King Air

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

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MULTITASKER WITH LEGS

350CER's versatility and extended range make it NOAA's 'King of the Road'

by MeLinda Schnyder

When Hurricane Matthew started on its path of destruction from the Caribbean to the Southeast United States last fall, the National Oceanic and Atmospheric Administration's (NOAA) Office of Marine and Aviation Operations was called into action. Three aircraft and one ship supported forecasting, research and post-storm survey operations as the storm approached and moved along the Florida, Georgia, South Carolina and North Carolina coasts.

NOAA's Lockheed WP-3D Orion and Gulfstream IV-SP Hurricane Hunter aircraft conducted 19 storm reconnaissance, research and surveillance flights, operating a total of 158 hours. After Hurricane Matthew passed, NOAA's Beechcraft King Air 350CER (featuring a cargo door and extended range) conducted eight aerial survey missions in support of the Federal Emergency Management Agency (FEMA), collecting high-resolution imagery in areas impacted by the storm. Also following the storm, NOAA Ship Ferdinand R. Hassler surveyed channels in the Charleston Harbor and Port of Savannah using

The National Oceanic and Atmospheric Administration's Office of Marine and Aviation Operations operates five different aircraft models, including a 2009 Beechcraft King Air 350CER. (PHOTO: SEAN MICHAEL DAVIS)

The NOAA Commissioned Officer Corps celebrates 100 years of service this year. (NOAA)

Andrew Halbach is pictured in the back of the cabin of NOAA68 as the King Air 350CER collects high-resolution imagery of the aftermath of Hurricane Matthew in support of FEMA (Federal Emergency Management Agency).
(PHOTO CREDIT: LT. CMDR. DAVE GOTHAN, NOAA CORPS)

multibeam echo sounders to check for any submerged hazards to navigation resulting from the storm.

NOAA is a science-based federal agency within the Department of Commerce with regulatory, operational, information service and public safety responsibilities. The NOAA Commissioned Officer Corps is one of the seven U.S. uniformed services. They command the NOAA ships and pilot the NOAA aircraft that play a vital role in the acquisition and analysis of environmental data needed to meet national security, economic and environmental challenges.

A Century of Service

Faced with tough national security and economic challenges and a natural world governed by powerful and mysterious forces that often threatened life, property and commerce, President Thomas Jefferson signed a bill creating a new federal agency in 1807 that would support the nation's defense, promote the well-being of its citizens and unlock nature's secrets. The new agency's mission was to chart the nation's coastal waters to ensure that ships could move civilians, troops and material safely.

During the next 150 years, that agency – the Survey of the Coast and later the Coast & Geodetic Survey (C&GS) – would prove itself in war as well as in peacetime. With America's entry into World War I, a commissioned service of the C&GS was formed on May 22, 1917, to ensure the rapid assimilation of C&GS technical skills for defense purposes. During World War II, officers and civilians of the C&GS produced nautical and aeronautical charts, provided critical geospatial information to artillery units and conducted reconnaissance surveys.

Eventually the organization became known as the National Oceanic and Atmospheric Administration and today NOAA and the NOAA Commissioned Officer Corps, one of the lesser known of the U.S.'s seven uniformed services, conduct the work of the C&GS and more. The direct descendants of the C&GS, NOAA and the NOAA Corps work every day on land, in the air and on the sea to keep the nation secure and productive by providing products and services that support maritime domain awareness; help ensure safe passage of commercial and military traffic on our nation's waterways; warn mariners, aviators and the public of severe weather; aid search and rescue efforts; and conserve and protect our natural resources.

NOAA is comprised of the National Weather Service; National Marine Fisheries Service; Office of Oceanic and Atmospheric Research; National Environmental Satellite, Data and Information Service; National Ocean Service; and the Office of Marine and Aviation Operations. For the past 100 years, the NOAA Corps officers have commanded NOAA's fleet of research and survey vessels and aircraft, and they serve within each of the above NOAA line offices.

NOAA's Aircraft Fleet

NOAA has conducted airborne environmental data gathering missions for more than four decades. A fleet of nine manned aircraft is operated, managed and maintained at NOAA's Aircraft Operations Center (AOC), part of NOAA's Office of Marine and Aviation Operations.

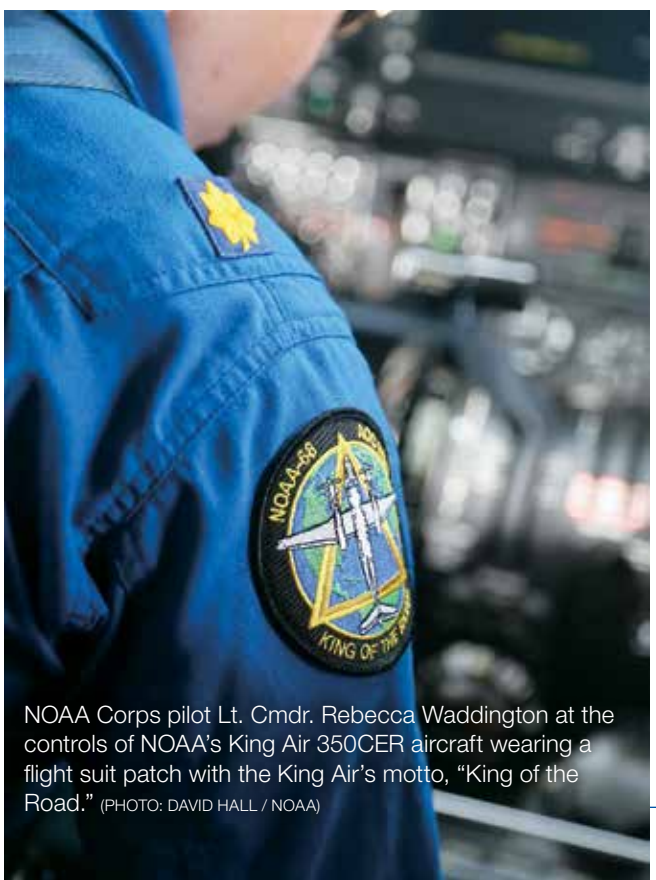
In June, the AOC moved from MacDill Air Force Base in Tampa, Florida, into a new facility at Lakeland (Florida) Linder Regional Airport that serves as the main base for the aircraft fleet. The AOC has a 58,000-square-foot aircraft hangar, office space and facilities for aircraft repairs and component storage.

Cmdr. Mark Sweeney, deputy director of the National Geodetic Survey's Remote Sensing Division within the National Oceanic and Atmospheric Administration, with the 2009 Beechcraft King Air 350CER. The bubble window is one of several mods made to the airplane.

Cmdrs. Mark Sweeney (left) and Ryan Kidder, both NOAA Corps officers, with NOAA's Beechcraft King Air 350CER (N68RF) in May 2015. (PHOTO: DAVID HALL / NOAA)

Pilots Lt. Cmdr. Nicole Cabana (left) and Lt. Cmdr. Rebecca Waddington, also NOAA Corps officers, with NOAA's King Air. (PHOTO: DAVID HALL / NOAA)

Three aircraft in the fleet are called hurricane hunters: two Lockheed WP-3D Orion four-engine turboprop aircraft fly directly into the storms while a Gulfstream IV-SP jet flies missions above and around the storms. All three are equipped with tail Doppler radar and the ability to deploy weather data-gathering probes in flight, and their mission is to forecast the hurricane with precision accuracy while gathering data that can help scientists better understand storm processes in order to improve forecast models. Outside of the hurricane hunting, these aircraft also conduct atmospheric and air chemistry studies missions.



NOAA Corps pilot Lt. Cmdr. Rebecca Waddington at the controls of NOAA's King Air 350CER aircraft wearing a flight suit patch with the King Air's motto, "King of the Road." (PHOTO: DAVID HALL / NOAA)

The NOAA's light aircraft also help monitor the environment and they operate nationwide. The Beechcraft King Air 350CER twin-turboprop is used primarily for coastal mapping and emergency response. A Gulfstream Turbo Commander AC-695A high-wing, twin-engine turboprop spends most of its time collecting data used to forecast river levels, water flow and potential flooding events when the snow melts. Four de Havilland DHC-6 Twin Otter turboprops support airborne marine mammal, hydrological, remote sensing, air chemistry and emergency response programs. NOAA also operates unmanned aircraft systems to observe marine life, seabirds and their habitat.

A team of 110 civilians and officers of the NOAA Corps oversee these aerial assets. One of those officers is Commander Mark Sweeney, deputy director of the National Geodetic Survey's Remote Sensing Division within NOAA.

