King Air

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COVER PHOTO
LifeSave Transport's 1980 Beechcraft King Air C90. (Credit: Grant Boyd)

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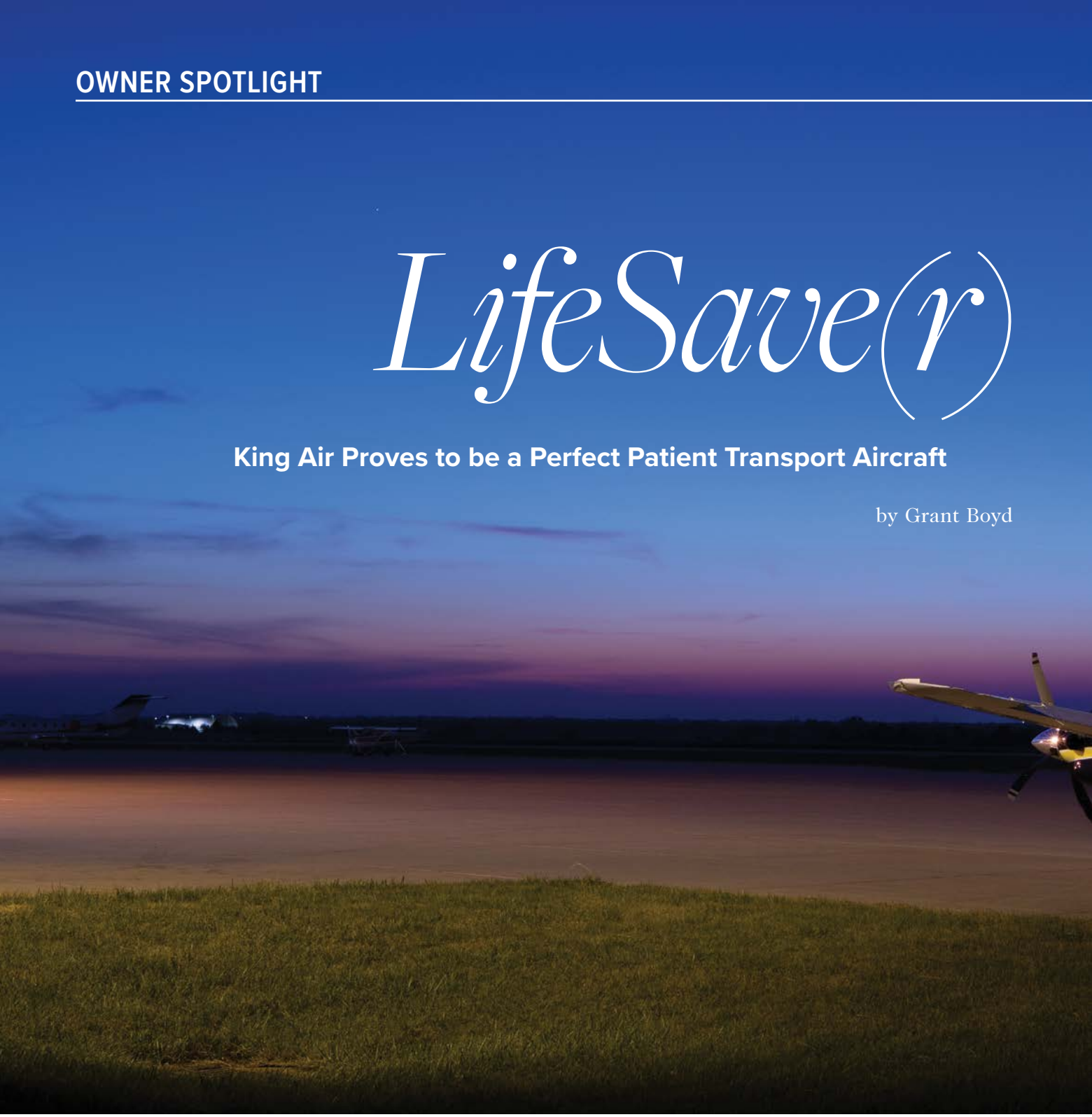
LifeSave(r)

King Air Proves to be a Perfect Patient Transport Aircraft

by Grant Boyd



The altimeter climbed through 1,000 feet as the aircraft began a controlled turn to the left. The back of the aircraft, which once held an executive interior, has been replaced with a myriad of medical devices and purpose kept seats. Passengers now include medical professionals and a patient on a gurney connected to tubes and breathing apparatus.

LifeSave's 1980 C90 ready to go when the call comes in. The company's goal is to be able to take off within 10 to 15 minutes of receiving a transport request. The "quick start; quick flight" mission profile is important, as it can dictate a patient's ultimate outcome – "speed is life." (Credit: LifeSave Transport)

This is a standard scene in a "flying intensive care unit," found in the aft section of hundreds of Beechcraft King Airs throughout the world.

LifeSave Transport solely operates King Airs for its fixed-wing operations and is one of the largest independently held air medical services in the nation. The company is owned and operated by two Kansas physicians who have designed a complete medical transport system to serve communities, hospitals and patients.

History and Operations

The company was launched in 2001 by 6,000-plus-hour pilot Martin Sellberg, M.D., FACEP (Fellow of the American College of Emergency Physicians). Being a fourth-generation rural Kansan and emergency physician, he understood the need for efficient medical transport from smaller communities in the state to larger ones with a more robust medical infrastructure.

Dr. Sellberg partnered with Dr. Richard Watson, another experienced physician and entrepreneur, to build

After landing at the destination, the LifeSave King Air can pull up to the company's ground units waiting to transfer the patient to the hospital. (Credit: LifeSave Transport)

a complete emergency transport system operating as a medical company first that is focused on patient care and safety with a state-of-the-art communications system, patient-centered billing division and maintenance facility.

Today, LifeSave operates 13 King Airs (several C90s, a C90-1, several C90Bs and a B200), as well as Bell 206 and 407 helicopters. It has bases in 15 locations in Kansas, Nebraska, Texas and Hawaii. The company also operates ambulances for patient transfers from the fixed-wing aircraft to the hospital.

The transmission of information is of the utmost importance in emergency medicine as it is in aviation, and LifeSave prides itself on informed and decisive exchanges. To this end, all the company's actions derive from its communication center. Here, inbound calls originate from either medical professionals at the hospital or in the field. The skilled team gathers information related to a patient's need for transport and helps guide the journey from point of origin, to LifeSave pickup, and all the way to drop-off at the tertiary care facility.

Through their experience in the communication center guiding hospitals and other facilities, Dr. Sellberg saw the need to further ideate what type of transport is appropriate in certain scenarios. Making the decision between calling a ground, rotor or fixed-wing asset for a heart attack patient who is 120 miles away but in stable condition can be a tough decision even for the most experienced providers. Drs. Sellberg and Watson developed a proprietary software as a guidance tool for these complex situations.

The Mission Control™ software assists the sending facility in choosing the appropriate transport method. This can be a life or death decision as well as the difference between a financially successful or unsuccessful mission. Once the method of transport is identified, the sending and receiving facilities are then directly linked to the LifeSave team to improve care throughout the transport process.

The company's overall operations derive from the founders' vision and backgrounds. Dr. Sellberg said they view LifeSave as "a healthcare-focused company with aviation assets," that is "designed to provide critical care solutions when a patient needs it the most."

Why King Airs?

The low-margin world of emergency air transport make the King Air an ideal platform. The family of turboprop's durability, relatively low operating costs, and availability of parts are a natural fit for many medical transport operators.

All things considered – weight capacity, speed, endurance, operational ease – the King Air is an almost perfect candidate for the rigors and unique mission profile of emergency air medical transport.

Two important aspects of the aircraft are its range and endurance profiles, which tie in directly to the company's operations in the Midwest and Hawaii, which may seem as a "random" location to some, Dr. Sellberg notes. "Hawaii is surprising in how similar it is to the Midwest, in terms of the distribution of specialty medical resources and the distances between them, so it was a natural expansion for us." For instance, Hilo (PHTO) to trauma care in Honolulu (PHNL) is within four nautical miles of the same trip from Liberal (KLBL) in the western part of the state to Wichita (KAAO), a major medical hub for Kansas.

LifeSave, one of the largest independently held air medical services in the nation, operates 13 various models of King Airs as well as Bell 206 and 407 helicopters. It also operates ambulances for patient transfers from the fixed-wing aircraft to the hospital. (Credit: LifeSave Transport)

To better understand LifeSave's operations, I rode along on a training flight with the crew on a Saturday evening in early August.

Briefing

Arriving at Colonel James Jabara Airport (KAAO) in Wichita, I was greeted by the sight of a stoutly King Air with a Staff of Hermes painted on the tail. Excited to learn more about the operation of a flight, I attended the evening's shift briefing, in which information pertinent to the night's possible flights, as well as details for the pilots and medical staff to be mindful of, were discussed.

David Marten, ATP-rated and former military test pilot, was the night's on-duty pilot and in charge of the briefing. It was a standard affair, discussing the weather in the Wichita base's immediate service area and a rundown for me on aircraft operations, as well as other important details.

Having learned some already on why King Airs are well-equipped birds for the mission, I asked Marten how he felt about the aircraft.

