

# King Air

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

FEBRUARY 2020 • VOLUME 14, NUMBER 2 • \$6.50



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(credit: Clint Goff Photography)

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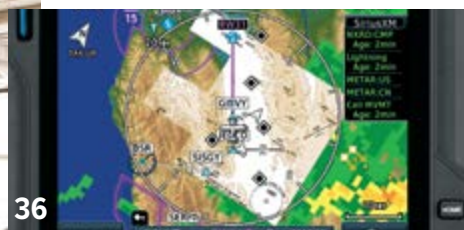
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# Unexpected Career

## Chance encounter reveals flight path

by Kim Blonigen

*photos by Clint Goff Photography (unless specified)*



The Beechcraft King Airs managed by Casey Aviation –  
a 1989 Model 300 and 1979 B100.

**G**rowing up, Joe Casey had no idea he'd own an aircraft-related company one day. It was really a fluke that he discovered aviation at all.

"When I graduated from college with my non-aviation degree, I didn't have a plan of what I was going to do," he explains. "I decided to drive halfway to the next town, stop at every business I came to and ask for a job; the airport just happened to be located within that span."

While the airport didn't have a job for him, officials there offered a ride in the back of a Cessna 172 during a training flight.

"I was completely hooked the second we left the ground," he said.





Casey Aviation operates efficiently with three full-time employees, as well as owner Joe Casey, and two part-time employees. Pictured above (front to back): Deanna Wallace (King Air pilot/PA-46 instructor), Clint Goff (photography), Josh Best (sales manager), Ben Casey (aircraft management/PA-46 training), Joe Casey (owner/DPE/pilot) and Clay Cleaver (aircraft detailing and facilities).



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Casey's life changed that day and so did his career path. He decided he wanted to fly for a living, so he joined the U.S. Army as a warrant officer flying Sikorsky UH-60 Black Hawk helicopters. He quickly earned instructor pilot (IP) and instrument flight examiner (IFE) ratings.

In 1999, after eight years in the Army full-time, he transferred to the Army Reserves and joined the ranks of airline pilot to start the career he thought he wanted. ➤



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Joe Casey



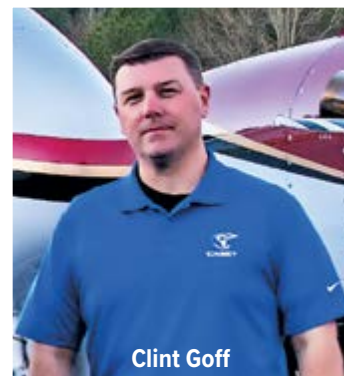
Clay Cleaver



Josh Best



Ben Casey



Clint Goff

Deanna Wallace



***“We have a great team environment and are really more of a small family than co-workers.”***

**-Joe Casey**

He didn't like it as much as he thought he would, though, and as was the case for many airline pilots, he was furloughed after Sept. 11, 2001.

That's when he started flying a Piper PA-46 Mirage for a private company, which Casey says taught him as much about business as aviation. Seven years later he launched his own company, Casey Aviation, based at Cherokee County Airport (KJSO) near the East Texas city of Jacksonville.

What started as a small venture providing flight instruction in the PA-46 has grown into a multifunctional aviation business with three full-time employees in

addition to Casey, who has logged 15,100 total hours. The company still gives flight lessons – and Casey, a Designated Pilot Examiner (DPE) in many models of aircraft (including the King Air 300/350), continues to provide checkrides – but after 11 years in business, the firm also acts as an aircraft buyer's agent/broker, manages two Beechcraft King Airs and offers ferry pilot services.

“The company experienced slow, but sustainable, growth on purpose,” Casey explains. “Although more gradual, expanding the business 100% debt-free allows me to sleep better at night and keep my stress level low.”

Casey Aviation has two flight instructors and one sales division manager, in addition to Casey who oversees the business and jumps in where needed; all four are pilots and instructors. The company also employs two part-timers, one who's in charge of keeping the aircraft and hangar clean and a photographer who captures photos and video of the aircraft.

“We have a great team environment and are really more of a small family than co-workers,” Casey says. “If something needs to be accomplished and the primary employee who usually carries out the task is unavailable, someone else will jump in and get it done.”

Joe Casey, owner of Casey Aviation based in East Texas at the Cherokee County Airport (KJSO), has flown every variant of the King Air and says the Model 300 is his favorite.



## King Air Connection

Casey Aviation manages two King Airls, a 1989 Model 300 and a 1979 B100, both having had avionics upgrades to Garmin GTN 750 panels. The King Airls are used by private businesses and each fly about 125 hours per year, mostly within an 800-mile radius of Jacksonville.

Casey believes there's no better airplane to handle "mission creep" than a King Air. He explains that what started out as a need from their client to fly four to five people

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about 450 nm morphed into often having eight-plus people and bags on longer trips.

“Had we bought any other airplane, we would have needed to move up but the King Air fleet is so adaptable that we just load up more people and go,” he says. “Since we have the two King Airs, sometimes we’ll take both when we’ve got a larger number of people that need to travel.”

Casey Aviation also completes a number of King Air ferry flights, including about 10-15 internationally

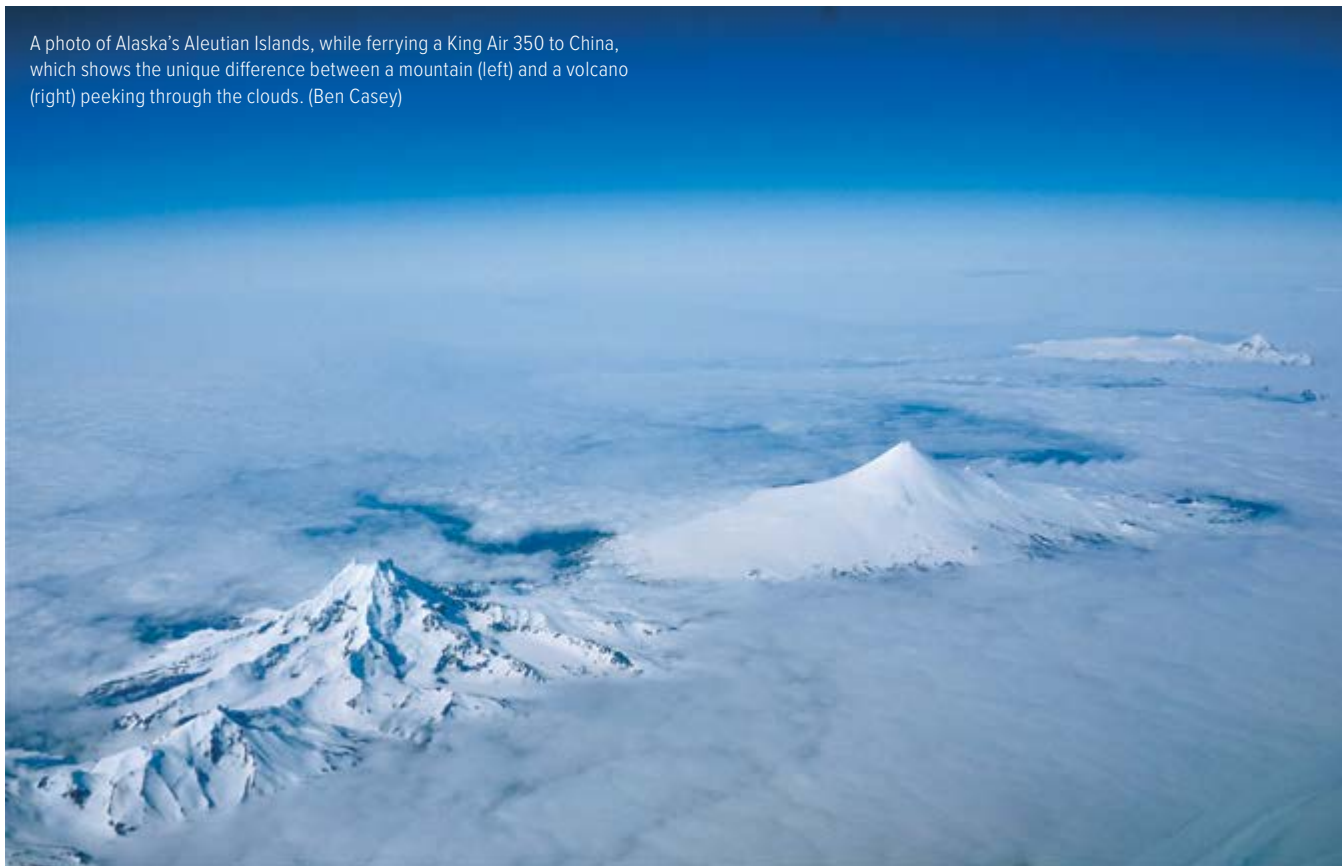
each year. In 2019, Casey said they landed at 29 different countries on trips to India, the South Pacific, Africa, China, South America and Europe. These trips usually provide a variety of special operating conditions.