Sweeney went to Cornell University on a Navy ROTC scholarship, then was commissioned in the Navy and went to flight school in Pensacola, Florida, and Corpus Christi, Texas. He served as a Navy pilot for 10 years, with his last duty station at the Naval Research Laboratory, where he trained some of NOAA's P-3 pilots and learned about the organization's mission.

In 2006, he made an inter-service transfer to NOAA and began flying the P-3 hurricane hunters and the Twin

Otters before switching over to a Cessna Citation II that was conducting coastal mapping at the time.

The King Air 350CER

Sweeney flew the hurricane hunters and the Citation for several years and then camera equipment changes brought a change in platforms.

"We were switching from large-format film cameras to digital cameras, which have a lower resolution than film and required us to fly at lower altitudes," Sweeney said. "It wasn't efficient to fly the Citation at 7,000 to 10,000 feet and it had growing maintenance costs because of its age."

A selection team chose the King Air 350CER for its performance, operating costs and versatility. While the aircraft is used primarily for coastal mapping and emergency response, NOAA wanted an airplane with the flexibility to be used for any of its line offices.

"We needed a multi-engine aircraft with legs that could get out to Hawaii, up to Alaska and down to the Caribbean without too much jumping around to get there," Sweeney said. "We also wanted fuel efficiency and an airplane that could carry the camera payloads that we have. We also needed a platform with a good dash speed so that if we're in the Pacific Northwest on a coastal mapping mission and something happens in the Southeast that requires an emergency response we would be able to be there quickly."

NOAA's King Air combines the extended range version of the 350 (an extra 1,580 pounds of fuel) with a 52-inch-by-49-inch cargo door. The agency purchased its 2009 Beechcraft King Air 350CER new from the factory and immediately sent it to Avcon Industries in Newton, Kansas, north of the Textron Aviation factory in Wichita.

NOAA's King Air 350CER can carry an extra 1,580 pounds of fuel for extended range and has a 52-inch-by-49-inch cargo door, with other interior special missions modifications. (PHOTO: DAVID HALL / NOAA)

Avcon installed modifications necessary for the King Air's primary roles.

The aircraft's main modification is two large, downward-facing sensor ports that can support a wide variety of remote sensing systems, including digital cameras, multispectral and hyperspectral sensors, and topographic and bathymetric LIDAR systems (measuring water depth using light detection and ranging).

"One port is right at the main cabin door and one is just a little forward of that," Sweeney said. "They allow us to mount a camera or other sensor in a well in the floor. It shoots straight down through the floor of the plane through about an inch-and-a-half thick optical glass. It's structural glass that maintains the pressure bulkhead of the plane and it's optically clear so that it does not distort. There are telescoping doors that cover the glass when it's not being used to protect that expensive optical glass."

Sweeney said the King Air most often flies using a multi-camera system. That allows the crew to successfully fly coastal mapping missions that require cameras to be pointed straight down while also collecting oblique imagery of the shoreline that will be useful when assessing future damage to a particular area.

"Our camera systems allow us to do some sophisticated 3-D modeling of the entire shoreline," Sweeney said. "Then after an event like a mudslide, earthquake or storm we can reassess and see what changes have taken place as a result of that event."

The optical plates can be removed and the aircraft operated unpressurized, for example if the glass will degrade a laser signal. Other modifications include bubble windows that allow an observer to see down and two window blanks.

"As a product of all of the mods we have, the tail end of the airplane is very heavy," Sweeney said. "We flew it for a couple of months in 2009 and we had some problems

A team of NOAA aviators captured this image showing before and after in Kitty Hawk, North Carolina. The aftermath photo was taken after Hurricane Matthew moved through the area in 2016 and used specialized remote-sensing cameras aboard King Air N68RF flying at an altitude between 2,000-3,000 feet. (PHOTO: NOAA)

with the camera door, so when we took it back to Avcon to have that looked at we explained that the CG on the plane was so far aft that we couldn't put fuel in the ER tanks and accomplish the mission that we wanted to accomplish. The fix ended up being taking a lot of the avionics equipment out of the aft bay and moving it into the forward avionics bay and the nose, and also putting some ballast weight up there."

'King of the Road'

Because of those adjustments, the aircraft didn't actually enter service until March 2010 when it began flying missions from Puerto Rico to assess damage caused by the earthquake in Haiti.

In the seven years since, NOAA's King Air 350CER has accumulated 3,972 hours, or roughly 560 hours per year. There is rarely a time when the King Air returns to the AOC to remain idle because it is in between projects, like some of the other NOAA fleet aircraft. The airplane is almost always in action – on the road – so the crew came up with the slogan "King of the Road" that it wears on a patch on their flight suits.

Most of the King Air's hours have come from conducting coastal mapping for the Remote Sensing Division, which creates nautical charts used by a variety of agencies and companies, including commercial fisherman. Other hours come from flying emergency response missions to collect aerial imagery following destructive events such as tornadoes, hurricanes making landfall or flooding events that agencies like FEMA could then use to assess damage paying claims and providing support.

Sweeney describes the emergency response missions as an extension of the coastal mapping missions: both are about getting vital imagery but the circumstances are very different. On mapping flights, the pilots are chasing great weather and ideal conditions (no cloud cover, tide has to be just right, optimal sun angle) for capturing useful images. The flights typically take them to beautiful settings. In contrast, flights to support an emergency such as a hurricane can take the pilots into terrible weather. Rather than taking their time to get just the right images, they need to collect the data quickly and get it to the agencies waiting for it.

"We might be providing images for FEMA to decide if they need to evacuate an area or let homeowners return," Sweeney said, adding that FEMA will use the images during and after an event. "FEMA typically would have to send out assessors to a disaster area to go house-to-house to assess the levels of damage. That's very expensive for them to send people out on the ground. Our imagery allows them to look at an entire neighborhood at once and make those assessments much faster and at less expense."

In 2016, NOAA's King Air 350CER supported severe flooding in Louisiana in August and in October flew missions to survey the aftermath of Hurricane Matthew and to monitor river flooding in North Carolina caused by heavy rain from the dissipated hurricane.

A typical crew on the King Air 350CER is two pilots and one sensor operator; the AOC has seven pilots qualified to fly the King Air and two sensor operators assigned to work onboard. Most pilots, like Sweeney, will fly one of the hurricane hunters as well as one of the smaller platforms. The difference of flying conditions between the aircraft is significant as is the difference in flying the two main missions of the King Air 350CER.

"The emergency response flights can be very disheartening when you're flying over vast areas of flooding or destruction and you're typically flying in when there is still lingering weather in the area," Sweeney said. "On the other hand, the coastal mapping is great, it's almost all shoreline settings in nice, scenic areas with perfect weather conditions." KA

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Registration Now Open for King Air Gathering II

SEPTEMBER 29-30, 2017 – DAYTON, OHIO

by Kim Blonigen

Planning has been finalized and registration is open for the second King Air Gathering being held September 29-30, 2017, at Stevens Aviation in Dayton, Ohio (KDAY). The event will offer different speakers and subjects than the first Gathering, and also includes an optional tour of Hartzell Propeller Inc., which is currently celebrating a century in the business of making propellers, and free admission to the National Museum of the U.S. Air Force located at the Wright-Patterson Air Force Base near Dayton, Ohio.

Seminars will be presented by King Air experts in various areas and will include breakout sessions specializing in piloting and maintenance. Some of the topics covered will be how to approach and perform a post-maintenance flight, ADS-B options for King Airs, service issues Beechcraft is seeing in the field, ForeFlight Performance Plus for turboprops, the efficient PT6 engine and how to run yours, flight control rigging and knowing if it's correct, maintenance tracking versus record keeping and more.

Dr. David Strahle, known as the Father of Datalink is also a King Air 200 owner/pilot, and will be a Keynote Speaker at the KAG.

Robert "Hoot" Gibson, USN Retired, former fighter pilot, test pilot, and Navy Astronaut will be one of the Keynote Speakers at the KAG.

Two keynote speakers will also be featured: On Friday, Dr. David Strahle, Father of Datalink and fellow King Air 200 owner/pilot, will discuss *Thunderstorm Avoidance using NEXRAD Radar and Advanced Weather Planning*. On Saturday, Robert "Hoot" Gibson, USN Retired, former fighter pilot, test pilot, and Navy Astronaut will present *Beechcraft Bonanzas to the Space Shuttle*.