"The King Air's rugged dependability makes it a perfect fit for the medevac mission," he said. "We don't need the fastest, most luxurious airplane, rather we need a utilitarian aircraft offering simplicity of operation, renowned mechanical reliability and a high dispatch rate. The airplane must be ready to go when needed. There is no time to fuss with complicated systems requiring careful handling by pilots and mechanics. The King Air is the perfect load-and-go airplane offering the rugged dependability of your grandpa's pickup truck. It simply

> **" ... we need a utilitarian aircraft offering simplicity of operation, renowned mechanical reliability and a high dispatch rate. ... Whether the airplane's sitting out in subfreezing temperatures or baking on the ramp, I'm continuously impressed with its ability to dispatch nearly every time. When lives are on the line, I have full confidence the King Air is ready to fly."**
>
> - David Marten, LifeSave Transport pilot

works. Whether the airplane's sitting out in subfreezing temperatures or baking on the ramp, I'm continuously impressed with its ability to dispatch nearly every time. When lives are on the line, I have full confidence the King Air is ready to fly."

Unsurprisingly, medevac flying is an all-weather affair and thus pilots must be suited for such. Marten notes that "we routinely must be ready to fly into rural airports with a 4,000-foot runway and no precision approach." Coupled with the required innate ability of "having to make difficult decisions quickly and on one's feet, almost autonomously" leaves a special breed of pilot behind the yoke.

"Most pilots are a little bit of adrenaline junkies," he noted. "We have a first responder mentality and it's important to be able to focus on flying, even with a panic going on in the back. You have to be able to compartmentalize."

I learned that the company's pilots average about 400-500 hours a year and, for example, the Wichita-based aviators fly into about 200 airports in Kansas and Nebraska, so every flying day is different from the one before.

Soon after the briefing was completed, it was time for my orientation flight before the night's real mission calls came in. I was able to take the right seat on our short hop to Medicine Lodge Airport (K51), about one-and-a-half hours if driven.

This airport was chosen because it is a regular pickup location for the crew, including a trauma the night before. The airport is also almost a perfect locational representation for why medical evacuation flight companies exist. The town of 2,000 is the most populous in its west-central Kansas county but lacks advanced specialty medical care. LifeSave bridges the gap for residents, providing access to services such as trauma-related injuries. Operators like LifeSave help bridge the gap for residents in these more rural communities, allowing them to have better access to specialized medical care.

N813JB, a 1980 C90, was the airborne ambulance of the evening and was preflighted prior to my arrival. The aircraft's interior, like all of the company's King Air aircraft, was modified in-house.

The Flight

Marten fired up the right-side engine, followed by the left. Comms with Wichita were succinct, and our flight

The company's pilots average about 400-500 hours a year and possess a first responder mentality – the ability to focus on flying, even with a panic going on in the back of the aircraft. (Credit: LifeSave Transport)

details were confirmed. Being that LifeSave's hangar is at the far end of the airport, taxi to the hold-short line was quick, and we were cleared across moments later. This "quick start; quick flight" mission profile is important, as it can dictate a patient's ultimate outcome, which Marten communicates as "speed is life." The company's goal is always to be able to take off within 10 or 15 minutes of receiving a transport request.

Being that our flight was a dry-run-only mission and that no patient was on the receiving end, the crew didn't have the nerves that I would expect them to have if a car crash or heart attack victim would be riding back with us. That being said, all aspects of the trip were handled as realistically as they could.

While the aircraft continued climbing to 8,000 feet, the medical crew ran through some scenarios and communication points in the back. At this point, they would have begun arranging all needed medical supplies, in anticipation of what would be needed for the patient.

Our trip averaged about a 230-knot cruise speed and before touchdown we crossed the field at pattern altitude, to verify that no wildlife or farm implements were making the runway home. The C90 showed one of the reasons it is a staple in medical transport flying, as Marten put the props in reverse after the tires kissed pavement. In only about 1,000 feet, we were slowed and jaunting to parking at the north end of runway 16/34.

Patient Pickup

To better understand the flight from a patient's point of view, I opted to ride back in the cabin with Megan Campbell, flight nurse, and Ismael Maravilla, paramedic. Their medical knowledge and experience are a natural complement to one another, which allows them to handle

many types of medical emergencies and maladies. For those situations that require a little more attention, the two can phone the company's 24-hour medical control or the receiving hospital's doctors from a satellite phone.

To get the full feel of what a patient experiences, I became one. With my simulated broken leg from a car clipping me while on my bike, I was situated onto the sit-up medical cot facing the rear of the aircraft and buckled in. At that point, Campbell and Maravilla would have taken medical intervention had my condition been legitimate.

Perhaps surprising to many, about eight out of every 10 patients may be critically ill but are clinically not experiencing rapid changes in their condition during transport to a specialist (often orthopedic or cardiac-related). For the other remaining two, the medical crew's jobs become more complex.

Many times, when the crew arrives on the scene, they may be the most experienced in emergency trauma care and actively assist the other practitioners on actions in anticipation of transfer. For instance, the night prior to our flight, the crew was in Medicine Lodge to bring a trauma patient to Wichita for acute care. The ground team awaited LifeSave's arrival for trauma center care, so they were on-ground for more than an hour stabilizing the patient and preparing them for transport.

Even with the time spent on the ground, flying to Wichita was still a net time gain in the end. According to LifeSave, trips over 100 miles (of what would have been driven) almost always are better taken in the air. From that decision point, weather conditions and total distance dictate whether rotors or propellers prevail.

The return flight is only as eventful as the patient's condition and fortunately my flight was as uneventful as it could be. After 23 minutes, we were back on the ground at Jabara and pulled up next to one of the company's ground units where I got to experience the patient transfer process. At this stage (and onboarding), one of the King Air's few weaknesses became apparent. The relatively small 28-inch cabin door can occasionally be an obstacle for the team to navigate, as the cot is a tight fit. After passing the threshold, I was put down the "slide" onto a cart and on my way to the company's ground unit.

In some scenarios, such as transferring a critical patient in Denver where traffic slows an ambulance's route, I was informed that the patient would be transferred from the fixed-wing asset to a rotor wing.

The flight nurse and paramedic who tend to the patient in the King Air cabin share medical knowledge and experience that complement one another and allows them to handle many types of medical emergencies.
(Credit: Grant Boyd)

From there, the patient is airlifted directly to the care facility's helipad. More often though, they are whizzed away in the ambulance.

No matter which way the company transports someone to tertiary care, the pilots, paramedics and nurses are happy to know that they are making a difference on likely the worst day of someone's life. KA

Grant Boyd soloed at 17 in a 1977 Cessna 150M. In the seven years since, the private pilot has been involved in aviation through a variety of avenues: from marketing to customer service. He has written more than 85 articles for a number of aviation magazines and loves learning about aircraft/pilots with unique missions. Grant can be reached at *grantboyd2015@gmail.com.*

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King Air Community Loses Fellow Owner, Visionary, Avid Flyer … Friend

by Kim Blonigen

On August 20, King Air Academy Founder Ron McCalister was killed when his 1984 King Air B200 crashed while trying to depart Rockford, Illinois (RFD). He was the only one on board.

Ron had dreamed of becoming a pilot since his youth and loved to tell the story about just how committed he was to learning how to fly. In an article for *King Air* magazine in 2015, he said, "I was 18 years old when I got engaged, and I didn't have two nickels to rub together. I told the girl I got engaged to, 'Someday I'm going to learn to fly. I don't know how, I don't know when, but if you have a problem with that tell me now.'" That girl was Donna, and they had been married for 48 years when Ron died.

After purchasing his King Air in 2006, Ron said, "I absolutely fell in love with the airplane. It's so reliable and it's just so functional. It's the best airplane for me and I don't see ever flying another type."

Ron came up with the idea for the King Air Academy (KAA) after attending other flight schools throughout his life and being disappointed by the lack of customer service and the wide variance in curriculum and instructors. He started the company in 2014 with Tom Clements and Kevin Carson and called it "a labor of love." King Air pilots who have taken training at the KAA recall getting a follow-up call from Ron asking how their experience was and if there was anything they could change to improve it. Many looked forward to receiving his call after their next visits.

A few years after launching, the KAA decided to spearhead an event for King Air owners called King Air Gatherings. The idea was to get a group of like-minded, owner-pilots together to share information about their experiences with their King Air. Secondly, they wanted to have an outstanding group of King Air experts give educational, insightful presentations. The Gatherings quickly became a success and many more in the King Air community got to know Ron and how genuine he was. Many say they instantly felt like he was a friend … and that includes me. I got to know Ron and Donna and immediately knew they were all about their family and I felt like they made me part of it.

Ron left behind his loving wife Donna, four adult children, their spouses and 14 grandchildren.

He was 60 years old when he started the King Air Academy and Ron said people were asking why he was launching a new business at that time in his life. His answer, "Because I love aviation, I love flying and it's been such a part of all aspects of my life. I'm also a salesman and a business guy, and I like the idea of building a legacy business."

Ron left us with more than the King Air Academy, his legacy business; his passing reminds us to live life as he did … with passion and kindness. KA

Your Most Dangerous Flight

You Must Trust but Verify

by Kevin Carson (with excerpts from Tom Clements)

Over the last several years of watching King Air pilots in both their aircraft and in the simulator, it is obvious that they typically have developed their own cockpit flows and use of checklists. As Tom Clements has outlined time and time again, when you are new to flying a King Air, the checklist should be a "Do-List." The difference between a Do-List and a checklist is the Do-List is a step-by-step guide you should complete each and every time you fly. On the other hand, a checklist is a list of items that are done as a "check" or verify list. Over time, each pilot develops their own flow patterns and use the checklists in their own way. Some read them aloud, some look and verify, some breeze through them much too quickly and others use them to block the sun from the side windows or windshield.

Tom has an article titled "Looking Isn't Seeing" in which he discusses the phenomenon referred to as *expectation bias*. Many times during an instruction flight, he has pulled an engine gauge circuit breaker causing the gauge to drop to a zero reading, yet when the student reads the checklist and looks at the gauge they fail to notice the abnormality. Why is this? Because they see what they expect the gauge to read, not what their eyes are actually reading. Tom says there are two main reasons for this: (1) Going too fast and (2) A lack of judicious suspicion.

