaissance equipment. Further modifications were made inside the cabin and included consoles for electronic control and monitoring of the radar.

The Model 200T was capable of remaining airborne for more than eight hours at recommended power settings that were optimized for



loiter time. The company built 31 Model 200T King Airs across an 11-year period ending in 1987.

Since that time a large number of different commercial and military variations of the Model 200 series King Air have been developed to meet a staggering array of unique and classified surveillance and monitoring requirements. These airplanes serve a wide range of customers whose missions vary from coastal patrol to gathering intelligence on potential adversaries and terrorist organizations. Over the years the company has repeatedly refused to identify certain nations that operate these aircraft, chiefly for security reasons. It is known, however, that five FWC-12D airplanes were listed as Foreign Military Sales in 1983 to Israel, and that nation continues to employ sophisticated versions of Special Missions King Airs as an integral part of its Israeli Defense Force structure.

Throughout the late 1970s and into the present decade, the Model 200 and its successor, the Model B200, continue to attract U.S. and foreign military sales for Special Missions applications ranging from VIP transport to intelligence gathering, monitoring and communications.

The Army, Navy and the U.S. Air Force have been repeat customers for the C-12 series that began in 1974 with the C-12A (Model A200), of which 34 were ordered by those services. Another 20 were built in 1975 followed by 32 in 1976 and 18 for the Army in 1977.

The final 20 C-12A transports were built in 1978 before that model was replaced by the C/UC-12B (Model A200C). The Navy acquired nine airplanes for personnel and light utility missions (also operated by the U.S. Marine Corps) that were facilitated by installation of a 52-inch x 52-inch cargo door shared with the commercial Model 200C King Air. The factory produced 66 UC-12Bs from 1979-1982. The Air Force bought 12 UC-12F versions in 1986 that were similar to the UC-12B. Of these airplanes, c/n BU-11 and c/n BU-12 were specially modified for surveillance of firing range operations that were part of the Air Force's "RANSAC" mission. In 1988, the company delivered six C-12J airplanes that were based on the commercial Model 1900C-1 originally developed for the 19-seat commuter airlines market.

*This article was previously published in the March 2013 issue.

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.



New Interior and Cabin Amenities for King Air 260

Textron Aviation announced it is introducing new interiors to its Beechcraft King Air 260 turboprop. Featuring a stunning new look with craftsman-built cabinetry and a selection of opulent fabrics and color schemes, the luxurious, redesigned cabin interior will be available on all new King Air 260 aircraft in early 2022.



The new standard interior for the King Air 260 in Pewter.

The King Air 260's cabinetry offers beautiful woodgrain finishes along with a modernized refreshment center that is easily accessible for passengers throughout their flight. The cabin interior also offers a selection of four standard color palates and one premium. Throughout the cabin, LED lighting provides a warm, inviting atmosphere with lit cupholders and pinhole lighting along the lower sidewalls.

Multiple USB charging ports have been added throughout the cabin, making it easier for greater productivity on mobile devices throughout the flight. Other amenities that come standard on the entire King Air lineup include pleated pull-down shades, pull-out work tables and a private aft lavatory.

The King Air 260 cabin, which seats seven passengers, is configured to maximize passenger comfort. The cabin has been designed to create a spacious environment that offers ample legroom at every seating station.

The cockpit features the Innovative Solutions & Support (IS&S) ThrustSense Autothrottle system which automatically manages engine power from the takeoff roll through the climb, cruise, descent, landing and go-around phases of flight. This enhancement reduces pilot workload and is designed to prevent over-speed or under-speed, over-temp and over-torque conditions. It also has a digital pressurization controller, which automatically schedules cabin pressurization during both climb and descent, reducing pilot workload and increasing overall passenger comfort.

The aircraft includes the Collins Multi-Scan RTA-4112 weather radar, providing pilots with a fully automatic system that is optimized to detect short-, mid- and long-range weather.

McCauley Propeller Launches Aftermarket Solution for King Air B300 series

Owners and operators of the Beechcraft King Air B300 series will soon have the option of equipping their aircraft with a McCauley Blackmac Series 105-inch diameter propeller with four aluminum swept blades.

McCauley Propeller Systems is a division of Textron Aviation Inc. and says with the new propeller, King Air B300 operators can experience several benefits, including:

- A nearly 40-pound weight savings per aircraft
- The field repairability of an aluminum propeller
- Extended time between overhaul (TBO) of 5,000 hours or 72 months
- The benefits of Textron Aviation's 4,000 hours or 36-month limited propeller warranty

Certification is expected in the first half of 2022 with deliveries to follow.

For more information, visit *https://mccauley.txtav.* com/New-Products.

Garmin Pilot App Adds New Features on iPad or iPhone

Garmin[®] International Inc. recently announced the addition of new features to the Garmin PilotTM app on iPad[®] or iPhone[®] mobile devices. These new enhancements to Garmin Pilot include graphical depiction of runway and airport closures on the dynamic map. Alerts for terminal environment NOTAMs have been added throughout the Garmin Pilot app to enable pilots to quickly view any pertinent NOTAMs. Especially beneficial to pilots flying in Europe, this update also adds the display of airspaces using the ICAO defined classification colors.

Additional enhancements

The recent Garmin Pilot update adds additional enhancements, including:

 Terminal Aerodrome Forecasts (TAF) and Model Output Statistics (MOS) are now displayed as

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Please visit www.garmin.com/ aviation for additional information.

NBAA-BACE Offering Educational Sessions On-Demand

The 2021 NBAA Business Aviation Convention & Exhibition (NBAA-BACE) in Las Vegas, Nevada, will be holding more than 50 sessions – including pre- and post-show Professional Development Program courses; the Single Pilot Safety Standdown; the National Safety Forum; the Small Operator Symposium; and the Tax, Regulatory & Risk Management Conference – offered before, during and after the convention available on-demand as well as in-person.

A sampling of some of the topics that will be covered: Advanced Air Mobility, Unmanned Aircraft Systems, Workforce, Diversity, Equity & Inclusion, Leadership, Maintenance, Domestic and International Operations, Tax and Regulatory Updates, Sustainability and Safety & Security.

To view the full NBAA-BACE program schedule, go to: https:// bit.ly/3z1Vpms

Blackhawk Receives STC Approval for XP67A Engine+ Upgrade for King Air 300

Blackhawk Aerospace has received approval of its 30th Supplemental Type Certificate (STC) which is for the XP67A Engine+ Upgrade for the King Air 300.

Additional recent approvals include the addition of European Union Aviation Safety Agency (EASA) and British Civil Aviation Authority (CAA) certifications for the True Blue Power TB44 Lithium Ion battery on the **King Air 350 series**.

Further information can also be found at www.blackhawk.aero or by calling +1 (254) 755-6711.





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