Once again attendance numbers are limited, this event can only take 70 King Air owners/operators, so register now! Go to *www.kingairsociety.com* for registration and more detailed information, including an agenda.

A general view of the WWII Gallery at the National Museum of the United States Air Force (NMUSAF).

(U.S. AIR FORCE PHOTO BY KEN LAROCK)

The NMUSAF is located at the Wright-Patterson Air Force Base near Dayton, Ohio and is the world's largest and oldest military aviation museum.

Attendees to the King Air Gathering are being offered free admission to the NMUSAF on Sunday following the event.

Platinum Sponsors: Textron Aviation and Rockwell Collins

MAINTENANCE TIP

Beware of Black Death

by Dean Benedict, A&P, AI

During the hot summer months, nearly everyone is running their air conditioner, and it would be an awful thing for it to stop working. Black Death could be the culprit and it isn't what you want to happen to your King Air. Black Death is a sludgy disgusting goo that gums up the air conditioning compressor, condenser, evaporator and everything else in the system. Essentially, it destroys all the components. Everything must be replaced and the lines flushed clean – this is a miserable and expensive process.

On King Air 200s and 300s, the air conditioner (AC) compressor is on the R/H engine and the plumbing goes through the wing root, so the R/H leading edge must come off. It's a nightmare.

The crux of the problem is moisture in the system. AC systems are sealed to keep moisture out. When it is opened to replace a switch or a component, a vacuum pump is used to remove all the air, and the moisture in it, before recharging the system with Freon. Some think Black Death only affects R134a systems, but it can bring down an R12 system too.

Freon and Moisture

Freon becomes acidic when mixed with moisture, and the acid corrodes the aluminum in the condenser, the evaporator and certain parts of the compressor. Also, in aircraft AC systems, the lines (tubing) are aluminum. Think of the black residue on your rag after polishing the aluminum wheels on your car or the aluminum spinners on your King Air. That's the "black" in Black Death. The AC system is being eaten away from the inside out. Corroded aluminum mixes with the Freon and oil in the system and this mixture is subjected to extremes of temperature. The result is a gooey black sludge that eventually chokes the system to death, quite literally.

R12 and R134a

Dichlorodiflouromethane (R12) boils at -21.6° F; Tetrafluoroethane (R134a) boils at the warmer temperature of -15.34° F. This is why R134a doesn't cool as well as R12. Another difference is that R134a is slightly acidic to begin with, and adding moisture to it increases its acidity. This could be why Black Death rears its ugly head more frequently in R134a systems. That, and the fact that there are fewer R12 systems that exist these days.

I was never a fan of converting R12 systems to R134a because R12 cools so much better. The R134a systems in cars and airplanes today, however, are greatly improved over the anemic systems of 20 years ago. As long as I could procure R12 – good R12 – I kept servicing those systems. R12, although pricey, continues to be available today, but you must search for a reputable supplier.

Freon – the Good, the Bad and the Ugly

Ten years ago, I had a customer who owned a couple of King Airs with R12 systems. He chafed at the cost of R12, so he brought me his own cylinder. I knew that he flew frequently to Mexico and was worried his R12 was purchased there, so I was careful not to mix his Freon with my own. In refrigerant circles, Freon from Mexico and other countries has a reputation for impurities that muck up AC systems. I heard that Mexican R12 has butane added as a filler. Pure R12 is non-flammable.

There is nothing wrong with recycled Freon, whether it's R12 or 134a, as long as it is good quality (clean and pure). The air conditioning machines used by knowledgeable

Air conditioning systems that require R12 Freon are decreasing and make finding good quality R12 harder to come by. A quick way to identify R12 is the color of the cylinder; they are color-coded per type and white is reserved for R12.

AC technicians pull Freon out of an AC system and store it. The Freon is filtered during this process so it's safe to be reused. These machines have built-in sensors to indicate when the filters need to be changed.

Anyone buying Freon must (a) be licensed to do so, and (b) be very discerning. My supplier weighs each incoming cylinder of R12 before accepting it to ensure it's not tainted. Freon is heavier than air; if any air is cut into the Freon to dilute it, the cylinder won't weigh enough. Watch out for Freon substitutes, they can become highly corrosive. They often contain methyl chloride which turns more acidic with less moisture than R134a or R12.

FR12, also known as FrigC, sometimes creates confusion. FR12 is R134a with butane added; it's used in older cars. It comes in a white cylinder, which is the odd part. Refrigerant bottles are color coded and white is reserved for R12, sky blue is for R134a. Once I was buying R12, but got a cylinder of FR12 by mistake. When I looked closely I saw "Tetrafluoroethane" on the cylinder which threw me for a loop and wondering what R134a was doing in a white cylinder. Well, it's a funky cylinder, constructed upside down compared to R12 and R134a. These days R12 is becoming harder to come by. Those white cylinders are a sight for sore eyes, provided it's pure R12 and not FR12.

Mercury and Microns

A vacuum pump is used to evacuate the Freon from a system, then a stronger vacuum is applied and left on the system for a period of time. Moisture boils more readily under a vacuum. This is how moisture is purged from AC systems – the moisture is boiled away and the dry air is pulled out by vacuum.

The King Air manual calls for a vacuum pump that pulls at least 29 Hg (inches of mercury) and 125 microns. A proper AC machine in good condition meets this criteria. But on occasion, I have used a vacuum pump pulling 250 microns

when I suspected a lot of moisture in a system after repairing a large leak. The manual also states the system must be left under vacuum for up to four hours. I tend to leave a King Air system under vacuum for much longer.

An Open System Invites Trouble

I'm very particular about not leaving the system "open" while waiting for replacement parts to arrive. After troubleshooting and identifying the problem (let's say it's a bad expansion valve), I do not remove the bad valve. I wait until I have the new valve in my hot little hand before I remove the old one. The system is only open during the time it takes to remove and replace the expansion valve. This keeps the amount of air (moisture) entering the system to a minimum.

If an AC system was left open for a period of time, for whatever reason, I would change the receiver-drier. It contains a desiccant. Receiver-driers come with plugs on both ends. I never remove those plugs until just before I install it; otherwise, the desiccant starts pulling moisture from the ambient air, reducing the effectivity of the new receiver-drier.

Confession

I went to air conditioning school when I worked for an automotive shop during high school. In the many years since, I've worked on a wide variety of auto and aircraft AC systems but, lucky for me, I've never had to deal with Black Death. Yes, I have been working for many years in a desert climate which is less conducive to Black Death than high humidity, but I don't know if that tells the whole story.

My "partner in crime" for AC troubleshooting and repair hasn't dealt with Black Death in his long career either. Together we've troubleshot and repaired King Air AC systems that others gave up for dead, but none with Black Death. Some of those King Airs lived in the desert, but others lived in coastal environments.

Here's what I do know: He and I are on the same page regarding pulling vacuum – the more time, the better. When it comes to purging moisture from AC systems we routinely exceed the maintenance manual requirements for time under vacuum. And we're vigilant on keeping systems closed until the replacement part is in hand, ready for install.

What Can You Do?

If your King Air is in the shop with an AC squawk, don't be in a hurry. Consider this typical scenario: Your AC is inop and you have a trip coming up. You get your King Air to the shop at the last minute for a quick fix. They troubleshoot it and find the compressor is bad. They have a new one coming, but they know you're in a hurry so they take the old one off in preparation for replacement. The system sits open for one to two days. The shop receives and installs the new compressor as soon as it arrives; then they suck the system down with vacuum for an hour or so. They check for leaks and don't find any, so they top off the Freon and send you on your way. Most likely your AC will blow ice cubes, but the door was opened for moisture to get into the system and this could hamper AC performance down the road.

If you find your AC blows cold, then warms up, then gets cold again – get your aircraft to a shop. In my experience, this intermittent cooling indicates moisture in the system. AC techs can diagnose this with their gauges. If you're really pressed for time or far from home base, you can have the AC serviced with Freon as a stop-gap measure. But as soon as you can schedule it, put the aircraft down for a thorough check and fix of the AC. Allow the time.

The Good Guys

Besides patience, you need a shop with a good AC guy. Anyone can throw Freon in a system, but proper servicing and effective troubleshooting requires specialized

equipment, knowledge and experience. A good AC tech will have all three, plus he or she will know where to source quality Freon.

I'm in a pickle here, because there are good guys out there that know what they're doing and they go by the book. Maybe they've faced an AC system with Black Death and maybe not. But, I don't want to give the impression that I've prevented Black Death because I went beyond the book requirements. That could be a factor but I don't know it for a fact. Extended vacuum time has worked for me and I don't see a downside to it.