Your Most Dangerous Flight

Some would argue that every flight should be viewed as your most dangerous flight. However, from too many recent King Air accidents there seems to be an all too common theme – it just came out of maintenance. No maintenance personnel wants to deliver an aircraft that is not airworthy and no pilot wants to feel like a test pilot on the first flight.

Most pilots are not A&Ps and most A&Ps are not pilots. How do we get each of the two disciplines to understand the other? The Phase inspections, calendar items and cycle items on a King Air maintenance schedule are very detailed and take a considerable amount of time to complete; some are very invasive to the aircraft.

Maintenance providers are liable for their work and most are very diligent about how they perform the tasks and how it is documented in the aircraft log books. They want it to be correct the first time, every time.

So why is your first flight out of maintenance your most dangerous flight?

If you stood and watched how much tedious work is required in your Phase inspections, engine or prop overhauls and avionics upgrades and how much of the aircraft was disassembled, inspected and reassembled, it is an amazing amount of labor (as referred to in more detail in Dean Benedict's article on page 22). To verify their work, technicians perform various checks, ground runs, and in some larger shops they have a final inspector verify the work … but all too often there is no test flight.

Maintenance technicians do everything in their power to provide a safe, airworthy aircraft. However, to perform all the tasks required for maintenance they must make significant changes to the aircraft that we, as pilots, must verify are back to "normal" prior to any flight. We all

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know how long it takes to complete a full run-up and that, on a daily basis, some of the items may be deemed unnecessary (fuel sumps, tire pressure, etc.). Any time an aircraft comes out of maintenance you want to trust that your shop did everything correct, but it is up to you to verify it. Remember? Trust but verify.

Look at a typical maintenance visit. After doing your best to describe any outstanding squawks and agreeing on all the items to be completed, you leave the aircraft in your shop's hands. Depending on the maintenance to be done, the first thing is to clean out the cockpit and cabin and put everything in a box or bags for temporary storage. That includes headsets, cords, charts, pens, pencils, manuals, checklists, etc. … everything you are used to using on every flight. Then the actual maintenance begins. Flight controls are checked, trims are moved, friction locks are loosened, circuit breakers are pulled, seats are moved or even removed, switches and levers are changed and that is just in the cockpit!

After the maintenance is complete, it would be nice if all was put back just as it was found. However, expecting maintenance to put everything back the way they found it is unrealistic. This is where you and your memory come into play. You try to remember where levers were switched and if you even have all the items that were with the aircraft when you dropped it off. Your phone might be your best friend here. Take pictures of the cockpit when you drop it off, note everything that was there and make sure you have it when you begin your after-maintenance checks. I have heard stories of "unloading the box" of items and thinking you had it all only to realize there were no charts for the approach.

Or, after landing, noticing that the control locks were nowhere to be found. Of course, forgetting to bring new databases to load often presents us with an illegal IFR machine. So begin this preflight inspection as if you had never seen or flown this airplane before.

Preflight from a Pilot's Perspective

Below are some examples of surprises told by Tom Clements that he personally experienced or has firsthand knowledge from stories told to him by colleagues and customers.

Static Air Line Drains Left Open

My company, Flight Review, Inc., owned and operated a 1972 C90 throughout the 1990s. Once I was picking it up by myself from a shop we often used after a routine Phase inspection. It was a lovely clear morning. I did a thorough exterior and interior preflight inspection and performed all of the run-up checks before takeoff. I lifted off at about 100 KIAS, pitched up to my standard +10 degrees attitude, retracted the landing gear, did a quick

scan of the engine gauges, and then returned my scan to the flight instruments. What the …? My airspeed was only 80 knots! I rechecked the torque gauges to ensure I was at takeoff power and rechecked my pitch attitude both visually and with the attitude indicator – all normal. Knowing "pitch plus power equals performance," I was sure the airspeed indicator was faulty. But dang, so was the one on the co-pilot's side! By then, the indicators were decreasing below 60 knots. I reached over and moved the alternate air selector lever to the alternate position; nothing happened. I leveled off at 1,500 feet AGL pattern altitude, pulled power back to the middle "magic number" (500 ft-lbs for this C90), and stared in disbelief at the airspeed indicators that now were reading extremely high … since they had decreased so much that the needles were beginning to point to the numbers to the left of zero!

Suspecting the problem, I reached down to the Pressurization Control switch and moved it to the Dump position. The cabin was only about a thousand feet below the airplane with 0.5 psid differential pressure so the dumping was not at all drastic. Immediately, the airspeed indicators resumed normal operation. I announced on the Unicom frequency that I was on left downwind for landing, proceeded with a normal landing, and taxied back to the shop's ramp. I knew what was likely wrong and, sure enough, they found the static air line drains were all open. This allowed cabin air to enter the static system since the drains are behind an access panel low on the right sidewall of the cockpit, inside the pressure vessel. The entrance of cabin air, being at a greater pressure than ambient, was what led the airspeed indicators to read low, since they sensed less of a difference between pitot and static pressure. It absolutely blew my mind that a half of a psi error could lead to a negative airspeed indication!

Once the drains were closed, the next takeoff was, of course, normal and I departed on my way. In the shop's defense I will mention that the drain valve blade "handles" were unusual. When the metal blade was parallel with the drain line, the drain was closed. Vice versa, when the blade was perpendicular to the line, it was open. In fact, as we examined the drains we noted that someone previously had used a Sharpie to draw a picture on the back side of the access panel, showing clearly the proper open and closed orientations of the blade. The mechanic obviously did not notice that picture.

Could this mistake have been caught before takeoff? I doubt it, except by observing the airspeed indicators during a ground pressurization test. The main takeaway here is the advantage of making that first flight in day, visual, conditions. I hope I could have handled this abnormality successfully even at night or departing into a low overcast, but I am thankful that those conditions did not exist. I would encourage strongly that the first post-maintenance flight be VFR.

A 300 in Sad Shape

A customer and friend, an owner-pilot of a later model 300, was in the habit of asking me to help him perform the post-maintenance acceptance flight. I enjoy doing this and was happy to provide my assistance. First, I observed that the threshold and cabin door step lights were inoperative. The mechanic found a short in the wiring and had it fixed in a relatively short time. Doing the cockpit check I found that the Engine Anti-Ice switches were Off, although it is proper procedure in the 300 to have the ice vanes extended (Engine Anti-Ice On) for all ground operation. When questioned about that, the mechanic stated, "It is easier to reinstall the cowling with the vanes up." That explains it, I thought. But it dawned on me later that either he never did a ground run-up after the cowls were reinstalled or else did it with the vanes up … increasing the chance for FOD. Either is unacceptable. After we reached the run-up area and performed the complete procedure, we found that neither side's propeller autofeather system was functioning correctly. That system is a required, no-go item in all 300s. The right-hand side had no autofeather action at all, whereas the left-hand side had everything happening at the higher torque value. (At 17% torque the opposite annunciator should extinguish and actual feathering should occur near 10%, but here it was all happening together at 17%, indicating a chance of feathering both propellers at the same time!)

Needless to say, the 300 was not picked up that day, but nearly a week later.

The E90 Flamer

This is a story that happened at the old United Beechcraft facility in Wichita. Once United Beech had a horrific accident due to a King Air's engine being started while the airplane was on jacks in the hangar! The plane came off the jacks and ran into other airplanes. What a mess! In reaction to that incident, a shop procedure was implemented requiring the ignitor circuit breakers (CB) to be pulled whenever a King Air was in the hangar.

A two-pilot crew came to pick up their E90. After a quick look-over they hit the right Start and Ignition switch to prepare to taxi and depart. As the N_1 stabilized, the condition lever was advanced from Cut-Off. Without the ignitors receiving power due to the tripped CB, no light off occurred. Hmmm. "Oh wait, I know!" says the left-seater. "They usually pull the Ignitor CBs here. Check down there on the end of the pedestal." The co-pilot did as requested and pushed the CBs back in; the linemen tell of a flame that went nearly the full length of the airplane! That resulted in engine damage, burnt deice boot and scorched paint.

In my opinion, two mistakes were made. First, a more thorough cockpit check should have caught the tripped CBs before start. Second, the pilot was obviously not in the habit of verifying the ignition annunciator illuminated while waiting for N_1 to stabilize … an important habit to form.

Loose FCU Connection in a 200

Many years ago, I was asked to be PIC on a 200 that had been modified by Commuter Air Technology (CAT) into a 13-seat "Catpass" commuter configuration. High density forward-facing seats, a cargo pod, panel-mounted avionics … these were some of the changes made to convert this executive airplane into a commuter. The CAT marketing department wanted to take some photographs showing this airplane in its element – all seats filled and a professional crew up front. They even provided me with a four-stripe uniform and captain's hat to wear! We taxied out at Scottsdale, Arizona, with the cameras running. Unbeknownst to me, the plane had not flown in some time while the modifications were being made. The preflight checks all proved to be OK so we were cleared for takeoff. Just as power was being set and we started to roll, the right engine spooled back to low idle. We idled to the next turnoff, told the tower we were aborting, and requested permission to return to the run-up pad. There, we could duplicate the problem. Power would come up fine for a bit, then abruptly go back to idle even though the power lever was still advanced. This had not happened during my earlier run-up. We taxied back to the CAT facility and aborted our photo shoot plans for that day. There, it was found that a safety wire had not been installed and this allowed the connection between the power lever and the Fuel Control Unit to slip, leading to the situation we experienced.

