King Air

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

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COVER PHOTO
King Air C90 N290PA at Innsbruck Airport (LOWI).
Photo Credit: Boris Greiner.

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Living Life to t

King Air C90 Plays Part in Austrian Owner's Plan

by Kim Blonigen

Greiner and Klein's Piaggios parked in front of Red Bull Hangar-7 located in Salzburg, Austria. Known for its architecture, it hosts a collection of the Flying Bulls' rare historical aircraft that have been refurbished and are airworthy.

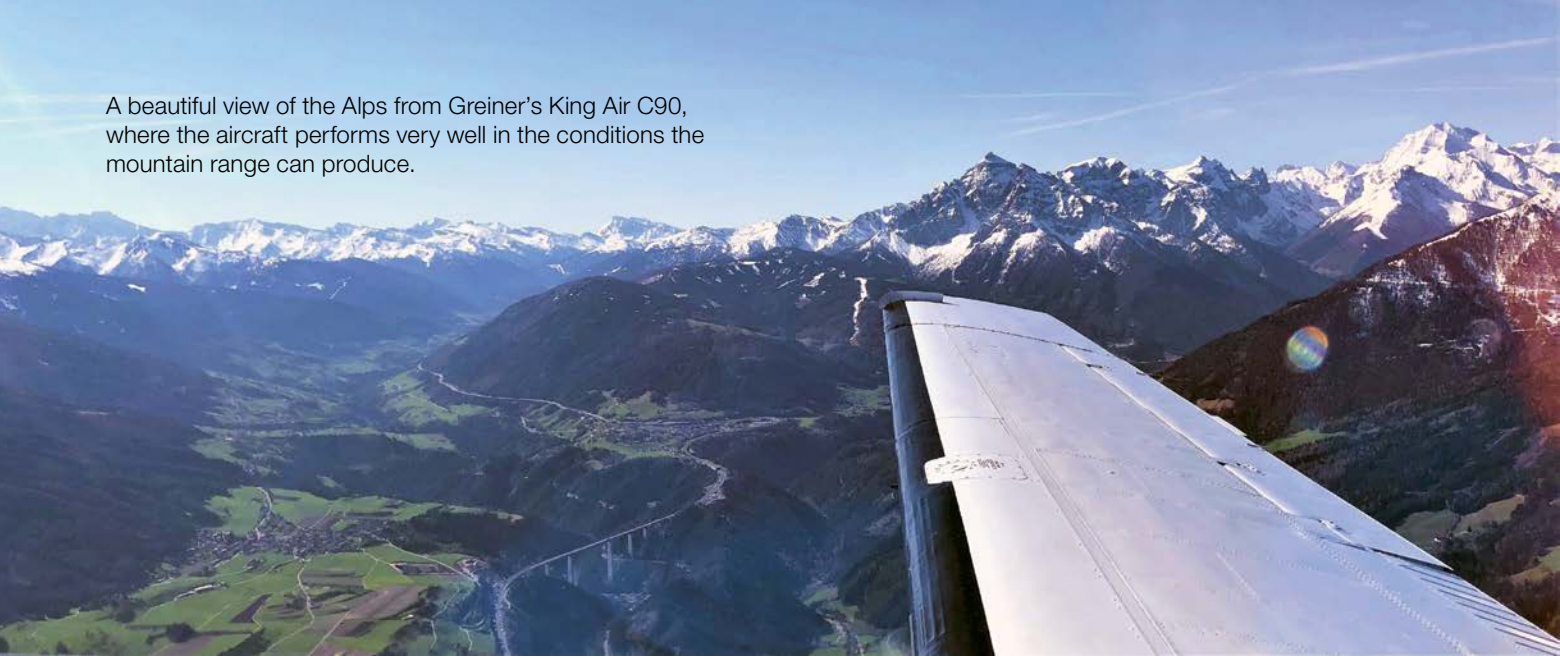
he Fullest

Greiner's King Air C90 N290PA parked on the ramp at Innsbruck Airport (LOWI) located in the middle of the Alps in Austria.

Austria native and King Air C90 owner Boris Greiner has the entrepreneurial spirit and business sense of taking what he learns, making good decisions and using it to better his life – both professionally and personally. He has this enterprising nature in his genes, as his ancestors started a small business in 1868 that has grown into a large global firm through bold decisions inspired by a visionary outlook, innovation and a keen sense of the market. It was his time working in the family operation that he learned the value of business aviation.

Greiner was born in Vienna in 1971 and raised in Upper Austria – a state in northern Austria that borders Germany and the Czech Republic. Knowing that working in the family business was an option, he prepared himself well by attending the Vienna campus of Webster University St. Louis, where he received a Bachelor of Arts degree in management. He went on to get his International Master of Business Administration (IMBA) through a program that allowed him to study seven months at the Vienna University of Economics and seven months at the University of South Carolina in Columbia.

After receiving his IMBA, Greiner stayed in the United States and oversaw a new manufacturing site of the Greiner company being constructed in Monroe, North Carolina. He then moved back to Austria and served as CEO of the Greiner company, where he experienced firsthand the value of aviation through chartered aircraft.



A beautiful view of the Alps from Greiner's King Air C90, where the aircraft performs very well in the conditions the mountain range can produce.

Although he still owns part of the business with 40 other family members, Greiner desired a better work/life balance. In 2008, he left the company and now spends his time managing real estate, consulting and operating a tour company he owns in Steyr, Austria. The sightseeing excursions take visitors on Segway PT® units through the old town area highlighted with historic buildings and stunning scenery.

Living a Fuller Life

Greiner now has more time for the "life" part of the work/life balance that he was seeking, which allows him to enjoy more of his passions. Chief among those passions is becoming a pilot and traveling. "Flying combines many of my interests – weather, physics, technology and more," Greiner explained.

He took his first flight lesson in 2008 and acquired his private pilot certificate in 2009. Since then, he hasn't stopped his training – he holds single-engine and multi-engine land ratings through the European Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA), as well as an FAA IFR rating. Greiner says that EASA and FAA single-engine sea ratings are on the list for 2019.

Right after attaining his pilot's license, Greiner leased a Diamond DA40 and a Piper Tomahawk for his travels. In 2011, he purchased a Piaggio P149D warbird (D-ELEV) – a 1950s Italian trainer (German built), utility and liaison aircraft. "I think the P149D is the perfect single-engine airplane and a wonderful Italian design; it's sturdy, easy to handle and provides a lot of payload," Greiner said.

Six years after he bought the Piaggio, Greiner was ready for his next challenge – expanding his flying envelope and traveling farther with friends for leisure. During the summer of 2017, he purchased his 1971 C90 (N290PA) which had 8,800 total hours. He admits that he didn't necessarily narrow his search down to a King Air, but it was available for sale nearby in Hungary, and he knew the model had a good reputation.

Greiner and his FAA- and EASA-certified pilot friend, Konrad Klein (who also owns a Piaggio), both came to the United States to receive initial and recurrent training in the King Air, and he says there is another friend who will join them next time. They took their training at the King Air Academy (KAA) in Phoenix and says they

The cockpit panels of Greiner's two aircraft – King Air C90 (above) and Piaggio P149D (below). He plans to upgrade the King Air panel this year by replacing the two Garmin 430s with the Garmin GTN™ 650/750.

will be back. While in the States, Greiner and Klein also attended the King Air Gathering held late September 2018 in Fredericksburg, Texas, which they both found very worthwhile. "Since we are new to the King Air, there was so much we learned," Greiner said.

When asked about what he finds as the biggest differences flying in Europe compared to the United States, Greiner said for him it was the language differentiations – some of the English was hard for him to understand. He also mentioned the high charges for landing fees and flying IFR in Europe.