The bottom line is that an AC system contaminated with moisture won't function properly and Black Death could eventually be a result. A humid climate, bad Freon, a leaky system, a system left open to the air – all of these factors could contribute to the rise of Black Death in a King Air AC system. The goal? Get and keep the moisture out and keep your cool!

Dean Benedict is a certified A&P, AI with over 40 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.

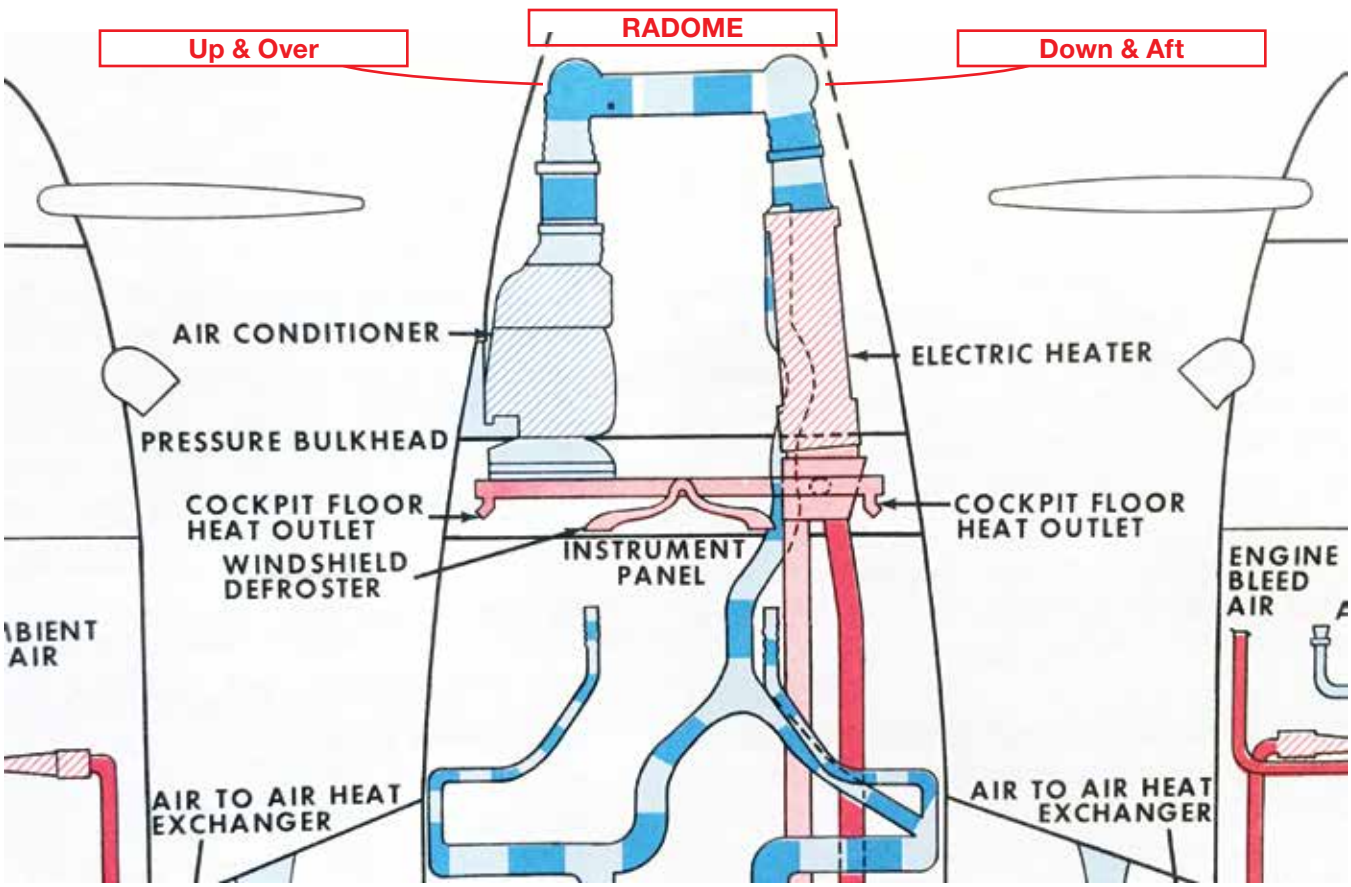
The Crossover Duct … and Why it was Eliminated

by Tom Clements

"Out of sight, out of mind." That can be one description of the topic for this month's article: The crossover duct. Take a look at the image below, showing the forward portion of a model 90's environmental system.

Do you see that dark blue and light blue tube that crosses from left to right, on the most forward portion of the diagram? It sits forward in the nose section, just aft of the bulkhead that has the radar antenna bolted onto it. It is totally inaccessible without removing lots and lots of equipment and panels. I have heard more than one King Air mechanic opine that Beech creates the air conditioning (AC) system first, then builds the airplane around it! Well, not really, but gaining access to the environmental components – air conditioner and heater – in the nose area is indeed a labor-intensive and time-consuming task. Keep your fingers crossed that there will be no repairs needed in this section during your next Phase inspection!

The fan that circulates air through the environmental components goes by the name of ***Vent Blower***. Personally, I don't like the "vent" portion of this label since I believe "venting" tends to involve air exiting some location or container. "Let's open the kitchen window to vent out the smell of those rancid eggs." Or, "I'll open the valve on the bottle to vent some oxygen out to keep the pressure from being excessive." Yet this particular fan merely picks up cabin air to recirculate it across the cooling and heating components before it flows through the outlets back into the cabin to repeat the process again. So I'd vote for just labeling it "blower," but the Beechcraft engineers decided to label it "vent blower" so that's the name we'll use.



A Nose Circulation drawing of a King Air E90 which shows the location of the crossover duct – the dark and light blue tube – far forward in the nose.

The vent blower is located under the cockpit floor, just between and in front of the pilot's rudder pedals. (Surprisingly, it is not shown nor labeled in the picture you have examined from the POH.) It picks up the air that is there (better wear clean, non-smelly socks, eh?) and sends it forward through a hole in the forward pressure bulkhead. It now enters the ***Evaporator Plenum*** that is located in the cavity beneath the avionics or baggage compartment floor on the left side of the nose wheel well. It passes through a filter before flowing across the coils of the evaporator. As the name indicates, this is where the air conditioning's Freon boils, or evaporates, from liquid to vapor. Just as it takes plenty of heat energy to boil a pot of water on the kitchen stove, so also does it take energy to boil the Freon. That energy comes from the cabin air, as it sends energy, heat, from the air into the Freon, causing the air to cool. Unlike the water on the stove, however, here the pressure of the Freon is very low and hence its boiling temperature is also low enough that it evaporates without high temperature involved.

As the cabin air loses heat energy and cools, less water can be held in suspension so some condensation of water almost always takes place. That is why the evaporator plenum (plenum is just another word for chamber or space) contains a drain hole on the bottom. That puddle you see on the ramp under the left side of the nose at the end of summer flights is merely the condensed water that exits the drain. To avoid an undesirable pressurization air leak, the drain contains a rubber seal that closes when a positive pressure differential is present, but relaxes to the open position when unpressurized. The evaporator plenum also contains a temperature-sensing switch that will shut down the AC before the plenum gets so cold as to cause the condensation to freeze, thus blocking the flow of air through the plenum. This is the "freeze switch," set to operate when it senses the temperature approaching 32°F.

So now the air from the vent blower proceeds past the evaporator plenum to continue its circulation pattern. Keep in mind that most of the time in cruise the AC is not operating because it's not needed. So even though the air always flows across the coils of the evaporator, no cooling may take place. During these times, the plenum merely serves as an inert component that directs the air forward so that it can continue its circulation. The diagram you examined is obviously a top-view, looking down at the environmental components. Hence, there is no way to see or visualize any vertical differences in the tubing's location. It's obviously not a 3-D drawing!