“We endure everything Mother Nature throws at us, oftentimes on the same trip.” Discussing a specific journey ferrying a King Air, he recalls, “We’ve taken off from Saudi Arabia in above 125 degrees Fahrenheit temps, flown an ILS into Iceland with howling winds and battled some serious ice in

Canada, and the King Air performs with ease.”

Casey has flown every variant of the King Air Model 90, 100, 200, 300 and 350 and says the King Air 300 “is simply my favorite airplane in the world.” Casey Aviation employee Deanna Wallace, who also flies the managed King Airs, as well as ferries them, agrees, “The 300/350 series is my favorite, as I have found very little it can’t do, but I have grown a certain fondness for the stepchild of the family, the B100, since flying it the past two years,” she says.

A photo of Alaska's Aleutian Islands, while ferrying a King Air 350 to China, which shows the unique difference between a mountain (left) and a volcano (right) peeking through the clouds. (Ben Casey)



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Wallace, who is CFI/CFII/MEI-certified and has logged almost 7,000 total flight hours, says she first fell in love with King Airs in 2002 when she flew right seat in a King Air 300. “I feel that the King Air (all models) is absolutely hands down one of the hardest working, finest performers on the market. With a model that will fit almost any mission, you can’t beat it in payload, performance or economy.”

### Spreading the Love

Casey’s love for flying shows through in his business and his employees. In fact, his son Ben, after gaining his master’s degree and working in the business world in Dallas/Fort Worth, joined the company to manage aircraft operations and assist with brokering services. Although he obviously grew up around aircraft, Ben didn’t start logging hours until 2017. He now holds CFI and CFII certificates and doesn’t plan on stopping there. He also instructs in the piston PA-46 for the company.

Besides the King Airs, the company has a variety of airplanes in their hangar, which Casey says sometimes surprises their clients. “I love tailwheel airplanes and believe the best pilots in the world will fly a tailwheel airplane regularly to stay proficient in the bigger airplanes,” he explains.

You will find a 1940 Porterfield, a 1994 Pitts S-2B, a 1990 Piper Super Cub, a 1961 Beechcraft N35 Bonanza and a 1978 Cessna 310Q in the hangar. Casey says they are all flown regularly. “Our pilots usually fly about



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The beautiful view on approach into Narsarsuaq, Greenland (BGBW).  
(Ben Casey)



A King Air on the ramp in Narsarsuaq, Greenland (BGBW) being ferried by Casey Aviation to India.  
(Ben Casey)



600-1,000 hours per year, partly because we fly some really long flights, partly because we instruct a lot and partly because we just love to fly.” He continues, “If we don’t have a King Air or training flight scheduled, we usually find one of the tailwheel airplanes and go for a fun local flight. We think flying more makes us better, so we fly a lot!”

Wallace adds, “Casey Aviation, under Joe’s leadership, is the first place I’ve been that I’ve not wanted to leave or even consider other employment options. I get all the hands-on flying I want with the King Airs, I get to instruct and help make safer pilots in high-performance, turbine, pressurized aircraft in the PA-46 world, and I

get to pull out Joe’s 1940 Porterfield or an available Super Cub any time I get the itch to fly low, slow and with a wheel in the proper spot on the tail. If that isn’t enough, I got to fly around the world five times last year ferrying aircraft.”

She continues, “I am simply enjoying aviation at all the levels Casey Aviation provides. I found a kindred, aviation-loving spirit in Joe Casey and I plan on supporting his mission of ‘helping others get where they want to go’ for years to come. For the first time, I have found a career ‘home,’ flying whatever may be housed in the hangar, and fortunately that includes a couple of beautiful King Airs.” **KA**



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# Looking Back

by Dean Benedict

**I**t's a new decade. Such milestones tend to prompt us to stop and take a look back. For me, I'm continually impressed by the resilience of the Beechcraft King Air – all of them. Every model has its virtues, and they have stood the test of time like no other aircraft in general aviation.

I went to work for BeechWest Van Nuys in 1975. Beech, Cessna and Piper were to general aviation what GM, Ford and Chrysler were to the auto industry. Many considered Beech head and shoulders above the rest and I heartily concurred. As a mechanic I was struck by the relative ease with which things went back together after disassembly. Beech Aircraft built each airplane by hand, and care was taken in the fitting of panels and where possible, components were located where maintenance could access them.

Everything comes apart faster than it goes back together. Having to fight every nut and screw in every panel during reassembly takes tons of time. That time is money coming out of the customer's pocket. When I worked on other brands it was a constant struggle to replace panels after inspection. The screw holes in the panel never lined up with the airframe. Interior removal and replacement is generally a nightmare on any aircraft, but interior jobs seemed to go more smoothly on a Beechcraft. Looking back, I considered myself lucky to be working on them.

## Strolling Down Memory Lane

During my first year at BeechWest we took delivery of BB-6, one of the very first King Air 200s. That was exciting. The model 90s already in existence were very popular, but the buzz on the 200 was spectacular –

more speed, greater range and a comfortable cabin. Recently, on a whim, I checked BB-6 on the Federal Aviation Administration's (FAA) website. It was de-registered in 2005 (at age 31) and exported to Mexico. Who knows? It could still be flying today and coming up on its 46th birthday. Another serial number that stands out in my mind is LJ-10, a model 90 built in 1964 (no A, B, C or E ... just a straight 90.) It came into Van Nuys for regular maintenance and I performed a lot of work on it. I saw on the FAA website it was de-registered in 2016. I'd like to assume it gave 52 years of King Air caliber service.