Could I have found this malfunction myself during the preflight? Sadly, I doubt it. Although I had opened the cowling doors to look for general condition, I don't trust that my eyes would have found the missing safety wire. The takeaway here? Had I known before that this was the plane's first flight after the mods, I should have refused to load it with passengers until after a crew-only test. Had the slippage not occurred until a short time later, it could have happened just at or after V_1 … never an experience wished for, but especially not with 13 passengers onboard!

Other Experiences

A common incident that happens on the first post-maintenance flight is to discover that the upper, forward cowling is not secure. As airspeed increases, the cowl will start to lift. On the walkaround, be sure not only to verify that the arrows on the latches point as they should but also take the palms of both hands and give that cowling piece a really sharp blow, trying to dislodge it upward. If it comes undone, it's time for the mechanic to adjust the latches properly.

What if the upper forward cowling *does* begin to lift in flight? One, slow down; two, extend the ice vanes.

Both of these actions will reduce the pressure inside the cowl and decrease the chance for the piece to depart completely as you return for landing.

For all of the older King Airs that still have the "chin type" cowling with the electrothermal deice boot, realize that every time the cowling is removed the electric leads to the boot must be disconnected. Vice versa, they must be reconnected upon cowling installation. Yet it is impossible to verify the connection before takeoff, since this system is prevented from operating on the ground due to squat switch activation. So you, the "test pilot," must turn on the lip boots separately, left and right, in flight while observing a slight increase in loadmeter readings. Only when that amperage increase is verified do you know that the boots were truly reconnected.

Do you know that in most King Airs the battery box cover can be installed backward? The air vent louvers need to be at the aft end when installed, not in front. Air cooling is not nearly as important now as it was when NiCad batteries were common. Still, let's position the cover correctly.

If your airplane has undergone a significant avionics upgrade, it is so very important to do a flight test to verify that it is doing what it is supposed to do. Even the most capable and conscientious avionics shop cannot know for sure how an autopilot will track that new LPV glide path, for example, until it is demonstrated in flight. So many, times I have found rather mind-blowing errors in this arena. One King Air would track its new GTN750 GPS course just fine in the normal leg mode but it would always go in the exact opposite direction when in OBS mode. Another would never enter a programmed holding pattern. Instead, it would merely turn to the holding course heading and fly that until it ran out of gas!

I have seen a newly-installed GPS unit that never had the HSI's course needle deviate from the center position! And this was far enough back in time that a flight test was required to gain IFR GPS approval … and the flight test had been signed off as satisfactory!

The Killer of Killers … Loose Friction Knobs

This is VERY important. Many pilots ensure their friction knobs are snugged up properly once and never give them further attention … which is OK. Others fiddle with the friction often, loosening it for taxiing and tightening for flight and that's also OK. But pity the pilot who never adjusts them and then assumes that they are at the same setting when leaving the shop as they were when entering it. Folks, whenever engine rigging takes place, it is common that the friction controls will be backed off to the totally loose position. This allows the engine-end of the control to be moved freely by hand, with the cockpit-end moving in unison. If the friction has

not been reset, and if the pilot does not carefully follow every step of the checklist, it is possible to depart with them still loose. Condition lever and propeller lever friction is not too important, but power lever? Oh my goodness! Those levers will spring strongly back toward idle when the pilot's hand moves to the landing gear control. If the pilot notices what is happening – of course that is usually the case – then the outcome is more comical than anything else as he tries to fly, get the gear up and tighten the friction while not letting the power be too low. But if the power lever migration (PLM) is not seen, then disaster can result. With both levers migrating back, but with the left almost always going to a lower power setting than the right, there may not be sufficient power to sustain flight. Also, the differential in power tends to lead the pilot to think that an engine has in fact failed. Furthermore, the marvelous autofeather system is rendered inoperative due to the migration of the levers.

Yet it is understandable (although, not excusable) for the pilot to never carry out the first step of his "Suspected Power Loss" procedure … advancing both power levers! Why? Because in his mind that was already done as the takeoff roll began. In other words, the "Power" and "Props" steps are already done in his mind, maybe even the "Flaps" step. So all he has to do (so he thinks) is get the "Gear" step done and watch autofeather do its job. (Or Identity, Verify and Feather manually if the airplane does not have the system.)

Please, please, please give proper attention to power lever friction before every takeoff!

Following on Tom's words of wisdom, I have some other recommendations.

Double-check the Trims

If you look at the trim wheels in most King Airs they are a combination of numbered units, a "0" inside a box in the center and solid box on each extreme. It is very easy to look at a rudder trim or elevator trim and see what you think is center or zero, but more than once pilots have taken off with full trim only to realize it after rotation. In the King Air it is certainly controllable, but it can be a handful and many pilots try to fix what's wrong instead of flying the airplane.

Be Thorough

In my opinion, the best way to approach the post-maintenance flight is to do it as slowly and methodically as practicable using the lengthy POH checklists in their entirety. In fact, you should do that twice … taking the aircraft to the shop and picking it up from the shop. By doing it before, you can discover any abnormalities that need the shop's attention. Of course, doing it after can uncover the errors that may exist. In addition to the full preflight and run-up procedures, I also recommend an inflight Flow Pack, Leak Rate, and Cabin Altitude annunciator check accomplished before the Phase inspection to determine how the plane stands in these important areas. These checks are easier to perform in flight than in the shop's hangar.

One more suggestion is to take off using approach flaps if airport conditions permit, as they almost always will. Recall that most, but not all, King Airs have a system that causes the landing gear warning horn to blow whenever the flaps are extended to a position greater than Approach when all three landing gear legs are not down and locked. I have observed numerous cases in which using flaps on takeoff causes the gear horn to blow as soon as the gear starts retracting. Why? Slight mis-adjustment of the triggering switch attached to the right inboard flap mechanism is the reason. The air loads that the flaps experience in flight usually ensure that the flaps do not extend far enough to

trigger the horn. However, when the flaps are extended to Approach while taxiing or in the run-up area, the lack of air load may allow them to extend far enough to trigger the horn – something you don't want during your short field takeoff!

Recording Results

Not long ago the only way that the pilot could communicate with the mechanic about some discrepancy he found was verbally or in writing. Of course, it is great to encourage the lead mechanic to accompany you on that first flight so that he can observe the same things that you are seeing, but often that is not feasible.

However, now we all carry one of the very best communication devices known to humankind … our smartphones. Having a video of the dancing engine gauge or of the autopilot overshooting the ILS localizer capture … wow, what an excellent way of showing what's wrong! Remember to take advantage of this aid.

Closing Thoughts

It is my belief that any appropriately-trained, competent King Air pilot can successfully serve as the PIC during this most dangerous of common flights. However, I know that some pilots – although meeting all requirements and current in the aircraft – lack confidence to do a good job in this unfamiliar area. A couple of suggestions: First, practice complete walk-arounds and runups more often until the uncertainty and mystery is removed. Second, if possible, invite a more-experienced, more knowledgeable pilot to go along to help you with the tasks at hand. Even if the available pilot is not as experienced and knowledgeable as you wish, just having another set of eyes and a checklist reader to help you can be very worthwhile.

Be careful out there! KA

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Preflight Procedures from a Maintenance Perspective

by Dean Benedict

For many years I maintained a B200 owned by a family business that had used the same pilot for years. He had flown for the airlines and was a decent guy, but every time he picked up the King Air after maintenance, he pulled the door shut, started the engines and took off without even checking the oil!

That boggled my mind. I've seen a lot of preflight routines, but this was no preflight at all. Some of my guys thought I should take it as a compliment because the pilot had so much faith in the work we were putting out, but I'd rather have my work questioned and verified by a thorough preflight inspection. Needless to say, when this King Air went out the door, everyone in the shop gave it an extra walkaround before "Speedy Gonzalez" came to pick it up.

If Possible, Make a Mid-maintenance Visit

Most shops don't allow customers in the hangar because of insurance reasons, but if you have never seen your King Air in the middle of a Phase inspection, you need to. Have the shop foreman give you a tour, just don't be surprised by what you see, even if it looks like total mayhem. Panels are open everywhere, the engine cowls are off and wing lockers, if you have them, are removed. Much of the interior is sitting on the hangar floor and the floorboards are pulled up to expose the guts (electrical, plumbing and ducting). A control surface may be off – a flap, most likely, so the Teflon washers can be accessed for replacement.

Airplanes are 15 pounds of stuff crammed into an oddly-shaped five-pound bag and getting to it is time-consuming and nonergonomic. The skinniest mechanic gets stuffed into the hellhole where they might have to remove ducting and avionics boxes just to carry out the 12-month check on your ELT. He or she then moves on to a dozen other tasks to be performed in there.

Obviously, you are not going to re-inspect the airplane, but think about what you've observed as you do your post-maintenance preflight. You're not doubting your shop; rather, you're confirming their execution of an extremely complex job. And if you find something amiss, good shops will rush to remedy the situation. That missed item will become a learning session for all involved, not to be repeated.

Cockpit Out of Order

After maintenance, it is vital that you allow ample time to restore your "switchology" to your liking. *Check everything; assume nothing*. You have no idea how many mechanics and avionics guys have been in and

out of your cockpit. Switches were flipped, breakers were pulled, levers were moved. The friction locks were loosened to check engine cables for binding.

Every pilot has their preferred "switchology." When I had my shop, I made every effort to return the cockpit to the configuration present at drop off. With repeat customers, I learned their habits and preferences. However, in my post-maintenance debrief I always asked every pilot, every time, to check and restore all cockpit preferences.