So, to the un-informed newcomer, there is no way to know that the dark blue and light blue crossover duct is not just a horizontal tube from left to right. That cannot be, however, because the nose wheel well gets in the way.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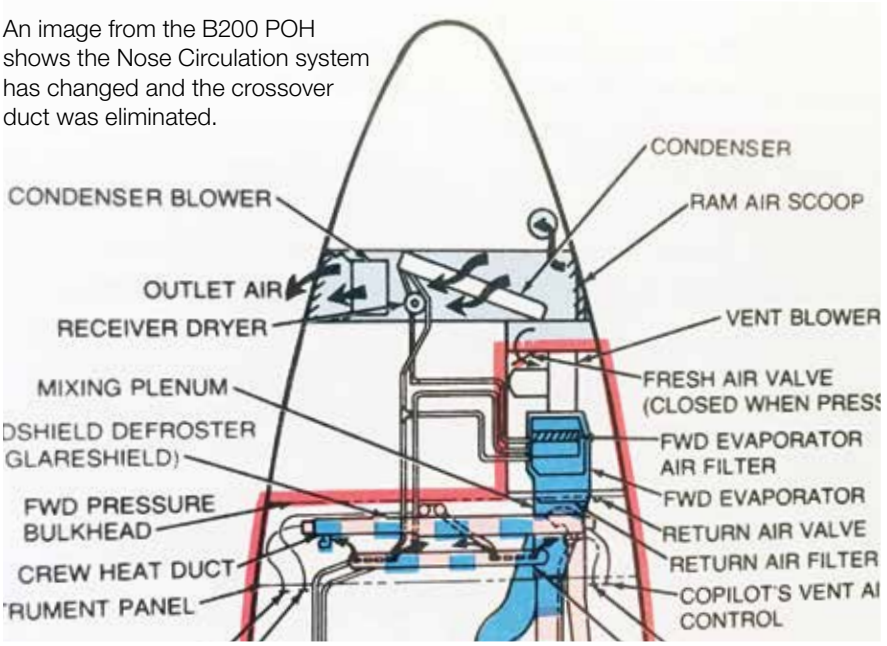


An image from the B200 POH shows the Nose Circulation system has changed and the crossover duct was eliminated.

So, this duct moves vertically upward to get above the wheel well, then goes horizontally from left to right, then drops vertically down to reach the electric heater (or kerosene-fired heater on the older models prior to the C90).

As the circulating air continues its flow, now moving aft on the right side of the nose wheel well, below the right side of the avionics bay, it branches into two parts. The larger part goes through the electric heater that contains eight large grids – coils of exposed wire – that are available to heat the air, if needed. Four of these grids are referred to as the "Normal" heat grids and the other four identical grids comprise the "Ground Max" heater. As you know, except for winter ground operation, rarely are any heat grids needed to supplement the bleed air heat. So, just as with the evaporator plenum, the air's temperature may or may not be changed here, depending upon the need for heating.

The smaller air circulation line on the right side of the nose bypasses the heater and sends the air directly to the overhead "Eyeball" or "Wemac" outlets. Again, since it is impossible to know height relationships from this top-down view, you need to know that this line splits into left and right sides, moves up in ducts behind the sidewall upholstery behind the crew seats to the ceiling, and then feeds the outlets. As you can figure, this air may be cooled but it is never hot, not having passed through the heater nor being mixed with new bleed air.

To complete our circulation pattern description, the air that exits the heater now passes through another hole in the forward pressure bulkhead to enter the ***Mixing Plenum.*** This chamber is under the floor beneath the copilot's feet and it is where incoming bleed air enters the distribution system. Hence the name: We are *mixing* bleed air and recirculated air in this plenum before the combination flows to all outlets in the cockpit and cabin *except* the overhead ones.

As you can well imagine, it would be pointless, and probably impossible, to vent our pressurized air into unpressurized components in the nose and then somehow force it to re-enter the pressurized cabin! Thus, all the nose distribution components and ducts that we have been discussing are pressurized and are experiencing the same ΔP between the inside and outside of the components and ducts that the airplane is experiencing. See the potential for leaks?

An increase in cabin leakage is virtually a certainty as a King Air ages and logs hours. In fact, it is my opinion that excessive leak rates – as compared to factory specifications – is the most universal "squawk" in all King Airs … and probably in every other pressurized airplane ever made!

Some leaks are relatively obvious because they are easy to hear. A bad door or emergency exit seal is usually quite apparent. But when you find that your airplane has a very high leak rate, yet the cabin seems relatively quiet and normal, guess where those leaks likely exist? Bingo! Up in the nose, far from your ears.

Through the five decades of King Air production and operation, it has become very apparent that the environmental components in the nose – especially that big crossover duct with its holding clamps on both ends – have a less-than-stellar reputation for trouble-free operation. Expressed more simply, they can leak like a sieve! So sorry, but one of the facts of operation of a 90- or 100-series King Air is that eventually your maintenance shop will be charging you for some extensive labor hours as they make needed repairs in this hard-to-access area.

By the time the model 200 was being designed in the early 1970s, the weakness in the 90- and 100-series nose-area environmental distribution was quite well recognized. The engineers wanted to improve the design and make it less problematic. Keep in mind that the highest ΔP any King Air model had up until this time was 4.6 psid, yet the 200 was going to have 6.0 psid. More ΔP – more aggravation of leaks.

Take a look at the image above from the B200 POH.

Well, looky there! No crossover duct! In fact, there is nothing beneath the avionics on the left side of the nose, period. (I always wondered when someone would come up with an STC to add an access door into this void space. Maybe a good spot to store the prop restraints and the inlet plugs, eh?)

Now, the vent blower is no longer under the cockpit floor, but instead is forward in the nose. Air comes through a flapper valve and filter in front of the copilot's

rudder pedals, on top of the cockpit floor, gets sucked to the blower through a hole in the pressure bulkhead, then gets expelled through the evaporator plenum and back through the pressure bulkhead beneath the cockpit floor into the mixing plenum.

Well and good, but where is the heater?! It's gone!

Sadly, Beech made a little boo-boo here. They looked at the higher compression ratio on these big PT6A-41 engines that had never been used before and concluded that bleed air heat would always be sufficient for cabin comfort, no supplemental heat would be required.

Wrong! In cruise flight, sure, there is plenty of heat. But the design team must have totally overlooked the fact that the bleed air is not very compressed and hence is not very hot on the ground with the engines at Idle. Before the flight test program concluded, it was recognized that something had to be done to provide cabin heat on the ground … or even to supplement the bleed air heat in flight, if ever needed. By this time, however, the environmental air distribution design had been finalized, with no provision for any type of grid heater in the ductwork.

What do they do? They come up with the rather puny and ineffective "Radiant Heat Panels" in the cabin overhead. Better than nothing? Absolutely! As good as an electric grid heater? Not even close! But at least they got rid of the potential for leaks in our now non-existent crossover duct. It was not until the model 300 appeared in 1984 that the design was modified to include both a forward and aft grid-type heater buried in the distribution ductwork. This same design was incorporated into the 200-series beginning with BB-1444 in 1993. Nice!

There you have it: More than you ever wanted to know about the infamous crossover duct. It is still in the latest C90GTx-series, but never in any 200- or 300-series, including the B300 (known as the 350).

May all your leaks be small! KA

King Air expert Tom Clements has been flying and instructing in King Airs for over 44 years, and is the author of *"The King Air Book."* He is a Gold Seal CFI and has over 23,000 total hours with more than 15,000 in King Airs. For information on ordering his book, go to www.flightreview.net. Tom is actively mentoring the instructors at King Air Academy in Phoenix.

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

Baron - The Businessman's Beechcraft Part One

The Model 95-55 was aimed directly at the CEO who wanted fast, economical transportation at an affordable price