## Buying High Time

I am asked about high-time King Airs often. Prospective buyers see a King Air with 10,000 hours and they balk. In most cases, *as long as an aircraft has been properly inspected and maintained*, having high hours is not a red flag. However, good research is necessary to determine how that aircraft has been treated over the years. The reports generated by computerized maintenance programs are easily passed around to brokers and prospective buyers. At minimum they show that the aircraft has had maintenance performed. But if you want the real story on an older aircraft, nothing beats slogging through the actual logbooks, related documents and the POH.

## Garbage In, Garbage Out

Right now, I'm evaluating a model 350 for a seller who will be putting it on the market. The computerized maintenance report lists one engine as having 2,200



hours since Hot Section Inspection (which means the HSI is 400 hours past due on that side) yet the report did not flag that item as overdue! The engine logbook, however, showed the HSI was done 400 hours ago. This happens all the time; data entry mistakes are common. Numbers are transposed or entered in the wrong field and it goes downhill from there. Garbage in, garbage out. In a typical pre-buy inspection, if there's a computerized report, I use it as a starting point. I comb through it and make a list of everything I don't see, or that doesn't make sense. When I finally see the aircraft in person, I jump all over those logbooks to get the real story. Almost always, I find revelations in the logbooks that did not appear in the computerized report. I found an engine logbook missing on a King Air that had been advertised as a cream puff in every way, including all paperwork. I found a high-time and high-cycle King Air that looked pretty good on paper, but the logbooks revealed it had spent 20 years in the Philippines so corrosion became a huge concern.

### Pushback on Maintenance?

Looking back at when the King Air 200 hit the market, Beech couldn't make them fast enough. The 90 models were already a huge success. Getting into a King Air was the thing to do; getting into a bigger one was even better. Owner attitude on maintenance was

very agreeable, even though the maintenance program then was comparatively stringent. Back then a Phase Inspection was required every 100 hours, but the owners did not hesitate. The interval between phases was later extended to 150 hours and ultimately the factory decided on what's currently used – 200 hours between phases with all 4 phases complied with in a 24-month period.

Somewhere along the line, I began to feel pushback from owners regarding required maintenance. More and more I would hear "I'm Part 91, is that *really* necessary?" Owners and pilots began to question the necessity of every item on the checklists. I was not alone. My colleagues have noticed the same thing. I mentioned this in my presentation last September at King Air Gathering IV. Is it just a reaction to the high cost of everything aviation-related? I completely understand keeping an eye on the bottom line. I would gently caution the bargain shoppers not to lose sight of safety. Proper maintenance of any aircraft is going to cost money.

Throughout my career I worked very hard to save my customers money. I would troubleshoot to isolate the problem. I would always repair instead of replace, if possible. I shopped around for pricing on exchanges and PMA parts. I gave warning when high-ticket items were coming due so customers could be prepared and took care not to gouge on labor. Aircraft maintenance is not an easy business; if it were, everyone would be doing it.

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## Maintenance Revisions and Updates

In the last few years there have been changes in the maintenance requirements for King Airs. We've seen some new inspections added, such as the 3-year/3,000-hour/3000-cycle flap inspection and the 2,500-cycle interior inspection, which I've touched on in previous articles. Very recently the mandatory

5-year replacement of flammable fluid carrying hoses was *removed* (for 200s, 300s and 350s – the 90 manual hasn't been updated yet). This surprised me. Engine hoses are essentially a rubber product and rubber doesn't last forever. Looking back, I remember learning that Beech called out a very specific type of hose, made by Stratoflex, to be used on King Airs for flammable fluids. When I had my shop, I made

certain my hose fabricator only used the Beech-specified Stratoflex material in making new hoses. They weren't cheap by any means. Hose shops sent their salespeople my way, and some could do the job for half the price, but the garden-variety black rubber hoses they used did not sit right with me. I was not willing to compromise in this area, so I tried to save my customers' money in other ways. Needless to say, I didn't see this one coming ... or should I say going?

Looking forward, I'm anxious to see what other changes are in store for the King Air maintenance schedule. Additionally, I extend wishes of health and prosperity for the new year and the new decade to all.

Safe flying in your Beechcraft King Air! 

**Correction/Clarification:** In the *Maintenance Tip* article titled "Winter Readiness" featured in the December 2019 issue of *King Air* in the paragraph discussing FCU heat on page 18: *Model 300s do not have FCU heat; in 200s the FCU heat comes on when the condition levers are moved forward; later 90s have the same condition lever setup as 200s, whereas earlier model 90s have a cockpit switch for each engine.*

Our apologies for the lack of clarity.

---

Dean Benedict Dean Benedict is a certified A&P, AI with 45 years' experience in King Air maintenance. He's the founder and former owner of Honest Air Inc., a "King Air maintenance boutique" (with some Dukes and Barons on the side). Now, with BeechMedic LLC, Dean consults with King Air owners and operators on all things King Air related: maintenance, troubleshooting, pre-buys, etc. He can be reached at [dr.dean@beechmedic.com](mailto:dr.dean@beechmedic.com) or (702) 773-1800.



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# Illegal Charter Ops Warning, Big Changes Upcoming for Northeast Airspace and New Resource Regarding OTC Meds

by Kim Blonigen

## FAA Warns About Illegal Charter Operations

Recently, the Federal Aviation Administration (FAA) advised pilots and passengers to take caution regarding illegal charter operations, primarily those pilots soliciting flights for payment on web-based applications.

Pilots and passengers are cautioned to avoid these types of situations and verify their air transportation provider is authorized by the FAA to conduct Part 135 charter operations, which can be found on the FAA's website. Pilots flying for Part 135 operations are required to complete extra training as well as undergo mandatory drug and alcohol testing, and the aircraft flown in these charter operations are maintained to a higher minimum standard.

For the entire communication, go to: [https://www.faa.gov/about/initiatives/safe\\_charter\\_operations/](https://www.faa.gov/about/initiatives/safe_charter_operations/).

## Northeast Airspace to Undergo Big Changes in 2020

The National Business Aviation Association (NBAA) reported that business aircraft flying along the Eastern Seaboard may soon have relief from the usual delays as the FAA will be implementing changes to the airspace in that area with a projected completion date of November 2020.

"Among the FAA's goals for the Northeast Corridor Atlantic Coast Routes (NEC ACR) optimization project are enabling greater use of offshore route options, particularly during Severe Weather Avoidance Plan operations; reducing offshore vectoring and holds; and better segregating overflight traffic from busy arrival and departure corridors into New York and Washington, DC."

According to Ernie Stellings, senior manager at NBAA Air Traffic Services, FAA officials have met

with key stakeholders in the NEC project, including the NBAA, during the past several months to outline milestones and ensure operators are aware of these changes beforehand. Flight planning services used by business aircraft operators have also been included to “make sure they have time to make the necessary alterations to aeronautical charts prior to the targeted implementation dates.”

“The FAA hopes to improve routing and decrease operational complexity through the nation’s busiest airspace,” Stellings said. “This may be the biggest route change in 50 years; the Eastern Seaboard is the most congested airspace in the country, and it’s all being redone.”