Greiner explained that due to being down for maintenance and the time for him to attain his IFR rating, he was only able to add about 50 hours to N290PA throughout 2018. He made the most of those 50 hours, though, with trips to Dubrovnik, a city located on the Adriatic Sea, and Rijeka, a port city on the Kvarner Bay, both in Croatia; Southampton, United Kingdom, a port city on England's south coast; and Olbia, a coastal city in northeast Sardinia, Italy.

N290PA getting fueled at Györ Airport (LHPR) in Hungary on the way to Austria after purchase.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Greiner and his pilot friend Konrad Klein, on a flight in the King Air.

Austria provides some challenging flying conditions particularly among the Alps, which cover 62 percent of the country's total area, running east to west and reaching heights of 12,461 feet. According to Greiner, he typically flies the King Air at 18,000 to 21,000 feet to avoid anything that may arise from the extensive mountain range. One area they have to closely watch is local thunderstorm activity during the summer that can develop over the Alps reaching up to 25,000 to 30,000 feet. Greiner mainly flies out of Linz Airport (LOWL), an international Class C airport located in Austria. He explained that the smaller airports in Austria and Germany are towered for providing information but are not controlled airspace and many have grass runways. So far, the King Air has only landed on asphalt runways, 4,921 feet or more.

Greiner figures he'll typically add close to 100 hours per year on his King Air, as he intends to take 20 trips throughout Europe in 2019. In 2020, he plans to fly N290PA to the United States where he'll spend 4-6 weeks visiting the friends he made from his time getting his IMBA, obtaining recurrent training at KAA, attending another King Air Gathering and, of course, some sightseeing (Reno … smile).

"I'm happy to be part of the King Air family and look forward to continuing to grow as a pilot with the aircraft," Greiner stated. "It's the right airplane for all of the adventures I am planning." KA

PROP HEAT

by Dean Benedict

I got a call from a King Air pilot I know well. He used to fly a model 90 and brought it in to my shop for many years. Now he flies a 200 with four-blade Hartzell props. We got reacquainted last year during the pre-buy on this 200. The aircraft is working out well, but a recent glitch with the prop heat prompted him to give me a call.

In flight, he knew icing conditions were ahead so he turned on the prop heat. He watched his amp gauge from the start and it was reading 19 amps. He knew this reading was from the right-hand (R/H) prop because the prop heat on newer King Airs starts on the right side. He kept a close eye on the gauge and when it cycled to the left prop it dropped to 14 amps. When it cycled back to the right side, the amp gauge went back up to 19.

Then he got into icing conditions and had ice slinging off the left prop into the fuselage. This confirmed his suspicion that he had a prop heat problem. He switched to Manual (as we all know it's a spring-loaded toggle switch that must be physically held) and after a few more thuds of ice, he was OK.

He squawked the prop heat to his shop and their first words were, "The maintenance manual says 14-18 amps is OK for four-blade props. We don't see a problem." Well … yes, the manual does say that, but if the prop heat was functioning properly, then why was the left prop slinging ice?

He asked the shop to check the prop heat anyway. They did the typical check with one guy in the cockpit watching the gauge and another guy turning the prop slowly (so that the brushes do not arc on the slip ring) and feeling each boot. All boots were heating. The shop said nothing was wrong, so the pilot called me.

Prop Heat Review

When you put the prop heat switch in Auto, the prop heat timer sends power to brush blocks mounted on the engine nose case. These brushes ride on slip rings mounted on the back side of the prop bulkhead. The slip rings transfer power from the brushes, through the prop leads, to the boot. Tiny wires inside the boot resist the 28 volts coming in and generate heat. The boot gets hot, even the blade warms a little, and this prevents an accumulation of ice. Although called a "deice" system by Beech, it's really an "anti-ice" system when used properly.

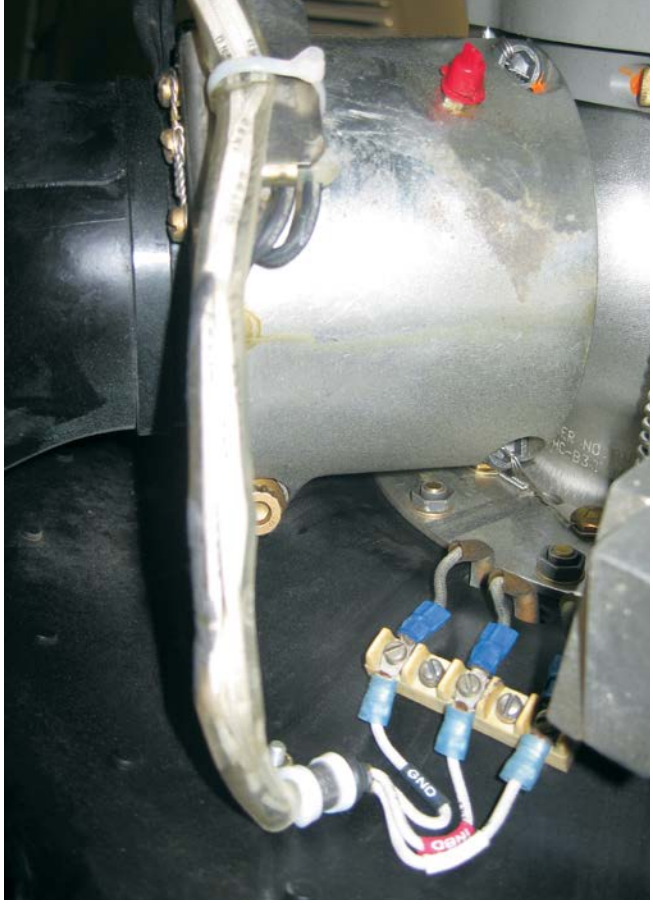
The King Air prop deice system was designed to be deployed before ice starts to form. If you wait until ice has developed, the heat makes the ice slip off the prop and slam into the avionics doors on the fuselage. Paint chips and dents in the skin around the avionics area are a sign that Prop Ice Protection was deployed too late; or there is a boot that is not heating, so ice forms, builds up, and flies off the prop when it gets too heavy.

Bad Prop Leads Evade Detection

Anytime you see a drop in amperage on the amp gauge (a low cycle), you know you have a boot that is not heating properly. You're not going to know which boot, and sometimes you're not even sure which prop. What you do know is your prop heat system needs attention.

The boots themselves rarely go bad unless you routinely fly into unimproved strips and get rock strikes on your prop boots. This will break the small wires inside the boots and they won't heat.

Far more common is a bad prop lead not getting power to the boot. These leads are subject to tremendous wear and tear as the props move from feather to reverse. Furthermore, the centrifugal force generated by the spinning prop pushes the leads outward against the inside of the spinner. I cannot emphasize this point strongly enough. The prop leads are under constant tension when the engine is running – even in low idle.



Prop leads endure significant wear and tear including constant tension when the engine is running, so they are often the culprit of lower than normal amp readings.

Unfortunately, it is easy to miss a bad lead. The turn-by-hand test described earlier (which is done at every Phase Inspection) doesn't begin to approximate the conditions in which prop leads operate. Prop leads in questionable condition often pass this test because they are not stretched or subjected to any tension. But as soon as the aircraft is cowled up and taken out for a final ground run, the amp gauge shows a low cycle.

Back when I had my shop, if a customer brought me a King Air and squawked a low cycle on the prop heat (or if I found it myself on the initial ground run) I wouldn't even bother with the hand-turning test. Instead, I had my guys tug on each prop lead until they found the one that drops the amperage on the gauge. Or better yet, if my avionics guy was available, he'd ohm out each lead.