by Edward H. Phillips

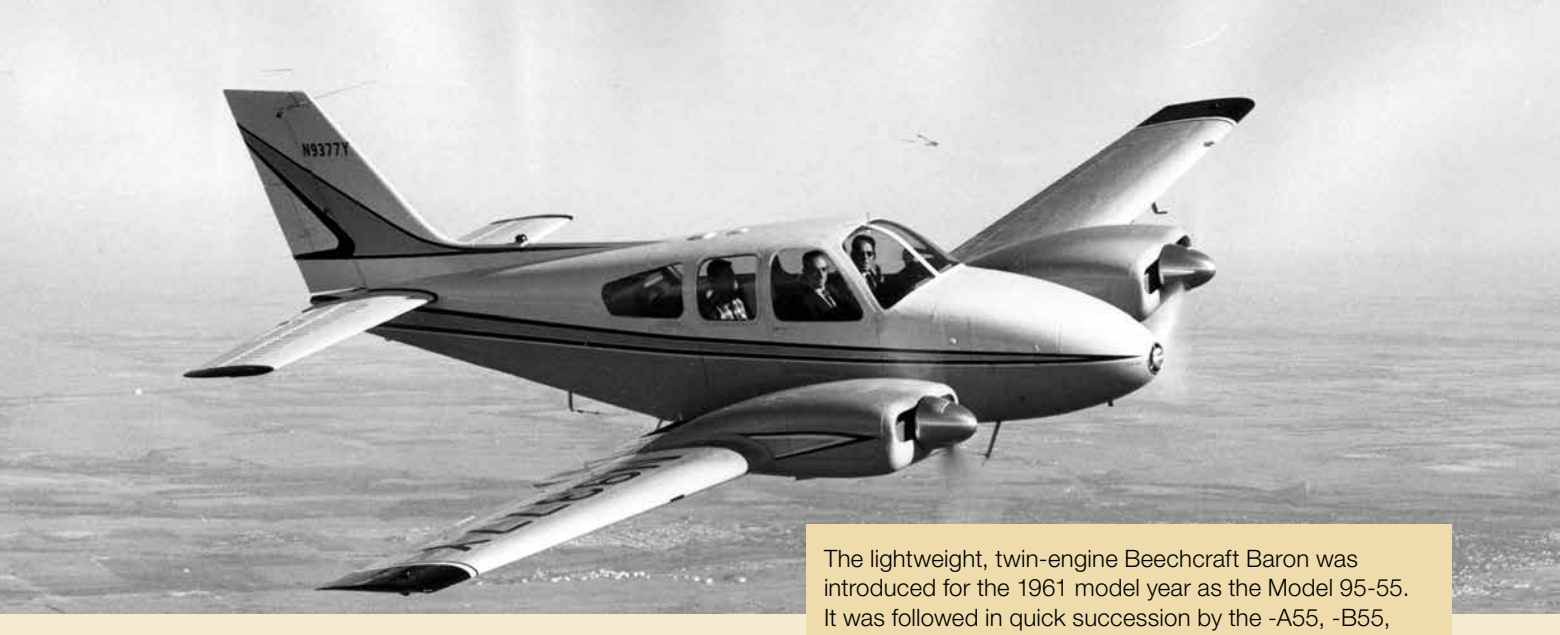
"Outstanding single event of the 1961 meeting was the introduction of the new Beechcraft Model 55 Baron, a fast, sleek, four- to five-seat twin-engine plane designed for the businessman-pilot. Ruggedly strong, yet extremely trim in appearance with swept tail and compact, flat-decked engine nacelles, the Baron offered a useful load of 1,920 pounds and a top speed of 236 mph."[1]

That glowing declaration about the new Model 95-55 excited salesmen attending the 1961 Beechcraft International Distributor-Dealer Sales Meeting held in November 1960. Although the Baron was the center of attention during the event, senior Beech Aircraft Corporation officials proudly declared that the 1960 fiscal year had ended with total sales of $98.8-million – a 10.4 percent increase over the previous year. In addition, the company's worldwide sales force had responded well to the rallying cry of "60 Million in '60" by selling $62.2-million worth of new Beechcraft airplanes.

As for the Baron, it was designed specifically to fill a critical gap in the product line between the smaller Model 95 *Travel Air* and the larger, quasi-cabin class Model 50 *Twin Bonanza*. In addition, Beech Aircraft needed to respond to improved versions of the Cessna Model 310D and 310F and Piper Aircraft's versatile PA-23-235 *Apache* as well as the PA-23-250 *Aztec*. Although Piper customers liked the Apache, they clamored for more power, speed, range and cabin comfort. Based on customer feedback accumulated since the PA-23-150's introduction in 1954, Piper Aircraft management realized that the Apache had matured to a point where a major upgrade was not only feasible, but essential.

As for Cessna, its leader, Dwane L. Wallace, had no intention of allowing Piper's new Aztec to upstage the

The Model 95-55 Baron design was largely based on the Model 95 Travel Air airframe but with major structural upgrades to handle the more powerful Continental engines and higher airspeeds.



The lightweight, twin-engine Beechcraft Baron was introduced for the 1961 model year as the Model 95-55. It was followed in quick succession by the -A55, -B55, -C55 and -D55 versions that kept pace with competition from Cessna Aircraft's Model 310 and Piper Aircraft's PA-23-250 Aztec.

highly popular Model 310. As a result, he authorized development of the Model 310D (1960 model year) and Model 310F (1961) that featured a "Flight Sweep" vertical stabilizer and a host of systems upgrades including 260-horsepower Continental IO-470-D engines and an increase in maximum gross weight to 4,830 pounds. Maximum speed increased to 242 mph with a service ceiling of 21,300 feet.[2]

Meanwhile, Beech salesmen were experiencing an increasingly tough time selling the Model 95 *Travel Air* against the more powerful and faster Aztec and Model 310F. During 1959-1960, however, Beech engineering had been busy designing what would become the Model 95-55 Baron – a stylish, fast and thoroughly modern lightweight, twin-engine airplane that would not only be competitive with the Aztec and Model 310, but more importantly, keep customers in the Beechcraft family.

The popular 95-B55 continued to be manufactured until production was terminated in 1982 after 1,815 commercial units had been built. Another 65 were manufactured for the U.S. Army as multi-engine transition trainers.

A production prototype first flew on February 29, 1960, powered by two Continental IO-470-L engines, each rated at 260 horsepower and equipped with two-blade, constant-speed, full-feathering propellers. The overall dimensions of the Baron were slightly larger than those of the Model 95, with a wingspan of 37 feet 10 inches, length of 28 feet and a height of nine feet seven inches. Unlike the Travel Air, however, the Baron's cabin could accommodate up to five people, although the fifth seat was at the rear of the cabin and was more suitable for a child than an adult.

The wing, with a total area of 199.2 square feet, featured an NACA 23016.5 airfoil at the root, changing to the NACA 23010.5 at the tip. The six-cylinder engines were each housed in compact, low-drag nacelles that represented a major design improvement compared to the deep, bulky nacelles used on the Travel Air. Whereas all versions of the Model 95 used a standard vertical stabilizer, the Baron boasted a swept stabilizer similar to those found on the Aztec and the Model 310D that included a dorsal fairing that helped to promote the airplane's sleek lines from nose to tail.

Maximum takeoff weight was 4,880 pounds for the initial production Baron 55, and the new Beechcraft was capable of achieving a cruise speed of 190 knots at an altitude of 7,000 feet. Carrying 116 gallons of fuel, or 136 gallons with optional auxiliary tanks, the Baron had a range of 1,200 statute miles with a 45-minute fuel reserve. The electrically-operated, retractable tricycle landing gear was a typical Beechcraft installation, with the main gear swinging inward and upward to retract, and the nose gear swinging aft and upward into the lower nose compartment.

As required by federal regulations, an emergency extension system (essentially identical to that of the Model 35 Bonanza and the Travel Air) was provided that required the pilot to crank down the gear until it locked in place for landing. Cabin heating was achieved by a combustion-type heater and blower rated at 50,000 BTU. The heater unit, which was fed avgas only from the left main fuel tank, was mounted in the nose section.

In September 1963, the Model 95-55 was certificated under FAA Type Certificate 3A16 (with amendments) that was originally issued to the Travel Air. A standard-equipped Baron 55 sold for $58,250 – a price that compared favorably with that of the Cessna Model 310D ($61,000) and the Aztec ($51,000).

New Barons began rolling off the assembly lines at the Wichita, Kansas, factory late in 1960 for the 1961 model year, and 190 of the original Model 95-55 were manufactured before production changed to the Model 95-A55 for the 1962 model year. Beechcraft salesmen were excited about the new airplane, and the Baron quickly established itself as a strong competitor to the Model 310D and the Aztec.

The next version of the Baron that was designated 95-A55 featured an optional six-seat interior, an increase in maximum gear extension speed to 175 mph with flaps extended to 15 degrees. Maximum gross weight also increased to 4,880 pounds from 4,830. Despite its price

tag of nearly $60,000 for a standard-equipped airplane, the 95-A55 sold well with 187 units built in 1962 followed by another 122 in 1963. As with its predecessor, the 95-A55 could be equipped with instrumentation allowing appropriately-rated businessman-pilots to operate their Baron under FAA instrument flight rules.

It is interesting to note that in 1963 Beech Aircraft Corporation shipped 19 Model A55 airframes (no engines) to its European affiliate in France, Societe Francaise d'Entretien et de Reparation de Materiel Aeronautique, or SFERMA for short. These airframes were part of a technical agreement between the two entities to cooperate on development of turboprop engine installations in the Baron, Travel Air and Model 18 aircraft. SFERMA was responsible for installing Astazou IIJ turbine engines, each rated at 450 shaft horsepower, in the airframes and marketing the modified Beechcrafts as the *Marquis*. The concept seemed sound, but what the business flying industry was waiting for arrived in 1964 – the Beechcraft Model 90 *King Air* that combined turboprop technology with a well-appointed, cabin-class interior that established a new standard for executive travel.