### FAA Provides Easy-to-Understand Resource for OTC Meds

The FAA has published a new resource for pilots pertaining to over-the-counter (OTC) medications and being in the middle of cold and flu season, it couldn’t be timelier.

The paper titled “What Over-the-Counter (OTC) medications can I take and still be safe to fly?” aids pilots in deciding if they are fit to fly in reference to regulation 14 CFR 61.53, which prohibits flight with known medical deficiency. It includes questions to ask yourself before each flight, what to look for when choosing an OTC



medication, a list of “NO GO” medications as well as those that are safe to take for various ailments, an example of how long to wait before you fly if you did take one of the NO GO meds, and other valuable information.

To access the paper go to: [https://www.faa.gov/licenses\\_certificates/medical\\_certification/media/OTCMedicationsforPilots.pdf](https://www.faa.gov/licenses_certificates/medical_certification/media/OTCMedicationsforPilots.pdf).

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# The Air Conditioner Reset Procedure

by Tom Clements

A reader recently asked me some questions about the procedure for restoring the air conditioner (AC) back into working order in a B200, following a shutdown caused by too low or too high system pressure. I came to believe that this would be a worthwhile topic for discussion, so here we go.

Before I discuss the King Air model 200 and 300 systems – the only ones that have the pressure protection circuit – I want to mention the method by which other King Air AC systems may sometimes be easily fixed when they fail. The AC system on the 90- and 100-series uses an electric motor to drive the refrigerant compressor. As you know, this motor is located between the inlet and outlet louvers located on the right and left sides, respectively, of the fuselage's nose section, forward of the avionics bay doors. The compressor motor receives its power from a circuit that includes a 150-amp current limiter or circuit breaker (CB), located in the cockpit. The CB on earlier models is visible on the floor, between the pilot's seat and the pedestal. The limiter is under the floor and is not visible until an access panel is removed. Most of these King Air models include an AC start control printed circuit board (PCB) located near the condenser between the louvers in the nose. The purpose of the start control is to reduce the large current spike (quick increase and decrease) caused by the initial application of power to the compressor motor. It was found that the voltage drop that accompanied this current spike often caused the autopilot to make some strange and undesirable deviations. (Somewhat hard to believe but tuning an ILS frequency into Nav 1 actually locked out the AC system in some early 90-series models prior to start controls!)

Some components on the start control PCB are protected by a 1-amp CB located on the board. It can be unfortunately common for this CB to trip, which prevents the AC from starting. Many 90- and 100-series operators have learned that if their AC is inoperative, it is wise to check that CB and do a one-time reset of it before calling the maintenance troops. Often, the CB reset solves the problem and it does not appear again for a long time, if ever. Cheap fix!

Where is the CB located? High in the nose section, under the panel that allows access to the condenser. In fact, many serial numbers have a hole in that access panel, covered by a 1-inch round “bullet hole patch,” that saves a lot of time. Now the CB may be seen and reset by removing the single screw securing the patch, not by taking out the myriad screws holding the entire access panel.

Let's now turn to the low- and high-pressure protection system on the 200- and 300-series. As you probably know, the AC compressor on these models is driven by the right engine's accessory case, no longer by an electric motor. These King Air models received an entire redesign of their environmental system around 2007 when the “Keith” system was introduced. Although overpressure protection is retained in the Keith system, the reset procedure is automatic. There is no reset procedure to do nor button to push. Nice!

However, the thousands of 200s and 300s – including B200s and 350s – with the original environmental system are the models to which this article is directed.

In all of these airplanes, two pressure-protection switches are installed. The underpressure or low-pressure switch is installed in the line going *to* the AC compressor and the overpressure or high pressure switch in the line coming *from* the compressor. Both switches are physically located side-by-side in the leading edge of the right wing's center section.

Low system pressure can be caused by a Freon® leak leading to there being less Freon mass in the fixed volume of all the components that make up the AC system: compressor, condenser, receiver-dryer, expansion valve, evaporator and all the lines connecting the components together. Perhaps the most common cause of a low-pressure trip is freezing in the evaporator plenum caused by a defective hot gas bypass valve. On the other hand, high system pressure is often caused by an inoperative condenser blower. There certainly are other reasons for pressure problems, such as a partial blockage in a line or component.





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Allow me to run through a simple AC system review. A rule of nature is that thermal energy always flows from hotter to colder. If we drop an ice cube into a glass of water, the energy in the warmer water flows into the cooler ice cube and melts it. We obviously never see the ice cube losing thermal energy and getting cooler while the water is receiving that energy and getting warmer! So how do we take energy from our 70°F cabin air and send it out into the 110°F outside air?

We do so by utilizing the properties of a refrigerant that goes by the DuPont tradename of Freon. (R-12 and R-134A versions are the most common refrigerants in King Airs. The first is a CHC – Chloro-fluorocarbon – while the second is an HFC – Hydrofluorocarbon.) Like water, this substance can be in solid, liquid or gaseous states of matter. Also, like water, the temperature at which the transition from liquid to vapor (evaporation) and from vapor

to liquid (condensation) takes place changes as pressure changes. As you all know, water on the stove boils at 212°F with standard sea level pressure, but its boiling temperature is less in Denver at a high altitude under less pressure.

What the AC system does is use the Freon as a mechanism to transport thermal energy from colder to hotter – the cool cabin to the warm outside. It does this by making the Freon's pressure very low, hence making its evaporation temperature also low. The expansion valve is the mechanism that causes this big drop in pressure and temperature. As the Freon flows through the coils of the evaporator, perhaps now with a boiling point of 30°F, the 70°F cabin air can lose energy into the Freon as it boils from liquid to gas. Next, the compressor squeezes the gas, making it hotter, say 180°F. The compressed Freon now flows through the coils of the condenser. The outside air flowing across the

other side of the coils, perhaps at 110°F, receives energy from the hot Freon and blows harmlessly out the left side louvers on the nose. (Ever hold your hand near those louvers with the AC running on the ramp? Isn't it hot air coming out?) To summarize, we make the Freon cold so that cabin air energy flows into it then we make it hot so that it may expel that energy into the outside air ... the Freon is our energy transport mechanism.

There have been three versions of the underpressure/overpressure reset mechanism installed in the 200-series. The very early 200s had a fuse holder easily accessible in the right wing's center section. Beneath the battery box, on the bottom of the wing, do you see that small hinged door with the three camlock fasteners? The fuses are in there. On these early models it contains a fuse and a spare fuse mounted beside it. If the fuse is blown (take it out and look at the element in the glass tube) merely replace it with the spare and maybe you will be lucky enough not to experience another pressure trip. If the spare fuse also blows, it's time for maintenance help.

The second version – which began with BB-345 and could be retrofitted to earlier models – replaced the fuses with a PCB. There are two things of interest here. First, the PCB contains two small red lights. With the battery switch turned on, the illumination of one indicated that the pressure trip was caused by low pressure; the other indicated high pressure was the reason for the shutdown. The second item of interest is a reset button. Just push it once, the pressure-indication light should extinguish and we're back in business for another try. (Make a record of what caused the trip – low or high. That information will help if further troubleshooting is required.)