My first piece of advice to the pilot who called with the left-hand (L/H) prop slinging ice was to convince the shop to take a good look at the prop leads by stretching them out and watching for a low cycle on the amp gauge.

Boot Systems: Single versus Dual Segment

Prop boots on older King Airs may have two segments – an inner segment and an outer segment – and each heats independently. Newer King Airs have single segment boots, whereas the entire length of the boot heats up. In general, three-blade props have the dual segment system and four-blade props have single segments boots, but there are always exceptions to this rule.

The difference is the number of slip rings. Three slip rings mean a dual segment system. Two slip rings means single segment boots. Look at the back side of the prop bulkhead. There is a gap between the bulkhead and the cowling through which you can see the brass-colored slip rings.

Do you have a dual segment system? If you're not sure, find out. The dual segment system requires that you act with greater anticipation of possible icing conditions and get your prop heat fired up well in advance. The alternating between inboard and outboard segments, delivers less consistent heating than the single segment system.

Again, I repeat, prop heat must be deployed in advance rather than after the fact. It may be called a deice system, but it functions as an anti-ice system.

Prop Amp Gauge

Whether you have a single or dual segment system, if a boot or segment is not heating as it should, you've got a low cycle. Ice will accumulate, fly off and slam into the fuselage. To check for a low cycle, keep your eyes glued to your prop amp gauge.

All King Airs have the same gauge regardless of single or dual segments. If the boots are operating normally, each boot (or boot segment) draws around 4-5 amps.

So, let's do the math. A three-blade prop with three good boots should show 12-15 amps on the gauge. A

The backside of the propeller bulkhead with an arrow pointing to the slip rings. This example shows two, which means the propellers have single-segment boots. Props with dual-segment boots have three slip rings.

four-blade prop with four good boots should show 16-20 amps. If a four-blade prop only draws 14 amps, it has one boot that is not heating. If the gauge reads 9 or 10, then two of the four boots are not heating on that side.

Yes, the manual says 14-18 is OK for a four-blade prop, but that's in theory. In practice, if the gauge reads 14 and ice is slamming against the nose, something is wrong. There's a bad lead somewhere, or there's another issue.

Part of the conflict here is that some of the newest boots draw fewer amps, in the 3-4 range. Perhaps the manual tries to compensate for this. In my opinion, a low cycle should be investigated and not brushed off as "within limits."

Time Will Tell

A single segment system will heat all the boots on one prop for a period (or cycle) of 60-90 seconds; then the prop heat timer switches the electrical current to the other prop for a 60-90-second cycle. As the system switches back and forth from one side to the other, the needle will flicker very slightly, but as long as all the boots on each prop are heating, the amp gauge reading will remain steady.

A dual segment system works in a similar manner but will have four cycles instead of just two: L/H prop inner segments, L/H outer segments, R/H prop inner and R/H outer (not necessarily in that order). If each cycle can be as long as 90 seconds, then it could take up to six minutes to cycle through all the boot segments one time. This is very important to know when troubleshooting prop deice because a cursory glance at the gauge now and then will not reveal the problem. You will recall the pilot mentioned he kept a steady eye on his prop amp gauge throughout several cycles.

Zero Cycles and Brush Blocks

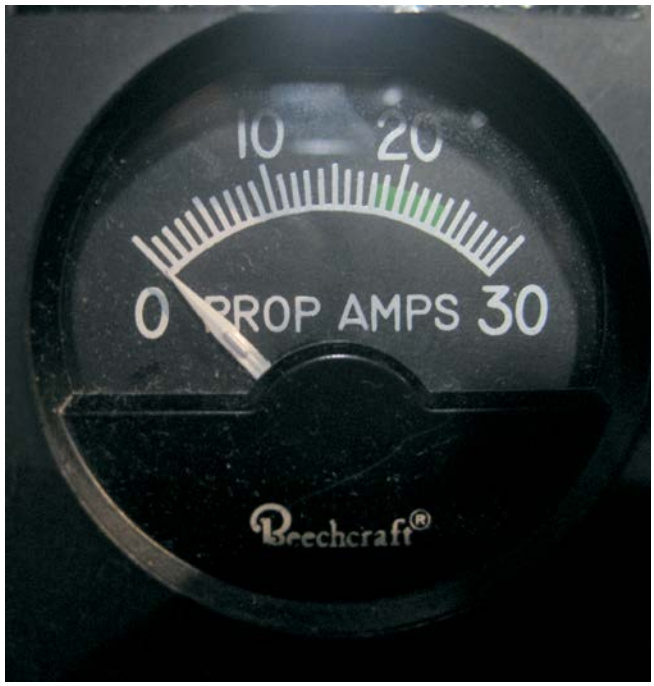
A zero cycle means no boots on the prop are heating. It is highly unlikely that all the prop leads would fail simultaneously. But if the brush block assembly is worn down to the point where it fails to make contact with the slip ring, that will give you a zero cycle every time.

Brush blocks have springs that push the brushes outward, keeping them in constant contact with the slip rings. When the spring becomes fully extended there is not enough pressure to keep that contact.

Brush Blocks and Prop Overhauls

Saving my customers money was always the uppermost in my mind, so when their props came back from overhaul, if the brush blocks looked reasonably good, I would not change them. Over time, however, I noticed prop heat failures occurring within months or maybe a year of the prop overhaul.

During a propeller overhaul, the slip rings are cleaned up and surfaced so that the brush blocks make optimum contact. This, in turn, makes the brushes wear down faster as they sit with the newly surfaced slip rings.



A lower than usual amp reading on the prop amp gauge could specify one of the prop leads is bad.

So, even though the prop brush blocks looked like they had some time left in them, they wore down much faster after the prop was overhauled.

Ultimately, I reversed my earlier practice and installed new prop brush blocks whenever props came back from overhaul. I then noticed that new brush blocks together with fresh slip rings often lasted the full six years between prop overhauls (depending on hours flown, of course).

Regarding the problem of the pilot who called me, I remembered that his props had been overhauled recently. So, in addition to checking the prop leads carefully, I suggested he have the shop check the brush blocks and verify good contact with the slip rings. Brush blocks that are on their way out can create intermittent prop heat performance. When they wear out completely, they make zero contact and you get a zero cycle.

When the spring-loaded Manual switch is toggled and held in place, the prop heat timer is bypassed and the prop heat runs on both props simultaneously.

Manual Prop Deice

Let's say you are mid-flight, you get some prop ice slinging against the nose so you check your amp gauge and find a zero cycle. It could be a brush block issue, or it could be a problem with the prop heat timer. That is the time to use the Manual mode.

A prop lead that went bad and had passed the turn-by-hand test.

When this spring-loaded switch is toggled and held in place, the prop heat timer is bypassed. Now, the prop heat on both props runs simultaneously.

With the dual-segment systems, the Manual switch stays in the center position until you push it up and hold it to heat the inboard segments of both props; then toggle it down and hold it to heat the outboard segments of both props.

Unfortunately, whether you have single or dual-segment prop heat, the Manual Prop Deice bypasses the amp gauge, so you can't rely on the gauge to verify that the manual mode is working. But if the ice slams go away, you'll know the Manual switch did the trick (or you are no longer in icing conditions). Either way, you'll be squawking prop heat when you get on the ground.

Summary

Ice slams are never a good thing. Either the prop heat was turned on too late, there's a malfunction in the prop heat system, or you've gotten yourself into icing conditions so heavy that the system just can't handle it.