By 1964, production of the Baron had changed again, this time to the Model 95-B55 that featured a maximum gross weight of 5,000 pounds (increase of 120 pounds compared with the 95-A55), a lengthened nose section that increased baggage space by 50 percent, and optional fuel tanks holding 144 gallons that gave the airplane a range of 1,225 statute miles at an altitude of 10,000 feet, at a 45 percent power setting (economy cruise). The fuel-injected, six-cylinder Continental engines remained the same, each rated at 260 horsepower. The 95-B55 cruised at 225 mph at an altitude of 7,000 feet, and earned a solid reputation as an excellent, easy-to-fly lightweight Beechcraft twin.

During the Baron's 1964 model year, the factory produced 271 airplanes. Eventually the upgraded 95-B55 proved so popular with customers that it remained in production (with minor upgrades) from 1964 until 1982 when production was terminated after 1,851 commercial units had been built.[3]

In addition, in February 1965, the U.S. Army chose the Model 95-B55 to serve as an instrument and multi-engine transition trainer. Designated T-42/T-42A and carrying the nickname "Cochise," the rugged Beechcraft proved itself up to the task as the United States' involvement in the Vietnam War increased along with the Army's demand for more multi-engine pilots.

The first five airplanes were delivered in September 1965, sporting a mixed olive drab and white exterior livery, but later the T-42A version was painted olive drab overall. Beechcrafters built 65 of these airplanes for the Army. In 1971, another five T-42A were built for the Army under the Military Assistance Program and

delivered to the Turkish Army, and the next year the Spanish Air Force received seven T-42A. By 1986, only 30 of these airplanes remained in Army inventory and were assigned to units of the Army Reserve and Army National Guard to serve as light utility transports.[4]

By comparison, during model years 1963-1965, Cessna built 548 Model 310H, 310I and 310J. As for Piper, during the first seven months of 1965 the company delivered 454 Aztec and PA-30 *Twin Comanche* aircraft that accounted for nearly 50 percent of all five- and six-place, twin-engine lightweight airplanes sold by U.S.-based airframe manufacturers that year. The combined output of Beech, Cessna and Aero Commander amounted to only 459 aircraft.

During the mid-1960s the competition continued to improve the Aztec and Model 310, and Beech Aircraft answered their challenge with the Model 95-C55. The most salient change was an increase in horsepower to 285 from 260 using Continental's relatively new engine designated IO-520-C that featured a gear-driven alternator. Horizontal stabilizer and elevator span were increased slightly, the fuselage nose section was lengthened to accommodate more baggage, as well as a growing list of optional avionics. A one-piece windshield was installed and the cabin interior received minor upgrades in materials and an expanded choice of colors. Price increased modestly to $68,350.

The 95-C55 was built alongside the 95-B55 and 265 of the improved version were produced in 1966 followed by another 185 in 1967. That year production was terminated to make way for the 95-D55. In addition, the College of Air Training based in Hamble, England, took delivery of 12 new Baron 95-C55 in 1967 to train aspiring airline pilots for the British air carrier industry.

By 1968, the venerable Baron was due for another upgrade in the form of the 95-D55 that retained the IO-520 engines but added three-blade propellers. The 95-C55's larger horizontal stabilizer/elevator was adopted that spanned 15 feet 11.25 inches. Once again, the popular Beechcraft Baron demonstrated its competitive spirit and 181 were built in 1968 and 135 in 1969 before the final version of the short-fuselage Baron series appeared for the 1970 model year.

The 95-E55 was fitted with the same IO-520 engines of the 95-D55 but could be configured to seat up to six people in the cabin or carry light cargo with four seats removed. Minor changes included a new exterior paint scheme, flush-mounted wingtip and rotating beacon lights, improved avionics and reconfigured instrument panel. An optional 172-gallon fuel capacity with one fuel cap per wing was offered for the 1976 model year. Price began at $83,950 in 1970 but had risen to $219,500 by 1982.

Maximum speed increased slightly to 230 mph, and two-engine rate of climb increased to 1,670 feet per minute. Although the 95-E55 initially was built in small numbers (59 in 1970, 434 total), it continued to be manufactured alongside the 95-B55 until 1982 when production of both versions ceased.[5] KA

NOTES:

1. McDaniel, William H.: "*The History of Beech*;" McCormick-Armstrong Company, Inc., Wichita, Kansas; 1971.
2. Kirby Grant, star of the popular 1950s television series, "Sky King," flew his "Songbird III," a 1960 Model 310D registered N6817T. He was often accompanied by his female sidekick Penny (Gloria Winters) in the co-pilot's seat. The 310D replaced "Songbird II," a 1958 Model 310B registered N5348A.
3. Not including production of the T-42A militarized version for the U.S. Army. By 1982, the price of a commercial Model 95-B55 had skyrocketed to $177,500.
4. Harding, Stephen; "*U.S. Army Aircraft Since 1947*." Airlife Publishing Ltd., United Kingdom, 1990.
5. As of late 2016, the used aircraft market for the Beechcraft Baron was strong with all versions of the short-fuselage series demanding prices from $60,000 to more than $230,000. According to Trade-A-Plane, a 1963 95-A55 was offered for $35,000, the owner of a 1969 Model 95-B55 was asking $68,900 for his airplane, and a 1977 95-E55 was priced at $189,900.

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

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Advent Earns STC for Anti-Skid Braking System on King Air 200-series Aircraft

As the company expected, Advent Aircraft Systems was granted an FAA STC approving its eABS™ anti-skid braking system for the Beechcraft King Air B200 series aircraft. The STC, issued June 30, follows a similar certification for King Air B300 series aircraft, granted in 2016. The first customer airplane, a King Air 250 which was also the certification aircraft, was completed by Pro Star Aviation of Londonderry, New Hampshire over a two-week period in June, and delivered to the customer July 1, 2017.

The company's first European order, from Sundt Air of Gardermoen, Norway, also for a King Air 250, is scheduled for installation in August, pending the addition of the B200 to Advent's previously announced EASA STC for the King Air B300.

Per the company, the Advent eABS breakthrough technology results in a reliable, lightweight, easily installed, low-cost anti-skid braking system that is FAA and EASA certified, with over 118 Eclipse, King Air, T-6 and PC-12 aircraft modified to date. Thousands of these aircraft, as well as aircraft under development, can now benefit from the improved safety, stopping power and directional control of anti-skid braking, on both contaminated and dry runways. The eABS reduces the risk of flat-spotting or blowing tires in all runway conditions, and allows aggressive braking as a valuable alternative to the use of reverse thrust, reducing the risk of engine FOD ingestion and prop erosion. With eABS, the operator can experience increased operational utility, lower maintenance costs and avoid the disruption and expense of unplanned downtime.

For more information, go to *www.aircraftsystems.aero*.

Global Jeppesen Charts Now Available on ForeFlight

ForeFlight, the creator of the widely used flight planning and electronic flight bag app for Apple iPad and iPhone, announced that Jeppesen's world-class library of standard chart coverages are now available as an option with the current release of ForeFlight Mobile, making it the premier all-in-one mobile solution for planning, briefing, filing, flying, and logging flights across aviation. Customers can purchase Jeppesen charts directly on *foreflight.com* in a matter of seconds. They can choose from 13 coverages that span the globe and

include departure, arrival, and terminal procedures, airport charts, and Jeppesen Airway Manuals.

Jeppesen charts are now seamlessly integrated into ForeFlight's innovative plates on map feature that allows pilots to view their aircraft position on geo-referenced departures, arrival, or approach plates along with weather overlays in one seamless moving map view. Jeppesen charts are also enabled for color inversion, reducing screen glare when flying at night. For business customers, account administrators can easily manage how Jeppesen coverages are distributed to, swapped among users, and shared across devices. Jeppesen charts combined with ForeFlight's next-generation performance flight planning capabilities provide a compelling solution for operators and pilots worldwide.

ForeFlight subscribers can link their existing Jeppesen license in ForeFlight Mobile or purchase standard worldwide Jeppesen charts for use inside the app through e-commerce on *foreflight.com*. ForeFlight business aviation customers can purchase chart coverages through Jeppesen and then link them to their ForeFlight subscription for use inside the ForeFlight Mobile app. Customers can access Jeppesen charts in the app in the same, familiar way they reference government charts.