The third and last of the BE-200 reset mechanisms – and the one most serial numbers now have – began with BB-729 and after, plus BB-688. (All of the 300-series also has this system.) With this version

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there is no need to have a Philips screwdriver to open that little access door in the wing. Instead, you can do a reset via the combination yellow light/reset switch on the left-hand side of the nose wheel well. Many folks erroneously refer to this light/switch combination as a circuit breaker. It is easy to see why this is a common misconception since pushing it usually causes the system to be restored ... just like resetting a CB. But, no, unlike the CB, no excessive current caused this trip and we are not merely closing an open circuit. We are pulling a relay on a printed circuit card back to a closed state after the pressure trip had caused it to go open.

There is one reason why the latest system – the one that eliminates the need for a screwdriver – is, in my opinion, a tiny bit less desirable than the one that preceded it: There is no way to easily tell if the trip was caused by low or high pressure. Yes, you can tell, but now it involves removing the floor aisle access panel behind the main spar in the cabin to find the PCB with the red indicator lights. In most cases, this is something your A&P will be doing, not you.

Consider this scenario: You takeoff from Meacham Field (KFTW) in Ft. Worth, Texas, on a July day and fly a 2:25 flight to El Paso (KELP). The AC worked well on the ground after starting and continued doing a fine job during climb and cruise. Unfortunately, as the descent brought you down into the hot West Texas temperatures, the cabin temperature began to rise. Turning the cabin temp rheostat down, trying the Man Cool mode and holding the Man Temp switch down to DECR for 60 seconds ... nothing improved the situation so you and your passengers were sweating by the time the cabin door was opened. You have only a one-hour layover. What do you do? Here's a time to try a reset.

It's not as easy as many pilots think. You cannot simply find the button in the nose wheel well, push it and be done. Oh no! There's more to it than that. Unless electric power is on and the AC system is receiving a command to operate, a reset cannot take place. Here's a checklist for the proper steps:

1. Turn the battery switch on. For the 300-series, also select Man Close on the Gen Ties switch.
2. Select Man Cool on the Cabin Temp Mode selector.
3. Note if the "AC N<sub>1</sub> Low" advisory (green) annunciator is illuminated.
  - A. Is the light on? If so, go to Step 4.
  - B. If the annunciator is *not* on, hold the Man Temp switch down until it illuminates or until 60 seconds or more have elapsed. If you cannot make the light appear, then that is your problem. You did not have a system trip caused by under- or overpressure, but instead your AC is not receiving a command to operate. Perhaps the left bleed air bypass valve's motor has failed causing it to never reach the "Full Cold" position or maybe the switch on this valve assembly is inoperative. Too bad; you're

going to be hot on the return flight until you reach cold outside air temperatures aloft. Turn everything back off and go drink some ice water.

3. With the "AC N<sub>1</sub> Low" light illuminated, leave the switches as they are and go check the nose wheel well.
4. If the reset light/button is not glowing yellow, again you are out of luck. No reset can be made. But if the light is indeed on, then push the button firmly. You should hear a "click" and the light should extinguish. Congratulations! You have done a successful reset of the pressure protection circuitry.
5. Return to the cockpit to turn everything back to its normal shutdown position.

Now the passengers have returned, you have started both engines and it's time for some cooling! I strongly suggest you add a step or two to your normal procedure. Here's why.

Do you know about the 10-second time delay in AC operation? As is true for any typical automobile, house or aircraft refrigerant cooling system, undesirable pressure excursions (spikes) can be caused by turning the system back on immediately after it has been shut off. It is best to wait a few moments to allow pressures in the closed-loop system to stabilize. The designers of the King Air system first used on the 200 model recognized this and envisioned a typical case in which this unwanted off-on action would occur. Consider landing on a warm day with the AC operating. In the flare, with the power levers now at Idle, the RH N<sub>1</sub> drops below about 60% causing the AC clutch to disengage. Perhaps the pilot chooses to spool up into reverse to make that turnoff closest to the FBO. As the N<sub>1</sub> increases above the AC clutch cut-out value and if the clutch re-engages now ... hello pressure spike and possible system damage! To handle this situation, the designers added a 10-second



The reset button in most BE-200 and all of the 300 series King Airs is located on the left-hand side of the nose wheel well.





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time delay. No engagement of the AC compressor clutch can occur until 10 seconds after the command for AC has been received.

Try this the next time you are in your aircraft on a hot day. Because it is hot, you probably have selected High on the vent blower switch, turned the aft blower on and made sure the bleed air switches are still in the center, Envir Off position. As needed, you have also tweaked your condition levers to have enough  $N_1$  for AC operation. After you turn the mode selector to Auto, note the ITT values then tilt your head back and closely watch the loadmeters. In about 10 seconds you should observe both meters jump up about 5 or 10%. Now look at the ITTs. The right side should have increased a bit (10 to 20° is typical) since the fuel control unit has put in more fuel to keep the  $N_1$  from falling due to the drag of the Freon compressor's load. Lastly, you possibly may hear a new whine in your headset: A little

electrical interference created by the condenser blower motor. These are the proper indications that the AC has begun working as you hoped.

Return now to our El Paso flight where we think we have done a successful system reset. Recall that one of the leading causes of an overpressure trip is an inoperative condenser blower. With both engines now started, I strongly suggest that you watch those loadmeters for the first 10 seconds after you have selected Auto or Man Cool. If you do *not* see the expected increase caused by the load of the condenser blower, quickly turn the mode selector back to Off. Aha! You have just probably confirmed why you had an overpressure trip – no blower.

You and your passengers will suffer on the ground due to no cooling. But relief is on the way! After takeoff with the gear up and climbing normally, return the mode

selector to Auto or Man Cool. See that RH ITT rise a tad after 10 seconds? Feel that cool air starting to flow? Ahhhhhh, feels good!

Realize that the airspeed itself creates enough airflow across the condenser such that it works properly while in flight. Unless we are going very slow – on the ground or perhaps in flight doing slow flight practice with the gear and flaps extended at 80 KIAS – we never need the blower to assist the relative wind. That's why it only operates when (1) the AC is receiving an operating command, and (2) the nose gear's downlock switch is activated. Now you understand why the whine in the noise-canceling headset sometimes begins when the gear goes down at the outer marker, eh?

On our next leg after KELP we can enjoy the comfort of the AC system, just not on the ground. To avoid a second overpressure trip, remember to turn the mode selector off before touchdown! Time for a repair or replacement of the blower.

I hope your AC system operates flawlessly so that you will never need to use that reset button in the wheel well. But if ever you do, now I hope you can do it correctly and with confidence. Stay cool out there! **KA**

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



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The new home of the Stearman Aircraft Company as it appeared after completion in October 1930. Despite having more than 84,000 square feet of floor space, by the late 1930s the factory underwent a series of major expansions as orders for the Model 73, Model 75 and Model 76 increased.

(Archives of the Wichita Area Chamber of Commerce)





The sole Model 70 first flew in January 1934, and later was designated XPT-943 by the Army Air Corps during flight evaluations.  
(Kansas Aviation Museum)

# Revival!

In 1933 the Stearman Aircraft Company's Model 73 biplane helped save the company and brought national recognition of Wichita, Kansas, as a major provider of commercial and military aircraft.

by Edward H. Philips

**F**ive years after the worst economic debacle in American history had gutted Wall Street and laid waste to billions of dollars-worth of investments, personal fortunes and corporations, the fragile aviation industry in Wichita, Kansas, was beginning to rise from the ashes.