The oxygen mic switch is a great example – when is the last time you touched that? Most likely it was in a simulator during loss of pressurization. But what if, during maintenance, an inexperienced mechanic puts all the switches in the "off" (down) position because it seemed like the right thing to do? He has no clue he just turned the O_2 mike on, cutting out the regular mike in the process. Now the pilot arrives to take delivery of the aircraft; he's in a rush to leave and has already taxied out before he realizes his mike is in-op. So, he taxis back in, shuts the engines down and barks at the shop because now he is delayed and frustrated.

This can happen in reverse also: Some pilots choose to leave systems in the "on" position all the time so they don't have to remember to turn them on each time they fly. I've seen this with windshield heat, pitot heat and the vent blower, among others. When the aircraft goes in the shop and external power is applied, these systems come on. An unsuspecting mechanic touches the pitot tube and gets his fingerprints burned off.

The preflight procedure on a King Air, as specified in your POH, is a long and involved routine. Many are compelled to develop shortcuts. But if they are the only one that flies that airplane and assume the cockpit is the way they left it last, then they are bound to encounter unwelcome surprises when they get their aircraft out of maintenance … unless they check everything carefully.

Distractions

Back in my days at BeechWest Van Nuys, there was a very sharp owner-operator with a 200. This guy was totally "by-the-book." One day he was preflighting out on the ramp. He had an aft cowl open when line service paged him for a phone call. He left what he was doing, went inside to take the call, then came back out and continued his preflight. On takeoff that rear cowl ripped off as soon as he rotated. That's when he realized he had forgotten to latch the cowl properly before taking that call, and afterward he failed to backtrack over what he had been doing when he was paged.

A few years ago, an owner-operator was pre-flighting his E90 when the fuel truck operator came by to clarify his fuel request. He was on a step ladder checking his oil at the time, so he got down to talk to the fuel truck operator then finished his preflight. He loaded his passengers and took off for a weekend retreat only to lose oil pressure on one side a short while later. After some very tense moments, he got on the ground safely and found the oil dipstick on that side exactly where he laid it when the fuel truck came by. This shocked him. He was absolutely certain he had replaced that dipstick.

My late father-in-law was the epitome of a thorough and deliberate preflighter. My wife remembers many hours of cooling her heels in an FBO while her dad did his preflight routine. He kept laminated

A post-maintenance preflight is not doubting your shop but confirming the execution of an extremely complex job.

checklists handy and read each item out loud as he performed the task. When she was old enough, he had her read the item out loud and he repeated it back to her as he checked it. But despite his best efforts, after 50 years of flying he left an oil cap latch open and lost oil pressure right after takeoff. Fortunately, he circled back around and landed safely, but he was embarrassed beyond imagination. Chances are, he was distracted when he was checking the oil on that side … I'll bet his cellphone had went off!

Cellphones – a Distraction on Steroids

Although cellphones have revolutionized our lives in many ways, these devilish devices have their downside. Distracted driving is just the tip of the iceberg. In the workplace – aircraft maintenance hangars, in particular – cellphones are a menace to safety.

One item on a phase checklist can require many small tasks in succession. When a cellphone goes off it grabs attention away from the job at hand; it destroys focus.

The problem worsened when text messaging became common. A short conversation becomes five or six "dings" and each one is an interruption. In my shop I had a zero-tolerance policy on cellphone usage that required mechanics to keep their phones turned off and stowed in their toolbox, not in their pocket on "vibrate." I fired two perfectly good A&Ps for violation of this policy.

In one case we were changing the engine mounts on a B200 before installing new engines. The metal portion of the mount assembly attaches to the engine case with four bolts. Two rubber blocks (isolators) "sandwich" around the mount. A large bolt runs through the center of this "isolator sandwich" to the engine truss. There is a sequence of tasks to install these; the four bolts going to the engine case must be safety-wired before the isolators go on. Otherwise, it is next to impossible to "safety" them later. On a 200, with four engine mounts per side, there are 16 bolts to "safety" per engine.

The mechanic assigned to the left engine was great when she followed my directions. But on this day, she was going back and forth to her tool box way more than necessary. When I checked her progress, I found all the rubber blocks in place but the bolts weren't safety-wired. I asked, "Aren't you going to safety-wire these?" She said, "Well, I got distracted." And then I heard the soft "ding" of her phone, in her pocket. She went back to her toolbox where she surreptitiously texted while appearing to search for her safety-wire pliers.

Aircraft maintenance is complicated enough without cellphone distractions. Many times I have woken up in the middle of the night, unable to remember if I "safetied" everything properly. I have even got out of bed, got dressed and drove to the airport at 2 a.m. to double-check myself to put my mind at rest.

I know of larger shops where the managers use text messaging to communicate with mechanics in the hangar. I vehemently disagree with this practice. First, the mechanics don't need more distractions and second, the use of cell phones on the job should be discouraged, not encouraged. Thirdly, the desk drivers might benefit from some firsthand hangar observation to keep their finger on the pulse of things.

In my opinion, you don't need your own phone going off during your preflight routine any more than you need cell phones distracting mechanics while they work on your aircraft. You could just as easily be sidetracked like the pilots I mentioned above. It could be the line guy, the fuel guy or an impatient passenger. Why add to the chaos? Your phone can be turned off.

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Where's Your Right Hand at Rotation?

by Tom Clements

As I write this near the end of August 2020, the "ADS Crash" thread on the *BeechTalk* forum is approaching 100 pages. As most of you know, in June 2019 a tragic accident occurred at Addison airport (KADS) in Dallas, Texas. A nearly new King Air 350i departing on a flight to Florida, crashed into a hangar on the airport just seconds after liftoff from Runway 15. All 10 people aboard – eight passengers and a crew of two – died. The NTSB preliminary docket was just released. This document presents their findings thus far concerning the facts of the case, but no conclusion of the cause has yet been found nor presented.

As you may imagine, this tragedy impacted most of us in the King Air community very strongly and it is easy to understand why the thread on *BeechTalk* is as large as it is. One of the many discussion points that has been raised is the position of the pilot's right hand at rotation. Let's discuss that.

Not until I received my Learjet type rating back in 1978 was I ever exposed to the procedure of "Right hand moves from throttles to control wheel at V_1." The Lear was the first airplane that I ever flew that was certificated under the rules of FAR Part 25 … the "big airplane" rules. Here, an engine failure during takeoff had to be considered and charts/procedures had to exist to allow either a successful abort or a successful continued one-engine takeoff, depending on the speed at which the engine failure was recognized. That is, Accelerate-Stop and Accelerate-Go distances, both had to be possible in the distances available on the runway.

With the relatively stellar single-engine performance of the Lear, the "Going" procedure lacked the drama that we experience in a light, piston-engine twin trainer. It is difficult to make a cogent argument for aborting the takeoff after V_1 when the airplane can continue so well even with an engine failed. In fact, high speed aborts were riddled

with unsuccessful outcomes – going off the end or side of the runway, incurring major damage and, often, resulting in death to the occupants.

The procedure I was taught by the FlightSafety team in Wichita was to reposition my right hand from the thrust levers ("throttles" for us piston-trained types) onto the control wheel when the V_1 call was made by the PNF (Pilot-Not-Flying). That helped to ensure that the thrust levers would never be erroneously retarded to initiate a *stopping* procedure after Decision Speed (the name for which V_1 is the abbreviation) was reached … when the *going* procedure was the correct and expected reaction to the recognition of a power loss.

I can definitely see the benefit of repositioning the right hand as airspeed passes Decision Speed for airplanes that have guaranteed capability to continue on the remaining engine. All the airliner jets, certified under FAR 25 rules, do it this way and rightly so. How about King Airs?

What King Air are you operating? Just counting standard, civilian models there are over 25 different types, each with its own flight manual. The certification rules decide what performance charts must be in that manual. As years pass, as rules change, as aircraft categories change, as maximum takeoff weight changes … all of these variables have an impact on what performance charts are presented in the flight manual. Heck, most King Air models don't even list a V_1 speed!

From a legal standpoint, must the operator comply with all of the charts in the POM (Pilot's Operating Manual) or POH (Pilot's Operating Handbook)? Surprisingly, the answer is no. With the exception of the 300-series, all King Airs are "light twins" since their maximum takeoff weight does not exceed 12,500 pounds. Unlike the heavier airplanes that fall in the Transport Category of rules, there is no requirement for a light twin to have the ability to continue a takeoff with an engine failure. Yes, Beech does the flight testing that allows performance charts to be created that give both Accelerate-Stop Distance and Accelerate-Go Distance under differing conditions of weight, OAT and wind. But they are for information only with no requirement to operate off runways that are long enough to meet these distances. That's a darn good thing, too! Taking your B90 into that 3,000-foot-long strip located near the boss's lakeside cabin would not be possible if "big boy" rules applied.

As we all should know, there is a calculated risk factor associated with many of the runways we use: There will be seconds of time during the takeoff when we will be going fast enough that we will go off the end of the runway if we abort and yet we are still slow enough that we won't be able to climb enough on one engine to clear the obstacles beyond the runway. With the reliability of turbine engines, the risk that an engine will fail during these critical few seconds of time is a risk most of us are willing to take.

However, what if the unlikely but possible event *does* occur? What if one of our PT6s does indeed have a catastrophic failure at, say 95 knots? If we abort under these assumed conditions, use the brakes to their maximum and maintain directional control, we will perhaps still be going 30 knots when we hit the ditch. But if we try to fly at 95 knots?! We are still more than 10 knots below single engine best-rate-of-climb speed (V_{YSE}, Blue Line), we have not yet started retracting the gear, and unless we are equipped with autofeather we still have tons of windmilling propeller drag. If we try to continue it will be very likely we will lose airspeed as we try to climb in this impossible situation and quickly encounter the deadly VMC loss of control. At best, if we keep the nose down to maintain airspeed and control, we hit the trees still going 90 knots. Abort, hit the ditch at 30. Try to continue, hit the trees at 90. Let's see: Three times the speed is nine times the kinetic energy to dissipate. There is a *lot* more chance we will live through the 30-knot hit into the ditch, eh?