Better to be safe than sorry. Test your prop heat on the next ground run. Keep your eye on that gauge and allow sufficient time for several cycles. Address low or zero cycles before flying into potential icing conditions.

If you report a low cycle to a shop and they come back with "unable to duplicate discrepancy" or tell you that your low cycle is "within limits," you should tactfully suggest a closer look at those deice leads. Some mechanics don't understand the extreme conditions endured by these leads. All they know is to turn the prop and feel the boots for heat.

Prop leads are the prime suspects if there's a low cycle. Brush blocks can also be the culprit. Occasionally the prop timer goes bad; that will give you ice slams. Beyond that, you need a good mechanic to troubleshoot the problem to full conclusion. The idiosyncrasies of brush block installation and alignment and the vagaries of mechanical or electronic prop heat timers is what he or she is all about.

As for my pilot friend, following my advice he returned to the shop and had them do a pull test on each prop lead. Guess what? They found a bad one – a lead that passed the hand-turning test. The pilot decided to have all the prop leads replaced as a precautionary measure.

I propose a toast: Here's to hot props in cold weather!

Fly safely. KA

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

Canadian King Air Summit, VNY Offers Sustainable Alternative Fuel, Reduced Separation Trial Coming to NAT and EASA Issues Runway Safety NPA

by Kim Blonigen

Canadian King Air Summit Scheduled for April 25

FastAir Executive Aviation Services is hosting what they say is the largest event for Beechcraft King Air owners and operators in Canada – the 2019 King Air Summit held April 25 from 9 a.m. to 5 p.m., in Winnipeg, Manitoba.

The one-day event focuses on education and information regarding best practices and upgrades for the King Air. Updates on support, innovation and operation will be provided through a variety of seminars throughout the day, along with a tradeshow of King Air suppliers and supporters.

Seminar topics offered include ADS-B Solutions, Wi-Fi connectivity options, "must have" King Air modifications, maximizing your King Air's efficiency, benefits of up-gross operations, PT6 Ops and best practices, runway excursion prevention, the future of GPS navigation in Canada and more.

The event will also include a static display of King Airs, and awards will be given to owners and operators with the best examples of aircraft in three categories: medevac, executive and high-capacity configuration.

Registration is limited to the first 80 participants and early bird registration cost is $35 and will increase to $60 after March 10.

To register or for more information, go to *www.flyfastair.com/kingair-operators-owners-summit*.

VNY Hosts Jet Fuel Sustainability Event, First to Make SAJF Available for Retail

In mid-January Van Nuys Airport (VNY) hosted "Business Jets Fuel Green: A Step Toward Sustainability" – a daylong event devoted to the use and awareness of sustainable alternative jet fuels (SAJF), which include the latest formulations of jet fuel that come from renewable and sustainable sources.

The event included discussions by general and business aviation groups, including the National Air Transportation Association (NATA), the National Business Aviation Association (NBAA), the European Business Aviation Association (EBAA), the International Business Aviation Council (IBAC) and the General Aviation Manufacturers Association (GAMA) – all members of the Sustainable Alternative Jet Fuels Initiative Coalition. Attendees were educated about SAJF's composition and its feasibility as a useable, economical alternative to conventional jet fuels. As opposed to traditional jet fuel, which consists mainly of kerosene-based hydrocarbons, SAJF is formulated by mixing traditional kerosene-based jet fuel with various sustainably-sourced hydrocarbons, including food stock or other materials. When used, the SAJF can reduce carbon emissions by as much as 50 percent.

Attendees also participated in hour-long flight demonstrations on aircraft running on SAJF, provided by business aviation manufacturers Gulfstream, Bombardier and Embraer, to show that the fuel is a seamless replacement. Aircraft using SAJF does not require any modification, which makes it a true "drop-in" fuel, eliminating another barrier to introduction.

The event also marked the first time SAJF was made available for retail to aircraft operators. World Fuel Services provided 8,000 gallons of the blended renewable fuel produced by California-based World Energy for the event, while Gevo, through its distributor Avfuel, offered another 6,200 gallons, which were delivered to the FBOs on the field and mixed into their fuel supplies.

VNY is now the first general aviation airport in the United States to offer SAJF on a trial basis, serving as a model for other general aviation airports.

To learn more about the SAJF initiative, see a full list of participants and view a video stream of key portions from the event at *futureofsustainablefuel.com*. Follow business aviation's commitment to alternative fuels on Twitter and Facebook at #Sustainability.

Reduced Separation Standards Trial Coming to NAT

On or soon after March 28, a trial of reduced separation standards for ADS-B-equipped aircraft in the Shanwick, Gander and Santa Maria Oceanic Control areas of the North Atlantic Track (NAT) will start.

Known as the Advanced Surveillance-Enhanced Procedural Separation (ASEPS), the trial program was announced per NATS Bulletin 2018-06, and will initially apply to: "a) 17 nm longitudinal separation of aircraft operating on the same track or intersecting tracks

provided, that the relative angle between the tracks is less than 90 degrees; b) 14 nm provided the relative angle between the tracks is less than 45 degrees; and c) Opposite-direction aircraft on reciprocal tracks may be cleared to climb or descend to or through the levels occupied by another aircraft provided that the aircraft have reported by ADS-B having passed each other by 5 nm."

The bulletin also stated that "a trial implementation of lateral ASEPS will start no earlier than six months after the beginning of the longitudinal separation operational trial."

To be eligible to participate in the trial, aircraft must be RVSM/HLA approved, ADS-B equipped with dedicated 1090-Mhz Out capability, and meet RNP 4, RCP 240 and RSP 180 specifications.

Starting simultaneously with the ASEPS trial will be changes to contingency and weather and weather deviation procedures for NAT operators, which were outlined in NATS Bulletin 2018-05. The revised procedures apply when there is an inability to comply with the assigned clearance due to weather; diversion across the prevailing traffic flow; loss of, or significant reduction in, the required navigation capability; or pressurization failure.

EASA Issues NPA Regarding Runway Safety

The European Aviation Safety Agency (EASA) issued a notice of proposed rulemaking (NPA) focused on runway safety, focusing primarily on preventing runway incursions and excursions and reporting runway surface conditions. It also touches on ground collisions, runway confusion, foreign object damage and related occurrences, as well as runway pavement maintenance.

The proposed rule would change the operation and conformance of vehicles and their drivers in aircraft movement areas, and new requirements for assessing and reporting runway surface conditions, snow control plans, airport maintenance, aircraft towing, and performance standards for runway surface-friction measurement devices. This latter requirement also provides for alignment with ICAO recommendations as regards runway surface condition assessment and reporting which will be applicable worldwide by November 2020.

Comments on the NPA are due March 18. KA

The History of King Air Chip Detector Annunciator Lights

by Tom Clements

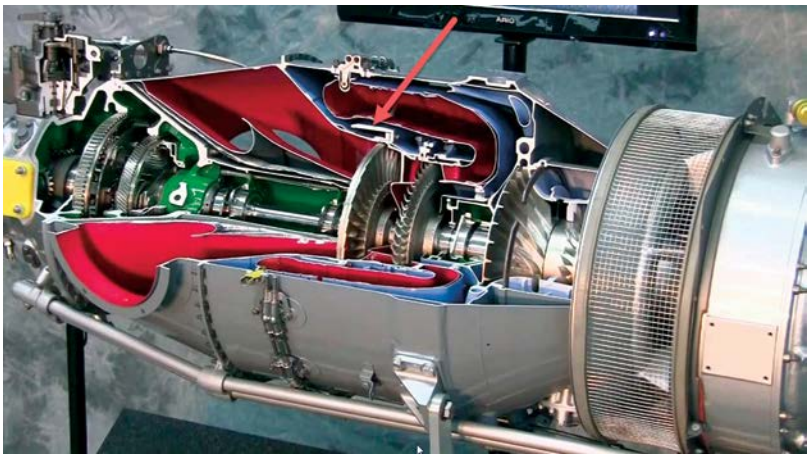
In the early days of the King Air and PT6 engines, back in the '60s and early '70s, there was no such thing as chip detectors. The low spot near the bottom of the Reduction Gearbox (RGB) at the front of the engine had a drain plug only. The plug was not fitted with any device that would check for metal particles in the RGB housing.