Southeast of the city at the Stearman factory, more than 100 employees were laboring to build components and assemblies for the new Boeing Model 247 airliner. Designed as an all-metal, twin-engine monoplane with retractable

landing gear, the airplane was state-of-the-art, and United Air Lines was anxious to place the sleek ship into service on its expanding system of routes.

East of downtown, the Beech Aircraft Corporation, under the able

guidance of Walter H. and Olive Ann Beech, was just beginning to manufacture the Model B17L cabin biplane designed by engineer Theodore "Ted" Wells. The Beechcraft featured a negative-stagger wing arrangement and, like

In 1934 the United States Navy expressed interest in the Model 70 and eventually ordered 41 Model 73 airplanes designated NS-1. (Walter House Collection)



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the Model 247, boasted a retractable main landing gear – one of the first for an airplane in the single-engine, four-place class.

Southeast of the city at the defunct Cessna Aircraft Company, brothers Dwane and Dwight Wallace were waging a campaign to wrest control of the business from its board of directors who, in 1932, had locked pioneer aviator Clyde V. Cessna out of his own factory and shut down production. Fortunately, the brothers succeeded in their quest and by 1934 were preparing to manufacture the Cessna Model C34 featuring a Warner *Scarab* static, air-cooled radial engine, a full-cantilever wing and a cantilever main landing gear.

Although all three of these companies were competitors, their leaders remained a close-knit clan that, regardless of who was prospering in those tough times, knew it was always in the best interest of Wichita to promote the city as a leader in small airplane design and manufacturing.

So, it was by 1934 a trio of talented engineers at the Stearman factory on South Oliver Road were busy completing the design of a primary training biplane – one that company officials hoped would find favor with the United States Army Air Corps and the U.S. Navy. Despite an improving economy and rising consumer confidence in the future, by 1934 a tight-fisted Congress remained reluctant to appropriate funds for military aviation. As a



result, the aircraft was conceived strictly on speculation and without any money from the Air Corps, Navy or the federal government.

During the past 85 years, exactly how the design process began in the mind of Lloyd C. Stearman sometime in 1931, and how it was revived in 1933 by engineers Mac Short, J. Jack Clark and Harold W. Zipp, remains somewhat unclear. Apparently, the trio based their design on a rudimentary drawing by Stearman of a modified Model 6 *Cloudboy* that embodied upgrades to make it appealing to the military.

Led by chief engineer Short, the team made further improvements to the airframe that included a cantilever main landing gear, a fuselage cross section that was similar to that of the sole Model 80 biplane and a new empennage that featured dual trim tabs. In general, it was only an evolutionary, not revolutionary design, but it did represent the company's latest attempt to create a rugged flying machine aimed specifically at the military's primary training mission.

Designated as the Model 70, the latest Stearman was both attractive in appearance but tough, too.

The airframe was stressed for +12G and -9G, which allowed for the execution of many aerobatic and combat maneuvers that were standard fare for a fledgling cadet. The trim biplane was powered by a Lycoming R-680 static, air-cooled, nine-cylinder radial engine rated at 210 horsepower swinging a two-blade, ground-adjustable steel propeller.

By the end of 1933 the airplane was completed and underwent a series of ground checks, rigging and engine runs before engineers and company test pilot David "Deed" Levy pronounced the Model 70 ready for its first flight. Levy took the ship into its element on New Year's Day, 1934, and upon landing proclaimed that the ship exhibited no bad habits and flew well.

The U.S. Army Air Corps and U.S. Navy agreed to test the biplane, and during the next few months test pilots would wring out the Model 70 at Wright Field near Dayton, Ohio, Naval Air Station Anacostia, and at the Navy's flight training base at Pensacola, Florida. Both Army and Navy aviators liked the Stearman but found fault in its stall behavior, which was too benign. They wanted the stall to be more abrupt, and eventually

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Early production line view showing NS-1 trainers for the Navy undergoing assembly.  
(Kansas Aviation Museum)



small, triangular wood strips were attached to the leading edge of the lower wing panels to achieve that requirement.

In the wake of flight trials, the Navy approached senior officials of the Stearman company and sought a quote to build trainers similar to the Model 70, but with minor modifications that included installation of aging but available Wright J5 radial engines rated at 200 horsepower. These changes transformed the Model 70 into the Model 73, and in May 1934 the Navy placed an order for 14 airplanes designated NS-1, plus spare parts and assemblies to construct another 20 of the primary trainers.

The contract marked a major turning point in the brief history of the Stearman Aircraft Company. Senior officials were hopeful that the initial order would be only a first in a series of aircraft for the military. When the company released information to the public, the *Wichita Eagle* newspaper was quick to recognize how important the new business would be to the city:

“Drama lies behind the simple, businesslike announcement of the factory for Wichita, metropolis of the Plains, this is accorded a large part in the up building of the nations’ sea forces more than a thousand miles away. Despite determined work on the part of Wichita plane



The cockpit of a NS-1 reveals the overall layout of flight and engine instruments and controls. (Kansas Aviation Museum)



builders and air enthusiasts, few large military contracts have been awarded factories here. The big order accorded the Stearman plant is thought to have broken down this barrier and to point the way to national recognition of Wichita as capital of the air whether in peace or war.”<sup>1</sup>

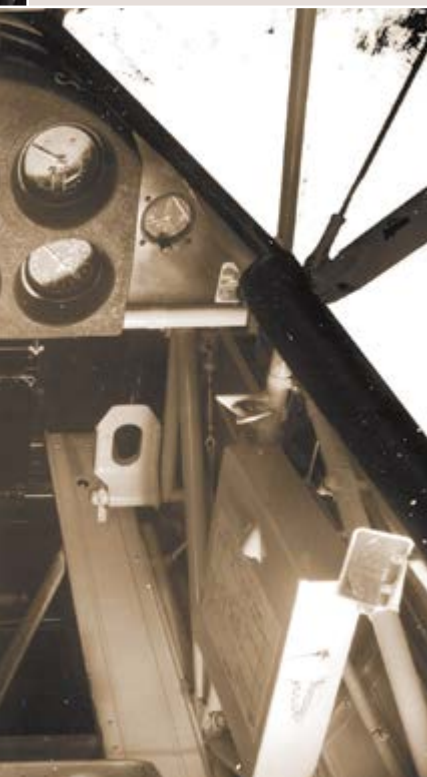
It is interesting to note here that before the Navy contract was announced, Julius E. Schaefer, president of the Stearman company, was becoming increasingly concerned about the ramifications of the federal government’s attempts to break up large holding companies such as Stearman Aircraft’s parent company, United Aircraft & Transport Corporation (UA&TC). President Franklin D. Roosevelt’s administration believed that UA&TC and similar organizations were monopolistic and threatened to dominate entire industries.

In response, Congress passed the Clayton Act and the Federal Trade Commission Act in 1934. The Clayton Act prohibited stock acquisitions that could lessen competition between the acquiring and acquired corporations, whereas the Federal Trade Commission was empowered to prevent companies from engaging in unfair methods of competition. As a result of these new laws, UA&TC renamed the Boeing Airplane Company as the Boeing Aircraft Company and placed Stearman Aircraft under its corporate umbrella. It was a fortuitous decision that would not only propel Wichita into the national spotlight, but cement Boeing’s stake in the City of the Plains.