So, where I am going with this is to state that my right hand is staying on the power levers at least until I am above nearby obstacles and the airspeed is at least at V_{YSE}. Why? So, I can readily pull the power levers to Idle to initiate the abort. Isn't this exactly what we should do in most other light twins? Due to the King Air's increased single engine climb capability compared to a Baron, our seconds of exposure to bad risk during takeoff from short runways is less than in a Baron but it is still there.

So when does my right hand leave the power levers? If I am flying single-pilot, it does so when I reach for the landing gear handle. And when is that? When continuing looks more favorable than stopping. But as soon as the gear handle is up, I return my hand to the power levers. With the exception of the brand-new, just announced King Air 360 model, no other King Airs have any power limiters except for the human controlling those power levers. It is the pilot's job to adjust the levers to get the torque or ITT value that is desired. As the airplane climbs, adjustments will have to be made. Hence, the right hand spends a lot of time on the power levers. It is not a "select the correct detent and forget" as in the FADEC-equipped turbines. (FADEC? Full Authority Digital Engine Control)

I hope that almost all who are reading this article are familiar

with the phenomenon of "Power Lever Migration," (PLM). That action may have played a role in the crash at KADS. For sure, it has contributed to other fatal King Air takeoff accidents. A spring at the engine-end of the power lever cable is always trying to retard the Fuel Control Unit (FCU) to its idle setting. Why? To ensure that the engine is not damaged when subjected to torque and temp limits that would be exceeded if/when the power lever cable malfunctions/ disconnects and tells the FCU to go to maximum N_g speed. Because (1) the Power Lever (PL) connects to the FCU on the right side of the PT6 and (2) the cockpit end of the PL sits slightly left of fuselage centerline, the left PL cable is significantly shorter than the right. Hence, it tends to move more freely, to have less "stiction"… a combination of friction and stickiness. If the individual PL friction knobs are not both sufficiently "snugged up," it is probable that both PLs will move, migrate back toward idle when unattended. Since the force a spring exerts increases as it is lengthened from its resting position, the pullback force increases as PLs are advanced.

Try it yourself in your hangar on your actual King Air. Turn both friction knobs fully counterclockwise (the looser direction) and push the PLs fully forward then take your hand away. Some of you will see no result, some will see one or both PLs move aft a little, and some will likely see the left lever move most of the way to idle and the right lever come maybe halfway back. It all depends on the "stiction" in your actual airplane. Before you leave the cockpit, remember to turn the friction knobs clockwise enough to ensure they are "snugged up" to where you want them!

If the checklist step of setting proper PL friction before takeoff is overlooked and if the friction is too loose, the stage is set for a huge surprise when the pilot releases the power levers to reach for the gear handle! In most cases (thank you, Lord!) the outcome is more humorous than scary. Of course the pilot sees the levers move and he immediately puts his hand back on them and advances them as desired … probably with the gear still down. Now it's a matter of taking his left hand off the control wheel long enough to (A) get the gear up if the handle is on the left side of the cockpit as it is in all newer

KA models, (B) tighten the friction knobs and (C) go back to flying the airplane with his left hand.

If the PL migration aft is *not* noticed, however? It sets the stage for tragedy.

Realize the following facts. First, power lever position controls the engine's compressor speed (N_g) directly, not torque. Of course, torque and ITT are what we watch as we adjust power but the reason they change is because we selected a new N_g speed. It's said that about the last 50% of available power is all achieved in about the last 12% of N_g. Thus, it takes relatively little PLM to cause a major loss of power. In the case of the left PL moving nearly to idle while the right PL comes back only one-fourth of the way, we would have close to no power on the left and maybe only 50% on the right.

Second, the marvelous autofeather system must be able to know that a loss of power is *unintentional* not intentional. It achieves this knowledge by looking at PL position. If the PL is moved back, the autofeather "thinks" that the resultant power reduction was requested by the pilot and feathering the propeller would not be appropriate. But if the PL is still well-advanced yet little power is being produced … something's wrong and autofeather will ride to the rescue and feather the propeller to reduce the drag. Therefore, when PLM occurs, autofeather is rendered inoperative. In fact, if *either* PL is retarded *both* propellers are incapable of automatically feathering.

Third, the +10-degree pitch attitude we have been taught to hold after takeoff (the 350's POH is the only one that actually states that value but it works rather well for all KA models) will not be correct with the windmilling prop and, probably, reduced power on not only the left but also, to a typically lesser extent, on the right as well. Airspeed will rapidly decay if that attitude is maintained.

Keeping the right hand on the power levers obviously eliminates the possibility of PLM. I am so used to doing this in piston-twins as well as King Airs, personally I do not reposition my hand when Decision Speed is reached even in the 350. Don't get me wrong: I am not saying that I'd pull power back and abort above V_1 in a 350, but the hand stays on the PLs. I have no argument whatsoever with those 350 pilots who *do* move their hand to the wheel at V_1.

But folks, I beg you … always prevent Power Lever Migration! How? First, by snugging up those friction knobs! How do you know they're set properly in a King Air that is new to you? One way is to lift your hand just slightly above the PLs after you have set takeoff power. Did anything move? No? Then put your hand back down and continue. Did a lever start to retard? Depending on the length of the runway, either pull both back to idle and taxi back for another try, now with tighter

friction, or turn the friction knob clockwise a little more before you reset the desired power as you continue rolling. And please realize that takeoff power should be set well before 60 KIAS. I'm not implying that you do this quick release of the PLs near rotation!

How about when flying as a crew of two? The earlier King Air models have the landing gear handle on the co-pilot's side so there is never a need for the left-seater to release the PLs right after liftoff. Even when the handle is on the pilot's side, some crews have the co-pilot reach across to activate it. The only thing I, personally, have against this procedure is that the reaching across looks rather weird and unprofessional. To guarantee no PLM if the pilot will raise his own gear, merely ensure that the co-pilot's hand is positioned such that the PLs cannot migrate aft. I strongly advocate that this be standard operating practice (SOP). It is so simple for the right-seater to rest his hand on the power quadrant with the tips of his first and middle fingers touching the base of the right and left PLs. As the left-seater adds power, the right-seater's hand slides forward to maintain light contact with the PLs. In the event of an abort, the co-pilot's hand can be instantly withdrawn. After liftoff, after the gear is raised and the pilot's hand returns to the PLs, then the co-pilot can move his left hand as desired.

As stated before in this article, no conclusion has yet been reached by the NTSB on the cause of the Addison crash. The cockpit voice recorder, sadly, shows that proper crew-coordination procedures were non-existent. No checklist was ever verbally requested. No briefing was ever given before takeoff. What happened, in my view, jibes perfectly with a Power Lever Migration scenario that was not noticed and not corrected. In addition, airplane control was not maintained. The airplane was allowed to yaw badly to the left and the airspeed was allowed to get too slow, leading to the loss of control. My condolences to the families and friends of those killed. KA

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*.

Stearman's Last Stand – The "Cloudboy"

In 1930 America's economy was in a tailspin when the Stearman Aircraft Company introduced the Model 6 biplane – a rugged design but one that found few commercial buyers and was rejected by the military as a primary trainer.

by Edward H. Philips

The "Roarin' Twenties" had been good to Wichita's airframe manufacturers. In 1928, for example, the city's big three – Travel Air, Cessna Aircraft and Stearman Aircraft – delivered more than 900 new airplanes and company officials were expecting to manufacture more than 1,000 aircraft in 1929. Travel Air, under the capable guidance of Walter H. Beech, was swamped with orders and the 600-man workforce struggled to build five airplanes per day. A few miles to the southwest, Cessna Aircraft Company's president Clyde V. Cessna and his employees were frantically trying to complete and equip a new factory complex, one designed to manufacture the popular Model AW cabin monoplane.

During service testing various radial engines were installed on the YPT-9, including one Kinner (YPT-9C) and two Lycoming powerplants (YPT-9B). In 1931 the Army Air Corps rejected the YPT-9 in favor of the Consolidated YPT-11. (Walter House Collection)

In addition, north of downtown Wichita the Stearman Aircraft Company was overwhelmed with orders for the handsome C3B and the new M-2 *Speedmail* open-cockpit biplanes. Nationwide, more manufacturers were entering the marketplace and the growing economy served to fuel the country's appetite for flying and everything aviation.

The driving force behind the nation's robust economy was the stock market. A growing number of people had money to spend and they spent it investing on Wall Street. Buying and selling stocks was no longer for the rich and the privileged few. Beginning as far back as 1925 it had become "all the rage" to dabble in stocks and bonds through a process known as "buying on margin." The process was not only tempting but simple: A person went to a broker, purchased a certain amount of stock, made a down payment and bought the remainder on credit by making monthly payments. One advantage of the procedure lay in the fact that as the value of the stock increased, the higher value would help pay off what a person still owed.

Lloyd Stearman's final design before he resigned from the company was the Model 6 *Cloudboy*. Rugged and reliable, the biplane was intended to be the Stearman Aircraft Company's entry-level airplane. (Kansas Aviation Museum)

The nation's fledgling aviation industry benefited greatly from such investors and fueled Wall Street's seemingly unstoppable growth. Private individuals, businessmen and high-ranking corporate executives were beginning to realize the advantages of flying compared to automobiles or trains, and flight schools were popping up across the country almost daily in an effort to train the latest batch of would-be aviators.