But a few of those early PT6s had RGB failures that led to the Power Turbine (PT) being "uncoupled" from the propeller. Realize that all of the various propeller governors are connected to the output shaft of the RGB – the shaft to which the propeller is bolted. Nothing directly monitors the speed of the PT, the input shaft. So, when the disconnect occurs, the PT has almost no rotational resistance and it runs away to extremely high speeds, causing the turbine blades on the PT disk to be "liberated." That's a fancy way of saying that the PT catastrophically fails, sending some of the PT blade fragments out though the exhaust stacks; (Wow! What an expensive sparkler show!) and also sending some blade fragments right through the engine casing. These fragments sometimes made their way through the fuselage skin and even occasionally into the crew's legs. Yuck!

The first step taken to deal with this obvious weakness was to add the PT Containment Ring that all PT6s now have. This heavy band of metal surrounds the PT disk – or disks, in the larger models that have a two-stage PT – and prevents the liberated blades from exiting tangential to the axis of rotation. Now the exhaust stack sparkler show is even more impressive!

The second step was to add the chip detector, so that the pilots could be informed that the RGB was "making metal." The detector is quite simple, comprised of two magnetic probes close together but not touching. If ferrous metal (ferrous means iron-based, which is an electrical conductor) bridges the gap, then the completion of the circuit advises the crew that all is not right in the RGB's world.

Somewhat surprisingly, when chip detectors were first installed, no annunciators were associated with them. Instead, the detectors had to be tested with an Ohmmeter every 25 hours. If continuity was discovered, then further flight was prohibited until the RGB and the engine filters were checked for metal. Yes, 25 hours between checks means that a lot of hours could be flown before a fault was discovered. But, hey, it was better than never even having the ability to test! Quite a number of A90, B90, and early C90 and E90 King Airs are still



A cut-away view of a PT6 engine with an arrow pointing to the containment ring – a heavy band of metal that surrounds the PT disk(s) and protects against PT disk blade fragments being released.

operating with the detector test points inside their cowlings and no chip annunciators.

The 200, receiving its Federal Aviation Administration (FAA) certification in late 1973, was the first King Air to have the left and right engine chip detectors wiring into the annunciator panel circuitry. The annunciators were in the warning panel – the one with all the red lights. Red implies "emergency," so they are very important lights that almost always involve some checklist steps that should be memorized.

So, what did the Emergency Checklist tell the pilot to do? Absolutely nothing! Why? Because the first 200 checklists had no procedure whatsoever dealing with this newly-installed annunciator! It appears the design engineers snuck an annunciator in without bothering to notify the POH writers.

Dave Simon, one of Beech Aircraft's marketing staff on the international sales team, was the first pilot to experience the illumination of a chip light while flying one of the early 200s. He dutifully searched the checklist and, as I've made obvious, found nothing! The engine was running just fine, so he chose to continue the flight. Yes, you guessed it: Within about 30 minutes the engine blew up! Dave made a successful single engine landing and the Beechcraft team quickly verified that indeed the RGB had uncoupled. Hmmm … perhaps we'd better address that annunciator in the POH!

A POH and checklist revision was quickly forthcoming. In fact, all of the King Air models then being produced – C90, E90, A100 and 200 – started being equipped with the annunciators and their POHs/Checklists had the procedure added. And what was the procedure? "If conditions permit, shut down the engine." In fact, some models merely added "Chip Detector Illumination" to the title of the already existing checklist "Engine Fire in Flight." Pull the Condition Lever and shut that sucker down!

As Mr. Simon's incident (and now some others) showed, there could be no abnormal engine indications whatsoever making themselves known before the engine turned into a bomb. "If conditions permit" has never been clearly defined. The consensus seems to be that shutting down an engine because of a chip light would not be wise if the other engine had already been shut down for some other reason! Likewise, perhaps waiting to either land or execute a successful two-engine missed approach might be the wise course of action if the light illuminated while inside the FAF while executing an ILS or LPV approach with the weather hovering right at minimums.

I have two personal experiences to tell you about. One of my clients with whom I conducted recurrent training had the light illuminate on a sunny day while departing Rock Springs, Wyoming, on a flight back to Portland, Oregon. The annunciator appeared just as they were leaving the Rock Springs' airspace. The 200 they were flying was used as a corporate shuttle and most seats were filled. Being in such good conditions, the crew went ahead and secured the engine. As they returned to Rock Springs for an uneventful single-engine landing, they hoped that the light had been triggered by some metallic "lint" instead of a significant piece of metal. This mysterious lint has indeed been the cause of some chip lights. In these cases, usually the main oil filter is inspected and, if nothing significant is found, the aircraft is authorized to fly 10 hours more before another check. If things are still copacetic on the follow-up check, then no further action is required. (One theory is that this lint may be manufacturing residue that was not thoroughly flushed away after the engine was manufactured or overhauled.)

Well, the crew's hopes of "nothing major" were dashed when, in their words, "We could do chin-ups on the prop blade!" The gearbox had frozen solid with contamination.

A year or two after this incident, I was conducting recurrent training for the pilots of an early C90 based at Gillespie Field (KSEE) near San Diego, California. We flew east to avoid the busy San Diego area, and while doing air work near Thermal, California, the chip detector on the left side came on. The weather was perfect, we were light with only about half fuel and three people (all pilots) on board, so we went ahead and shut the engine down. Being close to Gillespie, we decided to return to that airport where they had their own mechanic available. As we flew, having declared an emergency with ATC, I was pleased to see that occasionally the three-blade prop would turn slightly as we changed speed or configuration. "At least the gearbox isn't frozen, unlike the Rock Springs case" I thought to myself. "Probably gonna be a little lint."

In the hangar, the mechanic quickly pulled the forward cowling to gain access to the detector. He positioned a metal pan to catch the oil and removed the detector. As the oil fell into the pan, I swear we could hear metal hitting metal! Maybe not, but that oil was thick with metal contaminants. Have you heard the line about "Pieces being big enough to have part numbers on them?" That's about what we had here! I'm sure glad we shut it down expeditiously!

By the way, both this engine and its partner on the other side were very close to the suggested 3,600-hour TBO, so both were sent out for overhauls.

The F90 model made its appearance in 1978. Like the other models being produced then, it also had the chip detector on the red warning annunciator panel. As time passed, it became obvious that some chip light illuminations were indeed a precursor or indicator of major engine damage whereas other cases simply were lint-related.

At some point a meeting of Beechcraft engineers, pilots and lawyers was held and the issue was discussed in-depth. I was not in attendance, but I am guessing it may have gone something like this: "Should we really treat this basically equivalent to an engine fire, even when there may be no immediate problem? Aren't we exposing our company to possible legal action if a pilot were to botch a single-engine approach and landing, when in fact the airplane didn't need to be single-engine at all?"

Based on this type of concern, decisions were made to (1) change the annunciator in forthcoming models from red warning to yellow caution, and (2) insert a checklist step demanding/suggesting the pilot not shut down the engine unless abnormal engine instrument readings were observed.