As for the Navy contract, Schaefer explained that existing facilities would be large enough to accommodate the Navy’s order and there would be no need to expand the

campus nor the workforce at that time. The same hand-picked group of men that built the Model 70 also built the first production NS-1 that was rolled out of the factory into the Kansas sunlight early in December 1934 – 11 months after first flight of the Model 70.

Hot on the heels of the Navy’s order, the Army Air Corps was seeking a new primary training airplane. During the summer of 1934 the engineering department refined the Navy’s Model 73 into the Army’s Model 75. A prototype aircraft designated X75 was evaluated by the Air Corps as the XPT-945 that was powered by a seven-cylinder Wright R-760 static, air-cooled radial engine rated at 225 horsepower. Later that powerplant was exchanged for a nine-cylinder Lycoming R-680 that also produced 225 horsepower. Further flight testing by the Air Corps was completed but no orders



Formation flying was among the many skills a naval aviator had to learn, and these cadets are keeping a close eye on their leader (foreground). The NS-1 proved to be a reliable and rugged aircraft for the primary training mission.

(Archives of the Wichita Area Chamber of Commerce)

were forthcoming, chiefly because there was no funding available to buy the Army new airplanes.

Early in 1935, however, the Air Corps issued a specification and asked the Stearman company to prepare a bid, which was presented to the service in April and resulted in a contract for 20 airplanes to be designated PT-13A, powered by the R-680-5 engine. These orders from the U.S. War Department were part of an expansion program by the Army to increase the strength of its air fleet to more than 2,300 airplanes from a total of 1,800 as of early 1935.

Fortunately that year Congress had appropriated \$23 million for new armaments that included trainers, fighters, transports and

bombers. Captains of the nation's air power, however, knew that these appropriations fell woefully short of what the Army and Navy needed to train the next generation of air warriors to fight in a potentially global conflict. As the Eagle newspaper pointed out, soon after news of the Air Corps' order "Despite the unexpected increase of nearly 500 aircraft this year, War department officials see little hope of materially increasing the Air Corps' strength until larger appropriations are made or funds allotted from other sources."

The Stearman factory, however, was bursting at the seams with orders for new biplanes that totaled \$450,000. Not since the halcyon days of the late 1920s had the company experienced such a high level of activity. By the end of 1936

there were 400 men and women on the payroll working long, hard hours to build another 50 PT-13A trainers. In October the Air Corps contracted for another 30 of the biplanes, and before the end of the year export orders were received from Argentina and the Philippine Constabulary.

As the Great Depression slowly receded and military appropriations increased, Wichita's airframe manufacturers were struggling to keep pace with demand for their airplanes. At the end of 1936 the Beech Aircraft Corporation, Cessna Aircraft Company and the Stearman Aircraft Company had more than doubled their business by comparison with 1935, and 1937 promised to deliver hundreds of more orders for military aircraft. Per the Eagle newspaper, it was estimated that ... "perhaps \$2,500,000-worth

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During the mid-to-late 1930s the Army Air Corps' Randolph Field in Texas operated a large number of PT-13 and PT-13A biplanes. It was the first stop for cadets eager to earn their wings.

(Archives of the Wichita Area Chamber of Commerce)



of business was put on the books here during the year (1936), some of it yet to be filled, but a substantial part of it has been produced. It was the best year since the boom days of 1928-1929.” Walter Beech told the press that the factory on East Central Avenue had built twice as many commercial Model 17 cabin biplanes in 1936 as they had in 1935, and more than 300 men and women were working on the production lines. In addition, in 1936 the Cessna factory had rolled out 50 of the new C34 cabin monoplanes – three times the number built in 1935 – and manager Dwane Wallace boldly prophesied that the company would double its business in 1937.

As the year 1937 dawned, facilities at the Stearman factory were rapidly approaching maximum production capacity. More than 500 workers were turning out 15 new biplanes each month, but the management realized that more floor space would be required to meet future demand. As 1937 progressed, more orders for the PT-13A soon arrived from the Army Air Corps. Air Corps flight instructors, who were arriving almost weekly to ferry new ships south to Texas, were quick to tell the local newspapers that, “The primary training planes have proven highly popular and efficient at the Randolph Field, San Antonio, Texas, base. When the present contract is filled there will be more than 125 Stearman planes in service there, all Wichita-built.” By autumn 1937, the factory workforce was completing one PT-13A every other day.

The Stearman company not only ended 1937 with a profit, but also contributed significantly to the Boeing Aircraft Company’s bottom line. The parent company and its subsidiaries held a backlog of unfilled orders worth more than \$14 million. The Stearman factory had delivered 91 airplanes that year, with the majority of these delivered



The Air Corps designated the Model 75 as “PT-13” powered by a Lycoming radial engine.  
(Courtesy Lawrence Johnson)

to the Air Corps and U.S. Navy, along with export versions of the Model 73 and Model 76 for the military services of Brazil, Argentina and the Philippines.

In April 1938 at a meeting of senior Boeing officials, the Stearman Aircraft Company was renamed the Stearman Division of Boeing Aircraft Company. The new name took effect June 1. Boeing executives explained that the change was made “for reasons of economy and manufacturing advantages.” When 1938 ended, the Stearman Division was on the brink of a major expansion to greatly increase its workforce and manufacturing capacity.

By early 1939 it had become clear to an increasing number of military leaders and politicians in America that war clouds again were threatening to engulf Europe. Both Great Britain and France hoped to placate Germany’s Fuhrer, Adolf Hitler, and his thirst for more land. In addition, an increasingly belligerent and militaristic Japan had invaded Manchuria while rattling its sabre and calling for expansion of its “Greater East Asia Co-Prosperity Sphere.”

Meanwhile, the United States clung tightly to its isolationist policies as President Roosevelt walked a political tightrope between preparing for war and talking peace. As commander in chief of all United States military forces, he wanted the “Arsenal of Democracy” to be ready if and when America went to war. The Stearman Division would soon become an important part of that arsenal. **KA**

#### Notes:

- 1 Wichita “Eagle,” May 17, 1934, Page 5.  
Also Hoffman, Raymond J.B., “*History of Boeing Airplanes Designed in Wichita*,” Page 5. Boeing Aircraft Company, March 10, 1946.

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

## VALUE ADDED

### Garmin® Unveils Fourth Generation GPS/NAV/COMM

Garmin International, Inc. announced the GTN™ 650Xi and GTN 750Xi, the next generation of in-flight navigation technology. Designed as a direct slide-in upgrade to the previous generation GTN 650/750, pilots can preserve their panel and modernize the cockpit with the new GTN 650Xi and GTN 750Xi. The all-in-one GPS/NAV/COMM boasts a feature-rich multifunction display and can integrate with new or existing remote-mount equipment such as a transponder or audio panel. Dual-core processors and modern hardware also prepare the GTN Xi series for advanced capabilities in the future. The GTN 650Xi and GTN 750Xi have received Federal Aviation Administration (FAA) approval and are available immediately for fixed-wing single-engine and multi-engine piston, turbine and experimental aircraft, with helicopter and business aircraft approvals soon to follow.