Amid that wave of prosperity, Lloyd C. Stearman sought to expand the company's product line by designing a biplane that could be powered by radial engines rated at 165-300 horsepower. Designated the Model 6 *Cloudboy*, the ship began life in the engineering department at the old Bridgeport factory that had served as the company's headquarters since the autumn of 1927. Company officials realized that a market existed for an affordable training aircraft, and the Model 6 was designed to be Stearman Aircraft's entry-level product; one that would cost less to manufacture and sell without sacrificing overall performance that had become a worldwide hallmark of the Stearman brand.

Working in concert with chief engineer Mac Short and his staff, Lloyd planned to offer the Model 6 equipped with the new J6-5 static, air-cooled radial engine manufactured by the Wright Aeronautical Corporation in Paterson, New Jersey. Rated at 165 horsepower, the five-cylinder powerplant was relatively thrifty with a gallon of aviation fuel and enjoyed a solid reputation as a reliable engine. For customers who demanded more power, the Model 6 could be fitted with a nine-cylinder Wright J6-9 that developed 300 horsepower.

Lloyd also recognized that the Cloudboy could be a strong contender for military contracts, and he harbored high hopes that the airplane would find its greatest success wearing the colors of the United States Army Air Corps. The air service, however, had been starving for funding by Congress since the end of the "Great War," and by 1930 was preparing to solicit bids for a new primary trainer to replace the aging but reliable Consolidated PT-3 that had entered service in the mid-1920s. The PT-3 had, in turn, replaced the obsolete fleet of Curtiss JN-4/JN-6 biplanes that had served the Army Air Service well since 1917. During the postwar years Consolidated had built more than 460 trainers, and the rugged PT-3 was still teaching fledglings how to fly in the mid-1930s.

By design, the Cloudboy was a utilitarian flying machine. Although it lacked the graceful lines of its older siblings, the C3B and the Model 4 series biplanes, the Model 6 was a tough aircraft that could withstand the errors of student pilots in stride. In an effort to keep manufacturing costs to a minimum, the Cloudboy used conventional conduction practices for the time – a fabric-covered fuselage fabricated from welded chrome molybdenum steel tubing, wood wings with spruce spars with Friese-type ailerons on both the upper and lower panels.

The upper wings spanned 32 feet and the lower panels 28 feet with a chord of 60 inches for both sets. Total wing area was 272 square feet. An N-22 airfoil section was employed that provided good handling characteristics at the stall, during low-speed maneuvering and while landing. A simple but effective outrigger-type main landing gear with shock struts was installed and a tailskid replaced the tailwheel found on the more expensive Stearman airplanes.

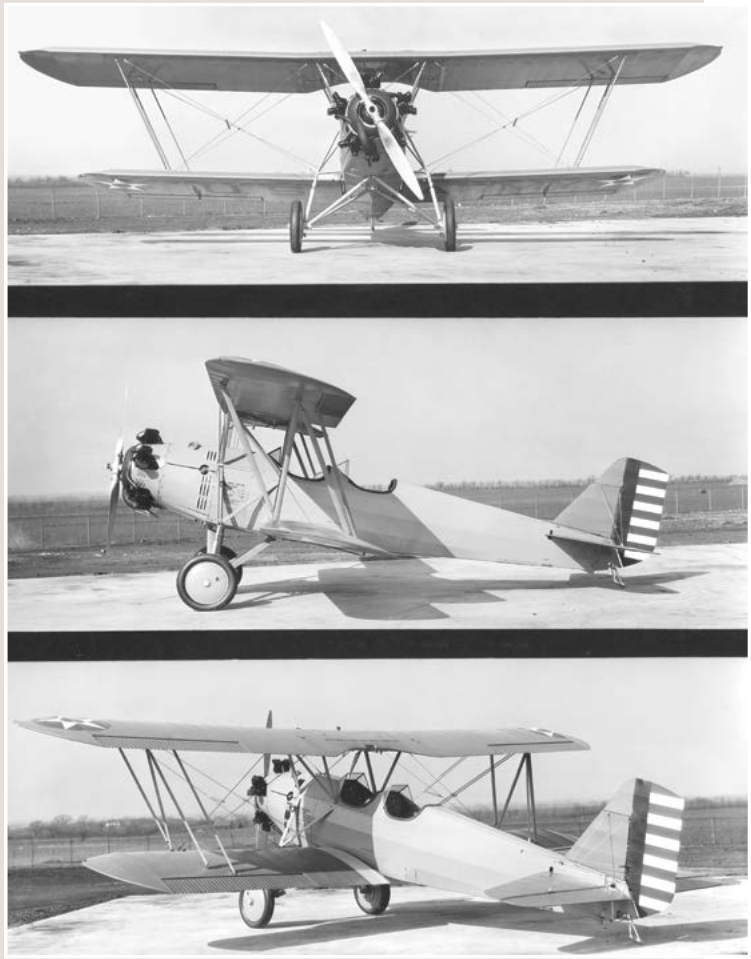
The J6-5 engine ensured that the Model 6's performance would be less than stellar, but it would be more than adequate for the flight training mission. Maximum speed was only 110 mph, slowing to 90 mph for cruise with a stall speed of 50 mph. The first airplane built (serial No. 6001) registered X786H, was soon followed by two other ships registered NC787H and NC795H. In September 1930 the Bureau of Aeronautics awarded the Model 6A Approved Type Certificate No. 365.

During 1930 and 1931 a series of other radial engines were approved for the Cloudboy, including a 165-horsepower Continental (Model 6F), the five-cylinder Kinner R-715 rated at 210 horsepower (Model 6H); the Model 6L equipped with a 215-horsepower Lycoming R-680, and the 300-horsepower Pratt & Whitney *Wasp* Junior engine (Model 6D). Lloyd's hopes for a military contract increased when the United States Army Air Corps held a competition aimed at selecting a new primary trainer that would finally put the PT-3 out to pasture.

The Model 6 fit the Air Corps' requirements well and the company submitted the first Model 6A built for evaluation and was assigned the military designation XPT-912. In the wake of flight trials held at Wright Field in Ohio, the ship was flown back to Wichita and a second Model 6A was built to comply with modifications specified by the Air Corps. In December 1930 another series of tests were conducted, followed by a contract to construct four airplanes for full service testing.

These aircraft, however, carried the designation YPT-9 and were powered by the Wright J6-5 powerplant. The first ship was delivered March 2, 1931. Soon after, the other three airplanes were flown by Lieutenants C.J. Crane, A.C. Kelly and C.B. McDaniel to Brooks Field, San Antonio, Texas. Two of the pilots, Crane and Kelly, were instructors while McDaniel was an engineering officer as well as an instructor. Three of the aircraft were assigned to the 11th Training School Group based at Brooks Field, but the fourth YPT-9 went to Wright Field for further evaluations. In addition, one of the ships was displayed at the annual Detroit aviation show held in April 1931.

All of the service test airplanes underwent a series of engine changes and other modifications in an effort to improve climb performance, but the Air Corps chose the Consolidated YPT-11 over the YPT-9 and other competitors. Senior officials of the Stearman company



The Model 6 was designed from its inception as a commercial biplane and a primary trainer for the military. Late in 1930 the Stearman company was awarded a contract by the Army Air Corps to build four airplanes designated YPT-9. Note the tailskid that replaced the tailwheel on commercial ships. (Walter House Collection)

were disappointed that the trainer had failed to secure a contract, but the Air Corps competition would prove to be a valuable learning experience that helped pave the way for future business with the military services.

During the time that the Model 6 and the XPT-9 were being developed, senior management at the Stearman Aircraft Company experienced a major shift in power. At the request of Frederick B. Rentschler, then serving as president of the giant United Aircraft & Transport Corporation, in December 1930, Lloyd resigned as president of the company he had founded in 1927. He was replaced by local Wichita businessman Walter P. Innes, Jr., who had been serving as treasurer.

Apparently, the change in management was driven largely by Lloyd's desire to design new aircraft coupled with a growing disdain for being entrenched in the day-to-day operations of the company. Specifically, Rentschler wanted him to focus on research and development projects and investigate methods that would expedite manufacturing processes and reduce costs, not only within the Stearman company but across the corporation's numerous subsidiaries as well. Lloyd retained his seat on the board of directors and was designated a consultant and technical adviser to the company.

In a letter dated December 23, 1930, Stearman penned a letter to employees that mapped out his future plans:

"Mr. Rentschler … has called upon me to devote my entire time and energy to research. Realizing that this will require that much of my time will be spent away from the factory investigating and developing new models and new ideas on management, production, sales and service, as well as aircraft design, he has requested that I pass the business responsibility of the company to Mr. Innes. This will give me ample time and energy to pursue my work, a work in which my deepest interest lies and a work I feel will permit my greatest and best contribution to the United Aircraft & Transport Corporation in general, and our company in particular. I am in no way diminishing my interest in the company. I am retaining my membership on the Board of Directors, and while my business responsibilities have been lessened, my technical responsibilities have been enlarged. It will be just as necessary now to have the loyalty of everyone in the company and to bespeak

Only seven Cloudboys were built and at least four have survived into the 21st century, including a former YPT-9B owned and flown by the Yanks Air Museum in Chino, California. (Courtesy Yanks Air Museum)

for Mr. Innes in his new office the same support and loyalty you have given me."