Having the annunciator red in some models and yellow in others has been a head-scratcher for many pilots and training providers for a long, long time. Realize that there is no difference in the installation whatsoever except for where the light is placed and what color it is. If your flight department has, say a straight 200 and a 350, the light will be a warning in the 200 and a caution in the 350. Therefore, should you actually react differently depending on which airplane you are flying that day?

We each must answer that question for ourselves. Based on what I have presented here, I imagine you can guess my personal position. Yes, so long as "conditions permit," I will be pulling the condition lever and feathering the prop quite rapidly. Now, granted, I have lots of single-engine time in King Airs because of the thousands of hours spent instructing in them. Since your level of one-engine-inoperative experience may be significantly less, I can appreciate your possible reluctance to do an immediate shutdown. That's understandable and just fine. After all, there is a reasonable chance that the illumination does not indicate that a catastrophe is imminent. And if the engine does indeed blow up? Well, that's a time to call the insurance agent.

I'll wrap this up by giving you, as Paul Harvey used to say, "The Rest of the Story" concerning the scenario at Rock Springs. When the engine was sent in for repair, the shop reported this interesting bit of news: They said they had never seen an engine with so much destruction in the power section and yet the compressor section was fine. The engine had been shut down before the contaminated oil had clogged the main oil filter enough to cause its bypass to open. Hence, the No. 1 and No. 2 bearings – the ones that support the aft and forward ends of the N_1 or N_g gas generator shaft – came through unscathed. Food for thought, eh? 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." He is a Gold Seal CFI and has over 23,000 total hours with more than 15,000 in King Airs. For information on ordering his book, contact Tom direct at *twcaz@msn.com*. Tom is actively mentoring the instructors at King Air Academy in Phoenix.

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

Stearman – The Early Days Part One

In 1926 Lloyd Carlton Stearman bid Wichita, Kansas, farewell to go west and build biplanes, but a year later was back in town to stay.

by Edward H. Phillips

Walter H. Beech shook hands with his friend and associate at the Travel Air Manufacturing Company after flying the Travel Air *Special* – a handsome, custom-built biplane designed for speed. It was September 1925, and that month Beech had "cleaned up" at the regional air races held in Tulsa, Oklahoma, beating all competitors and taking home much needed cash to keep the infant company solvent.

The friend/associate, Lloyd C. Stearman, was a young, self-taught designer and budding engineer who, with help from aeronautical engineer Mac Short, had created the *Special* and installed a 160-horsepower Curtiss C-6 engine up front under a metal, hand-crafted cowling. Capable of speeds in excess of 120 mph, the sleek biplane earned the admiration of both civilian and military pilots at the races.

In 1920 Stearman had begun his career in aviation when he assisted Emil Matthew Laird in development of the *Laird Swallow* – a two-place, open-cockpit, double-bay biplane powered by the ubiquitous Curtiss

The Stearman C1 was a handsome airplane. The Curtiss OX-5 engine was housed in a hand-fabricated, sheet metal cowling with the water radiator integrated into the entire design. The outrigger-type landing gear provided good shock absorption and the front cockpit was generously upholstered for comfort of the two passengers. (Edward H. Phillips Collection)

OX-5 engine, of which thousands were available at bargain prices after the end of World War I.

Lloyd was born in Wellsford, Kansas, on Oct. 26, 1898, to Frederick C. and Icie May (Grimm) Stearman. The eldest of four children, he worked with his father in the construction business based in Harper, Kansas, along with his younger brothers, Waverly and Ivan. Drawing plans and erecting commercial and residential structures taught Lloyd the elementary and practical applications of construction. In addition, he became familiar with the many types of wood and how they could be employed most effectively in the construction process.

At age 13 he had set up an electrical laboratory in the attic of the family home, and during his high school years Lloyd designed and built a welding machine as well as a small number of elementary electric motors and transformers. Blessed with a seemingly insatiable appetite for knowledge, he later established a photography studio in a local ice cream parlor and turned a profit until he graduated in 1916.

Lloyd's next step was to follow in his father's footsteps and pursue a degree in civil engineering from Kansas State Agricultural College located in the town of Manhattan. He began his freshman year in September 1917, only five months after America's entry into the Great War that was devastating the European continent.

Not content to stay on the sidelines when the flower of American youth were fighting in the trenches, in August 1918 Lloyd enlisted in the United States Navy and eventually was transferred to Naval Air Station North Island, San Diego, California, where he completed training as a Master Airplane Rigger. Stearman's greatest desire, however, was to fly and he did begin flight training in a Curtiss N-9 floatplane and may have soloed before the Armistice signed in November 1918, clipped his wings.

It is interesting to note that when the United States began fighting alongside the Allies, it lacked an air force capable of challenging the enemy in the skies above France and Belgium. So, it was with great enthusiasm and high expectations that Congress appropriated the staggering sum of $640 million for the production of military airplanes. The ambitious plan called for building 22,625 aircraft and 44,000 aero engines as well as manufacturing sufficient spare parts to construct thousands of additional warplanes. In addition, the federal government assigned 27,000 men as inspectors saddled with the responsibility of guaranteeing the quality of spruce wood and ensuring that the lumber mills and suppliers were providing the massive quantities required to assemble a fighting air fleet.

After Lloyd was discharged from the Navy late in 1918, he returned to his hometown of Harper and opened an electrical shop, but the venture was short-lived. Undaunted, Stearman accepted a position as a journeyman architect with the S.S. Voight Company in Wichita. He had worked there about one year when, sometime in 1919, his eyes were drawn to an advertisement in the local paper for men interested in fashioning wood and metal into flying machines.

The notice was placed by E.M. Laird, who at that time was preparing to start limited production of the Laird Tractor biplane. Confident that his education in college, coupled with the technical and flight training he received in the Navy qualified him to apply, Lloyd was hired as a draftsman, junior engineer and airplane and engine mechanic and shop foreman. A few months later Lloyd was supervising construction of the biplane's wood fuselage and wings.

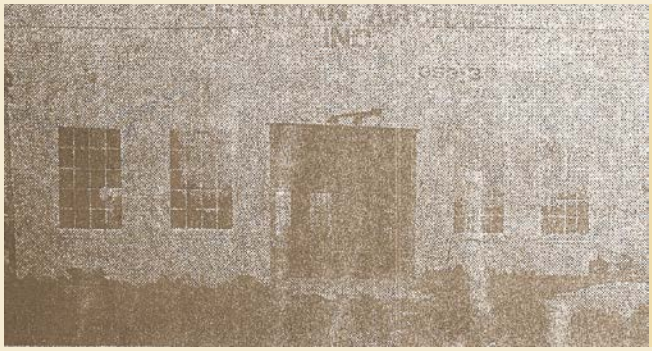
Early in 1920 Laird had 11 men working in an abandoned factory in downtown Wichita. A prototype biplane was completed in April and prepared for its first flight at a flying field north of the city. Late in the afternoon of April 8 Laird flew the ship on a short but successful test hop.

Soon after the flight the airplane was renamed the *Laird Swallow* and the stage was set to being limited manufacturing. Thanks to advertising in national aviation magazines, the E.M. Laird Company Partnership began receiving inquiries about the new biplane as well as a steady flow of visitors to the factory and flying field. By the end of the summer, production for 1920 was sold out and Laird was accepting orders for the 1921 sales year. Lloyd Stearman's role in the design and development of the Swallow was, at best, minimal, despite a story written seven years later by Dwight Pennington in September 1927 claiming that the airplane was "designed largely by Stearman" (there is, however, no known evidence to support that statement).