The company says that modern processing power and state-of-the-art hardware within the GTN 650Xi/750Xi supports faster map rendering and smoother panning throughout the touchscreen navigator. It boasts a large, ultrahigh-resolution display and wide viewing angle that offers superior readability in the cockpit. The displays



initialize within seconds of start-up, providing immediate access to frequencies and flight plan information, saving valuable time in the aircraft. Preserving the same form factor as the previous generation GTN 650/750, the 6-inch-tall GTN 750Xi and the 2.65-inch-tall GTN 650Xi offer an intuitive touchscreen design with a dedicated direct-to button and dual concentric knob that provide added convenience when interfacing with the display.

Retaining all the features of the GTN 650/750, the GTN Xi series adds a vibrant display and vivid colors that enhance the contemporary look of the new navigators. When installed alongside a G500 TXi or G600 TXi flight display, the GTN Xi series brings a new level of modernization to the cockpit. Highly complementary, the GTN Xi and the TXi flight displays share similarities in display, appearance and hardware qualities. For example, both products feature an angular bezel so the pilot has a near-seamless experience when transitioning between the touchscreen flight display and the navigator.

The GTN 650Xi/750Xi offer advanced navigation functions, including ILS and LPV instrument approach procedures, as well as visual approach guidance. Based on a published glide path angle or a three-degree glideslope from the threshold of the runway, visual approaches also take into account terrain and obstacle clearance to assist pilots in flying a stabilized approach to the runway in visual flight conditions. Approach types that incorporate radius-to-fix (RF) leg types are also supported by the GTN Xi series. Additional capabilities include the option to add a published or custom holding

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procedure, vertical navigation (VNAV), graphical flight plan editing on the moving map and more.

The colorful, multifunction display-like map allows pilots to better visualize their dynamic position relative to potential hazards, such as terrain, weather and traffic. Geo-referenced instrument approach procedures can be overlaid on the map page, offering superior situational awareness when transitioning from the enroute to approach phase of flight. Terrain alerting is included within the GTN Xi series and further enhances situational awareness by using its internal terrain and obstacle database to provide audible and visual terrain proximity alerts, including, "terrain ahead, pull up" and "obstacle ahead, pull up."

Superior integration with an array of avionics on the market make the GTN 650Xi/750Xi a simple and straightforward solution to incorporate into any cockpit. Options for remote audio panel or transponder display and control allow aircraft owners to simplify their panel. When paired with a Garmin autopilot, such as the GFC™ 500 or GFC 600, pilots can fly fully coupled VNAV profiles and instrument approach procedures. Pilot workload-reducing features such as Telligence™ voice control is also available within the GTN Xi when paired with the optional GMA™ 35c. When paired with a GSR 56 Iridium datalink, global text and voice calling can be completed through the touchscreen display on the navigator.

Wireless connectivity is available with the optional Flight Stream 510, allowing pilots to connect their mobile devices running the Garmin Pilot™ and FltPlan Go applications to the GTN 650Xi/750Xi. When connected to the navigator, pilots can save time in the cockpit by wirelessly transferring aviation databases and flight plans from their mobile device to the navigator. Flight Stream 510 also supports the sharing of traffic, weather, GPS position information and more. The GTN Xi series is also compatible with the cost-effective Garmin navigation database.

The GTN 650Xi and GTN 750Xi have received FAA Supplemental Type Certification (STC) and are available immediately through Garmin Authorized Dealers for a suggested retail price of \$12,495 and \$17,995 respectively. A free GTN Xi trainer app is also available for download on Apple mobile devices, which allows customers to experience the feature set of these navigators. A new GTN Essentials 2.0 eLearning Course provides instruction on best practices for operational use of the new GTN Xi series and can be accessed via this website: <https://buy.garmin.com/en-US/US/p/712644>.

The GTN Xi series come with a two-year warranty and are supported by Garmin's award-winning aviation support team, which provides 24/7 worldwide technical and warranty support. For additional information, visit [www.garmin.com/GTNXi](http://www.garmin.com/GTNXi).



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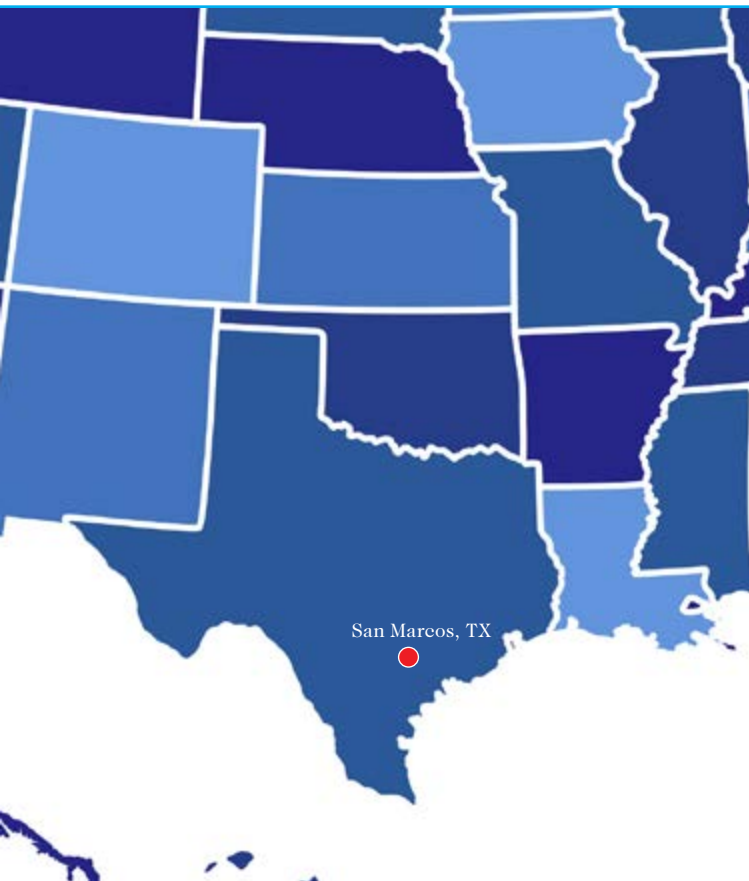
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## Berry Aviation Opens New Maintenance Hangar in San Marcos, Texas

Berry Aviation has announced the grand opening of its 31,400-square-foot maintenance hangar in San Marcos, Texas. The company has been preparing for the maintenance hangar and received 10 new Federal Aviation Administration (FAA) and European Union Aviation Safety Agency (EASA) Part 145 Class Ratings in late 2019. Its repair station certification includes airframe, powerplant, propeller and accessories, with FAA authorization to work on Beechcraft King Airs, as well as some Cessna Citation and Bombardier Learjet models, and others.

The larger maintenance space for Berry Aviation specifically includes a 19,300-square-foot aircraft maintenance area, a 3,500-square-foot component repair and overhaul area and a 2,800-square-foot parts department. The company says the new hangar adds enough aircraft capacity to give them an estimated 75% increase in hands-on maintenance work and also enhances back shop support for component repair and streamlines supply and parts operations.

For more information, go to [BerryAviation.com](http://BerryAviation.com) 



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