In July 1931, however, Lloyd submitted his letter of resignation to the board of directors. In October 1931, he and his family departed Wichita for California and the promise of a new future. Before he bid Kansas farewell, Lloyd had a few final words for the press:

"The growth of aviation may be slow for the next few years, but it will be constant and steady. I believe there is no question that it will shortly become one of the great industries of the nation. Because of Wichita's natural advantages as to climate, and because it is easily reached from the eastern and western airplane markets this city will always be an important factor in the growth of aviation."

His words proved to be prophetic, and even today the "Peerless Princess of the Prairie" maintains its reign as the "Air Capital of the World." KA

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.

NBAA GO Sessions to Offer Best Practices for Aviation Tax & Transactions

The National Business Aviation Association (NBAA) recently announced an informative series of upcoming NBAA GO virtual professional development seminars addressing common questions and concerns surrounding aircraft transactions, ownership structures and taxation, including the ramifications from COVID-19 pandemic.

Beginning Tuesday, Oct. 13, the Virtual Aviation Tax & Transactions Review will encompass a series of three live and three pre-recorded sessions featuring recognized leaders in aviation tax planning and transactions for an interactive analysis of critical tax and regulatory issues for aircraft owners and operators.

Live sessions will include:

- **The A to Z of Tax Depreciation for Aircraft Owners: How to Maximize Deductions and More – Tuesday, Oct. 13 at 2:30 p.m. (EDT):** During this session, attendees will learn how to determine the applicable depreciation schedules for business aircraft, including the potential availability of immediate expensing, and structure operations to maximize depreciation deductions.
- **Tax Aspects of a Successful Aircraft Transaction – Tuesday, Oct. 20 at 2:30 p.m. (EDT):** This live session will offer guidance to proactively identify federal tax concerns for common aircraft ownership structures and understanding of basic aircraft depreciation and the importance of state sales tax and use planning when acquiring aircraft.
- **CARES Act Business Tax Changes – Tuesday, Oct. 27 at 2:30 p.m. (EDT):** This session will provide high-level understanding of tax policy changes under the CARES Act such as net operating losses (NOLs); disallowance of excess business losses; and suspension of certain federal excise taxes and their impact on common aircraft ownership and operating structures.

In addition, pre-recorded sessions will provide detailed information about common regulatory and tax questions regarding different uses of business aircraft, for attendees to review at their convenience:

- **Regulatory Aspects of a Successful Aircraft Transaction:** This session will examine tax planning strategies that can have unforeseen regulatory consequences. Attendees will also gain an understanding of the differences between operating under FAR Part 91 or Part 135.
- **Tools to Share Aircraft Costs and Increase Utilization:** To effectively use a business aircraft, there is often the need to share costs or utilize the aircraft across various companies. This session will examine shared use models and how to structure them to ensure regulatory compliance.
- **Planning for Non-Business Use of Aircraft:** When non-business travel occurs, there are complicated tax regulations to comply with and detailed recordkeeping requirements. During this session, attendees will learn how to analyze non-business use flights to determine how they are treated for fringe benefit purposes, and SEC compliance.

Live sessions will include interactive Q&A forums providing the opportunity for attendees to ask presenters about specific taxation and transaction issues. Each hour-long session is eligible for continuing legal education (CLE) credit and CAM recertification credit, while the live sessions may also be applied toward continuing professional education (CPE) credit for CPAs.

NBAA Also Launches New Virtual Learning Series Tailored to Smaller Flight Departments

The NBAA also recently unveiled a new series of educational programming to address common issues facing leaders of small flight departments, and to provide guidance to newer managers for supervising and growing their flight operations.

Developed by NBAA's Small Flight Department Subcommittee, the new NBAA Small Operator Learning Series offers contributions from seasoned business aviation leaders on matters including operational excellence, management practices and financial considerations. All programming is available free for NBAA members to review at their convenience, on their schedule.

The online series recently launched with three informative modules:

- **Budgeting Basics:** Addressing one of the most common challenges for new managers, this program assists small operators in designing budget templates, managing department expenses and planning for scheduled and unanticipated expenditures.
- **Insurance Claims and Coverage:** Smaller flight departments consistently face insurance claims and coverage issues with respect to their aviation operations. This module addresses both fundamental issues as well as more specialized and highly nuanced areas, including aircraft

diminution in value claims and the limits to professional liability insurance.

- **Time Sharing Arrangements:** This module offers best practices for creating and utilizing a time-sharing agreement for aircraft principals to share their aircraft with others. This program also details NBAA's Small Aircraft Exemption that allows the use of regulations typically reserved for large operators.

The NBAA Small Operator Learning Series will continue evolving and adding new content, with future modules addressing maintenance best practices, building an effective safety culture and communicating effectively with the aircraft principal, among other topics.

Go to the organization's website at *nbaa.org* to find more information.

Garmin Announces New Addition to D2 Aviator Watch Series

Garmin® International, Inc. recently announced the D2™ Air, its latest GPS smartwatch for the modern pilot with powerful aviation capabilities and a sleek, new touchscreen design that can be worn 24/7. The newest addition in the D2 aviator watch series, the D2 Air offers tools for all phases of flight, including weather, direct-to navigation, airport information, flight logging, Pulse Ox[1] and much more. To keep up with life on the go, the D2 Air incorporates connected features like smart notifications[2], Garmin Pay™ contactless payment solution[3] and phone-free music, along with enhanced health monitoring and animated workouts.

The D2 Air includes several pre-flight features and tools, with the ability to display multiple time zones including Zulu time, and METAR and TAF aviation weather reports and forecasts, to name a few. Additionally, airport information such as runway orientation with wind components, runway lengths, airport frequencies and traffic pattern altitudes are easily accessible for each airport.

Preloaded with a worldwide navigation database containing NAVAIDs and Intersections, a waypoint info page, direct-to navigation, a three-axis compass with a horizontal situation indicator (HSI), and an altimeter with adjustable barometric setting, the D2 Air is packed with features to assist aviators in navigation and enhance situational awareness.

The D2 Air utilizes Garmin Pilot™ flight plan transfer[4], allowing for an easy way to access flight plan information by seamlessly transferring flight plans into the watch. Aviation alerts such as speed, time, distance, elevation, and a fuel timer are available on the D2 Air watch during flight. For post-flight ease, the D2 Air integrates

Statement of Ownership, Management and Monthly Circulation of *King Air*

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CIRCULATION-Average Each Issue During Last 12 Months: A. Total Copies Printed, 4777; B. Paid/Requested Circulation: 1. Outside-County, 2486; 2. In-County, 0; 3. Outside the Mail, 0; 4. Other Classes USPS Mail, 17; C. Total Paid/Requested Circulation (B 1-4), 2503; D. Free/Nonrequested Circulation: 1. Outside-County, 2186; 2. In-County, 0; 3. Other Classes USPS Mail, 0; 4. Outside the Mail, 6; E. Total Free/Nonrequested Circulation (D 1-4), 2192; F. Total Distribution, 4695; G. Copies Not Distributed, 82; H. Total (F and G), 4777; I. Percent Paid/Requested, 53.31%.

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Rebecca Mead, CFO

with flyGarmin.com® logbook[5] to sync post-flight data such as date, duration, and route of flight.

The D2 Air provides all-day connection and convenience for life on the go. When paired with a compatible device, users can receive smart notifications for incoming calls, text messages, calendar reminders and more on the vivid 1.2-inch AMOLED touchscreen display. Users can also download songs or playlists[6], including those from third-party music services like Spotify®, Amazon Music and Deezer[6]. And with Garmin Pay, pilots can make contactless payments right from their wrist[3].

As a multifunctional smartwatch, the D2 Air offers a broad range of health and wellness features, including advanced sleep monitoring, respiration tracking, stress tracking, hydration tracking, the Body Battery™ energy monitor enabling pilots to track energy levels all-day, Pulse Ox that gauges blood oxygen saturation levels for reference when flying at altitude, and more[1]. With

GPS, Elevate™ wrist-based heart rate[7], and over 20 built-in indoor and outdoor sports apps including walking, running, cycling, pool swimming, golf and more, the D2 Air is packed with features to keep up with an active lifestyle.

The D2 Air's AMOLED screen brings workouts to life with an additional 40-plus on-device animated workouts for strength training, cardio, yoga and Pilates. Easy-to-follow workouts demonstrate proper form and technique right on the user's wrist and can be downloaded at no charge from the Garmin Connect™ app[5].

The design of the D2 Air features an aviation-themed watch face, stylish stainless-steel finish on a 43.2 mm bezel and an elegant premium black leather strap with yellow accents. It boasts a rugged scratch- and damage-resistant lens with Corning® Gorilla® Glass 3 for durability, allowing pilots the freedom to use the watch as it was designed in a demanding flight environment. Also included with the D2 Air is a sporty silicone quick-release watch band, allowing for a seamless transition between exercise or a round of golf, to a more formal leather strap better suited for business environments or a night out, with additional band options available and sold separately.

The D2 Air boasts a battery life of up to 5 days while using smart notifications and pre-flight planning tools, and up to 10 hours of battery life when continuously using GPS and Pulse Ox while flying. Pilots can utilize the D2 Air's always-on mode to ensure all their information is right at hand when they need it. The D2 Air is available now for a suggested retail price of $499. KA

Notes:

1. This is not a medical device and is not intended for use in the diagnosis or monitoring of any medical condition; see *Garmin.com/ataccuracy* Pulse Ox not available in all countries
2. When paired with a compatible smartphone; see *Garmin.com/ble*
3. View current supported country, payment network and issuing bank information at *Garmin.com/GarminPay/banks*
4. When paired with a compatible smart device downloaded with the Garmin Pilot app
5. When paired with a compatible smart device downloaded with the Garmin Connect app
6. May require premium subscription by a third-party music provider
7. See *Garmin.com/ataccuracy*

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