During the next three years Lloyd gained valuable knowledge and experience assisting Laird in the development of improvements that were made to the Swallow as production slowly increased. When Laird resigned from the company during autumn 1923 and returned to Chicago, his business partner Jacob Moellendick took the reins and promoted Lloyd to chief engineer. In 1923 Stearman was chiefly responsible for the design of the aging *Swallow's* replacement – the *New Swallow*.

In 1924, however, he and Walter Beech, along with pioneer aviator Clyde V. Cessna, formed the Travel Air Manufacturing Company and moved Clyde's woodworking equipment into a small workshop in downtown Wichita. Lloyd had designed a single-bay, three-place, open-cockpit biplane that was designated the *Travel Air Model A* and although initial sales were slow, in 1925 sales increased and Stearman's name was appearing more frequently in national aviation publications as a promising designer.

Early in 1926 Stearman was approached by aviators Fred Day Hoyt, George Lyle and a few local businessmen in California to "go west young man" and build airplanes for the Hollywood elite. Hoyt was based at Clover Field, Santa Monica, and was a successful salesman and dealer for the Travel Air company. He was convinced that there were more than enough potential customers not only in Southern California but in the entire Golden State. On Oct. 8 he resigned from Travel Air, bid farewell to his good friends Walter Beech, Clyde Cessna, Olive



Stearman Aircraft, Inc., began in a small building in Venice, California. This is the only known photograph of the facility located at 353 Third Street. Completed airframes were taken by truck to nearby Clover Field in Santa Monica for assembly, rigging and test flights. (Santa Monica Public Library)

Ann Mellor and the small but dedicated workforce, and headed west in his quest for a fresh start.

Beech was sorry to lose his chief engineer, but he understood Lloyd's desire to make his own name in the aviation business. The seven years Stearman and his family had spent in Wichita had served him well, but many new challenges lay ahead that would test his spirit and determination to succeed. The decision to relocate to California was a logical one for a number of reasons:

- Hoyt and his friends possessed both the money and facilities to help establish the Stearman Aircraft Company.
- There was growing demand for custom-built airplanes, particularly in the Los Angeles area where Hollywood produced a steady crop of wealthy thespians.
- There was an emerging need for new airplanes to carry the airmail within California as well as the states of Nevada, Utah, Idaho and Washington.
- Lloyd had designed an entirely new biplane that not only built on his experience at Travel Air but would incorporate a number of innovations not found on a majority of light aircraft.

Late in October Stearman and his family relocated to Venice, near Santa Monica, and early in December a charter was granted and filed with the State of California for the new company, "Stearman Aircraft, Inc." A small building was leased and construction of the first airplane

George Lyle (left), Lloyd Stearman (center) and Fred Day Hoyt posed with the new *Commercial Sport Model C1* after the first flight in March 1927. The Curtiss OX-5 engine was later removed and replaced with a static, air-cooled radial powerplant. (Edward H. Phillips Collection)

to bear the name Stearman began late that month. The location was only a short distance from Clover Field and the Lyle-Hoyt Aircraft Corporation's hangar. The Santa Monica Evening Outlook reported that "several orders had been received for open-cockpit biplanes, and future plans called for building an enclosed cabin ship powered by a Wright *Whirlwind* static, air-cooled radial engine. Lloyd informed reporters that he intended to build one airplane each week when operations were fully underway and that standard-equipped airplane would cost about $3,000.

Fortunately for Lloyd, he was able to hire a few men who had worked for Donald Douglas and his aircraft company and had the skills necessary to build flying machines. His tiny workforce, however, lacked a chief engineer, but Stearman knew that his old friend Mac Short was the best man for the job. Lloyd easily persuaded Short to leave the ivy halls of the prestigious Massachusetts Institute of Technology and go west.

Throughout the winter of 1926-1927 Lloyd completed design work on a three-place, single-bay biplane designated the *Stearman Sport Commercial Model 1*, or simply the C1. It featured a welded steel tube fuselage and wood wings, with the upper two panels spanning 38 feet and the lower panels 35 feet. The fixed, outrigger-type landing gear featured a hydraulic shock strut in combination with rubber bungee cords to absorb taxi, takeoff and landing loads. Mechanical, cable-operated brakes were fitted to the wheels and were adequate for an aircraft of the C1's size and weight.

To reduce costs, Stearman and Short chose the ubiquitous Curtiss OX-5 engine to power the biplane, and it was enclosed in a cowling that blended seamlessly into the airframe and complemented the graceful lines of the fuselage. The water radiator was another example of Lloyd's innovative spirit: It was integrated into the front of the cowling to reduce drag, and water temperature could be controlled from the cockpit by a series of shutters that adjusted airflow.

The C1 made its successful first flight late in March 1927, and soon after that momentous event, Fred Hoyt flew the ship to various airports in Southern California. He was accompanied that day by Hoyt's friend, Frank E. Samuels. His interesting comments about flying in the C1 are presented in full:

"I had the pleasure of making the first official passenger-carrying flight in the first airplane built by Stearman Aircraft, Inc., using the plane to make the delivery of the March issue of *Aero Digest* on the airfields of Southern California. We loaded the magazines in the front cockpit and took off from Clover Field. I was greatly surprised with the smooth takeoff until I remembered that the plane was equipped with the new hydraulic landing gear. Before I realized it, we were in the air and climbing fast, crossing the Santa Monica Mountains at a height of 2,500 feet and landing at Kinner Field, Glendale, in less than 15 minutes. The field is short and rough in places but the oleo shock absorbers made the landing with perfect smoothness. Taxiing up to the Kinner factory the wheel brakes showed their efficiency, with Fred Hoyt turning the plane around in very little more than the length of the plane.

The Stearman C1 appeared in a number of advertisements published in 1927 that underscored Lloyd Stearman's penchant for advanced design without sacrificing performance. The aircraft further reinforced Stearman's growing reputation within the aviation industry as a talented designer.
(Edward H. Phillips Collection)

Dedicated to the Discriminating Buyer

Designed by Lloyd Stearman

STEARMAN AIRCRAFT Inc., was not organized with the intent of competing in that already large field of Airplane Manufacturers wherein success is dependent on the low selling price of a product.

Stearman-built airplanes are indicative of an unwavering purpose on the part of their builders to produce a line of aircraft of obvious superiority.

STEARMAN AIRCRAFT INC.
353 Third Avenue Venice, California
Write for particulars

The second airplane built in California was the Stearman *Sport Commercial Model C2*. It was almost identical to the C1 except for relocation of the water radiator between the landing gear struts, and push-pull rods and torque tubes to actuate the ailerons. Note the name "Stearman Aircraft" on the hangar of the Lyle-Hoyt Aircraft Corporation.
(Walter J. Innes Collection, Wichita State University Libraries and Archives, Department of Special Collections)

The brakes can be used individually as well as in unison. The short field did not hamper us in taking off as we were well up in the air after covering one-half the length of the field. From Glendale we made the rounds of the fields delivering the Digest, the plane causing favorable comment wherever we landed. The large, comfortable cockpit, well upholstered for its passengers, is a comfort to ride in and the performance of the aircraft must be a great pleasure for any pilot flying it. The motor was the same OX-5 with which Hoyt won the "On-To-Philadelphia" race and was used to prove that the aircraft would give good performance with an OX-5. It will be replaced with a 200-horsepower motor for which the aircraft was built. Lloyd Stearman has gained new laurels in the designing and building of this, his latest engineering feat, and Fred Hoyt, George Lyle and other members of Stearman Aircraft, Inc., may well feel proud to market a plane of this high-class performance."

By the first week of March three more aircraft were under construction in Venice. One of these was the Stearman C2 that shared the same airframe as the C1 but the aileron control systems incorporated push-pull rods from the cockpit that connected to torque tubes in the upper wing panels, which in turn actuated the ailerons. The new system would remain in use throughout production of the C-series biplanes. Another change made in the C2 centered on installing the water radiator between the landing gear struts, not in the front of the cowling.

The change may have been prompted by two factors: 1) The original radiator design required considerable work to fabricate and install that possibly increased manufacturing and labor costs. 2) The radiator was pleasing aesthetically but may not have proven as effective in practice as it did in theory. In addition, relocating the radiator made maintenance easier for mechanics by greatly improving access to the heat exchanger and associated plumbing.

As 1926 drew to a close, Lloyd Stearman had established himself as a viable airframe manufacturer and flown the first ship to bear his name. The year 1927, however, would put obstacles in his path that prove impossible to overcome. 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.

FreeFight Systems Names Hampton Aviation as an Authorized Dealer/Installer

NextGen avionics leader FreeFlight Systems announced that it had named Hampton Aviation of Mena, Arkansas, to the company's network of authorized dealers and installers.

FreeFlight Systems designs, manufactures, sells and supports avionics systems that improve the safety, efficiency and affordability of flying. For the King Air and twin turboprop market, FreeFlight Systems designed the Avail Performance Package – a complete and cost-effective ADS-B solution. Included in the Avail package is dual 1090 Mode S/ES transponders, a RANGR-RX/G 978 ADS-B receiver with an internal WAAS/GPS, integrated Wi-Fi, and a single control head. These remote-mounted solutions provide twin turboprop aircraft a modular, all-in-one solution to equip with ADS-B In and Out for the upcoming January 1, 2020 mandate.

This recognition has given Hampton Aviation another service they can provide their King Air customers. We are excited to add FreeFlight Systems products to our King Air capacities." said Tom Canavera, Sales and Marketing manager for Hampton Aviation. "This capability offers our customers an additional ADS-B solution."

Since 2003, Hampton Aviation has been the premier King Air inspection and repairs facility for the United States Army, Air Force and Navy. The company services all King Air models and their capabilities include complete inspections, heavy structural repair and maintenance, spar replacement or repair, sheet metal work, pre-purchase inspections, and paint and interior.

For more information visit *www.hamptonaviation.com,* or contact Tom Canavera by calling (479) 216-7161 or emailing *tom@hamptonaviation.com*.

Garmin Announces Aviation Webinar Offerings

Garmin has announced its aviation webinars through the first-half of 2019. Ranging from Garmin Pilot tips and tricks, cost-effective autopilot upgrades to low-cost avionics solutions, the company says the free webinars offer pilots and customers with a broad overview of

the latest Garmin has to offer, while also providing a general operational overview of its vast product line.

Autopilot Retrofits

The GFC 500 and GFC 600 retrofit autopilots offer reduced maintenance, as well as safety-enhancing capabilities such as Garmin Electronic Stability Protection (ESP), underspeed/overspeed protection and coupled approaches. This webinar focuses on the features and benefits of both autopilots.

- Cost-effective Retrofit Autopilot Solutions, March 21st @ 4:00 PM CT

Low-cost Avionics Solutions

Learn about upgrading an aircraft panel with cost-effective avionics such as the GDL 82 ADS-B Out datalink, the GTX 345 series all-in-one ADS-B transponders and the G5 electronic flight instrument.

- Low-cost ADS-B, Instruments & Avionics, February 20th @ 7:00 PM CT

Garmin Pilot

Get insider tips and tricks for using the Garmin Pilot mobile app to make flight planning, navigation and flying easier – and more fun.

- Garmin Pilot Tips & Tricks for your iPad, February 5th @ 4:00 PM CT

For more information or to register for one of the webinars listed above, go to *https://www.garmin.com/us/products/intheair/seminars*.

For more information about Garmin's full line of avionics, go to *www.garmin.com/aviation*.

GFC 600

GFC 500

King Air Technically...

Service Bulletins

SB 23-4175, Rev.1, Communications – Audio Storage and Playback Unit (ASPU) Configuration Change

Issued: Original, July 14, 2017
Revision 1, January 17, 2019

Note: This revision replaces the original issue of SB 23-4175 in its entirety and was revised to:

A. Add clarity to the *Effectivity* section as to which aircraft this kit is compatible with

B. Update the aircraft serial number effectivity for kits 434-3018-0003 and 434-3018-0009

Revision Compliance: NO EFFECT. Airplanes previously modified by this service bulletin are not affected by this revision.

Effectivity: Super King Air Model B300, Serial Numbers FL-954, FL-967 thru FL-1096; Super King Air Model B300C, Serial Numbers FM-58 thru FM-71; Super King Air Model B200GT, Serial Numbers BY-229 thru BY-293; Super King Air Model B200CGT, Serial Number BZ-1; King Air C90CTi, Serial Numbers LJ-2122 thru LJ-2136.

The equivalent of this service document has been incorporated on production airplanes FL-1097 and on, FM-72 and on, BY-294 and on, BZ-2 and on, and LJ-2137 and on.

Note: Do not install the 434-3018-003 kit if any aircraft has a 434-3014, 434-3017 or 434-3019 Fusion Phase 2 Upgrade Kit installed on the aircraft. The Fusion Phase 2 upgrade kit installs the most recent production ASPU software, thus eliminating the need for the 434-3018 ASPU kit.

Note: Textron Aviation-owned or Textron Aviation-authorized Service Centers are the only facilities that can complete this service document.

Reason: The aural warning system may give a false failure call-out during startup.

Description: This service document provides parts and instructions to install Recommended Field Service Kit 434-3018-0001, 434-3018-0003, or 434-3018-0009. This kit should be installed to prevent the aural warning system from annunciating a test failure when a failure does not exist on a Mod 3A ASPU. This kit eliminates the aural warning system test false failure that may occur during startup.

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

A service document published by Textron Aviation may be recorded as completed in an aircraft log only when the following requirements are satisfied:

1. The mechanic must complete all of the instructions in the service document, including the intent therein.
2. The mechanic must correctly use and install all applicable parts supplied with the service document kit. Only with written authorization

from Textron Aviation can substitute parts or rebuilt parts be used to replace new parts.

3. The mechanic or airplane owner must use the technical data in the service document only as approved and published.
4. The mechanic or airplane owner must apply the information in the service document only to aircraft serial numbers identified in the Effectivity section of the document.
5. The mechanic or airplane owner must use maintenance practices that are identified as acceptable standard practices in the aviation industry and governmental regulations.

No individual or corporate organization other than Textron Aviation is authorized to make or apply any changes to a Textron Aviation-issued service document or flight manual supplement without prior written consent from Textron Aviation.

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

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

ADVERTISING INDEX

GARMIN'S #1 G1000 NXi RETROFITTER

At Elliott Aviation, we are Garmin's #1 King Air G1000 NXi retrofitter and we've completed **more Garmin G1000 installations than all other dealers in the world COMBINED!** As a Factory Authorized King Air Service Center, Elliott Aviation offers on-site training to make sure you are comfortable with your system before you leave.

The Garmin G1000 NXi Features the Following Upgrades over the Standard G1000:

- SurfaceWatch Runway Monitoring Technology
- Optional Cockpit Connectivity Including Automated Database Transfer
- MFD Display-Like in the HSI on the PFD (Can Include SafeTaxi, Flight Plan, METAR's and More)
- Greater Display Resolution and Brightness
- Improved Map Performance
- Many More Improvements!

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