With this latest release of ForeFlight, Jeppesen's high-quality NavData® also comes standard in every plan, improving data consistency between the mobile device and installed avionics, enhancing features like data-driven Aeronautical Maps (available in Plus plans), and expanding Procedure Advisor for all customers to airports around the world. Customers should take note that the Jeppesen NavData® on ForeFlight is separate from Jeppesen NavData® for installed avionics, which requires a separate subscription from Jeppesen.

Global high-resolution terrain and obstacle data, powered by Jeppesen, already comes standard in every

VALUE KA ADDED

ForeFlight subscription plan, making ForeFlight's hazard awareness features better than ever. Customers flying with advanced features like Synthetic Vision, Hazard Advisor, and Profile View now see a clear picture of terrain and obstacle hazards anywhere in the world.

A follow-on release later this summer will bring the display of Jeppesen's data-driven IFR Enroute charts, which is automatically included for subscribers who have purchased or linked Jeppesen charts on ForeFlight.

In addition to the integration of Jeppesen charts into ForeFlight Mobile, the strategic alliance between the two companies also spans the commercial airline market and users of Jeppesen FliteDeck Pro, the leading EFB solution for airlines and large-scale operators. Jeppesen and ForeFlight are working together on a next-generation release of FliteDeck Pro for both iOS and Windows that will deliver a combination of the familiar capabilities in FliteDeck Pro and significant features and functionality from ForeFlight Mobile.

To view more information on combined Jeppesen and ForeFlight products, please see *www.foreflight.com/jeppesen* and *www.jeppesen.com/foreflight.* KA

Service Bulletin 30-4166: REVISION TRANSMITTAL – Ice and Rain Protection - Air Intake - Ram Air Recovery System

Issued: **Revision 1 – June 29, 2017;**
Original – March 9, 2017

Revision 1 to SB 30-4166:

A. Adds instructions for lower forward cowling repair in Step 6 of the Accomplishment Instructions.

B. Corrects a serial number in Step 7 of the Accomplishment Instructions.

C. Adds Figure 2.

D. Adds the 101-910020-3 Vane, S3806-9 Sheet Metal Repair Kit, S3806-10 Sheet Metal Repair Kit, and S3806-11 Sheet Metal Repair Kit to Material Information.

NOTE: This revision replaces the original issue of SB 30-4166 in its entirety.

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

Effectivity: B200GT (Super King Air) Serial Numbers BY-122, BY-128 thru BY-278 with Raisbeck Engineering Ram Air Recovery System (STC SA3366NM) installed.

The equivalent of this service bulletin has been incorporated on production airplanes BY-279 and On for the brush issue and BY-222 and On for the remainder of issues.

Compliance – Recommended: This service bulletin should be accomplished within the next 200 flight hours or 12 months, whichever occurs first.

A service bulletin 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 bulletin, including the intent therein.

2) The mechanic or airplane owner must use the technical data in the service bulletin only as approved and published.

3) The mechanic or airplane owner must apply the information in the service bulletin only to aircraft serial numbers identified in the Effectivity section of the bulletin.

4) The mechanic or airplane owner must use maintenance practices that are identified as acceptable standard practices in the aviation industry and governmental regulations.

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Reason: This service bulletin is being issued to do a one-time inspection for Textron Aviation-approved factory installed Raisbeck Ram Air Recovery System (RARS) and to verify rigging as required per Raisbeck STC SA3366NM and Raisbeck Engineering Document 93-1021.

Service Bulletin 53-4173: Fuselage – Brake Master Cylinder Support Tube Inspection

Issued: June 28, 2017

Effectivity: Beechcraft Super King Air C90GTi, Serial Numbers LJ-2091 thru LJ-2095, LJ-2097; Beechcraft Super King Air B200, Serial Number BB-2019; Beechcraft Super King Air B200GT, Serial Numbers BY-194 thru BY-201; Beechcraft Super King Air B300, Serial Numbers FL-889 thru FL-902, FL-904 thru FL-907.

Compliance – Recommended: This service document should be accomplished at the next 400-hour or 12-month (annual-type) inspection.

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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.
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Reason: The brake master cylinder support tube may have incomplete welds.

Description: This service document provides instructions to do an inspection of the pilot's and copilot's master cylinder support tubes.

Service Bulletin 23-4175: Communications – Audio Storage and Playback Unit (ASPU) Configuration Change

Issued: July 14, 2017

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; and King Air C90GTi, Serial Numbers LJ-2122 thru LJ-2136.

The equivalent of this service document has been incorporated on production airplanes FL-1097 and On, FM72 and On, BY-294 and On, BZ-2 and On, and LJ-2137 and On.

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

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.

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.

From Communiqué # ME-TP-004: Multi-Engine Turboprop Communiqué

Issued: June 2017

ATA 27 – Control Column Bearing Support Inspection

A recent field report has come into the technical support group that stated an out of tolerance gap was found on the control column support bearing. Technical support would like to encourage operators to carefully inspect this area when performing the third phase inspection. This inspection will ensure that the bearing assembly has not worked loose from the associated mounting rivets.

ATA 31 – Fusion Equipped King Airs with Collins AFD 3700 Adaptive Flight Displays (AFD) USB port usage to charge mobile devices

We have received several inquiries concerning the use of the Collins AFD USB ports to charge mobile devices in flight. These ports are designed solely for updating data within the AFDs and were not designed to provide the current most devices can draw when charging. Utilizing the AFD USB port for this purpose can cause damage to the AFD and prevent the port from functioning at a later time when it is needed to update the display. Textron recommends that these USB ports are only used for their intended purpose and not to charge any other devices.

ATA 31 – Fusion Equipped B200GT and B350i King Air Phase 2 Update for Software and Databases

Textron Aviation recently began deliveries of B200GT and B350i Pro Line Fusion phase 2 aircraft. The serial effectively for factory production is BY-285 and after; BZ-2 and after; FL-1077, FL-1080 and after; and FM-71 and after. The effectivity of the C90GTx will be set at a later date.

This update primarily provides new special mission equipment capability but also adds a surface management system, allows installed equipment options to be selected through the MFD instead of a loadable APM file, updates the electronic standby system remote sensor unit (RSU) software, and on the B350i moves the cabin altitude alert from a physical annunciator to the CAS system.

There are changes to software, databases, and manuals with this release that should be noted. The introduction of Phase 2, the Rockwell Collins Pilot's Operating Guide 523-0820001; Pro Line Fusion Aircraft Maintenance Manual 523-0821905; FMS Quick Ref Guide 523-0823290; Fusion Quick Ref Guide 523-0822518 and Fault Isolation Manual 523-0821906 all roll to Edition 2 of each manual. Edition 1 of these manuals should still be used on all phase 1 Fusion aircraft. Additional software files and databases have changed from the list provided for phase 1 of Fusion in King Air Communiqué 2016-04. The list for production phase 2 aircraft is shown in this referenced Communiqué on the web site. The field loadable software files will be made available on the *txtavsupport.com* web site. The phase 2 AFD software, like phase 1 software is bundled into a load set as the part number 434-310011-0005 file at *txtavsupport.com*.

ATA 33 - King Air LED Cabin Lighting Upgrade

Textron Aviation Service Centers are announcing the availability of Precision Windings Inc. (PWI) King Air cabin lighting LED Upgrades. These cabin lighting upgrades replace the existing fluorescent or incandescent lighting with LEDs. PWI's LEDs last far longer – thus reducing or even eliminating related maintenance costs,

and are easy to install due to the "plug 'n play" feature, which also greatly reduces downtime. The total downtime for installation of any of our King Air upgrade kits is less than a day, allowing the airplane to be back in the air as soon as possible! To request more information on applicability and cost, please contact a regional Textron Aviation sales representative or log on to *www.txtavsupport.com* and click on the Aftermarket Catalog.

ATA 56 - King Air Windshield Haze Removal Procedure

All

Technical Support has received reports that some King Air windshields have developed a visible haze on the glass panes. PPG Aerospace Transparencies, the manufacturer of the windshield, investigated this condition and provided the following explanation and a procedure to correct this condition:

A uniform haze can be experienced as the result of an interaction between the different interlayers under a certain limited condition, which is the long-term exposure (two-plus days) to temperatures between 5-20 degrees F.

This condition can often be treated by operating the window heating system for several hours. It is possible to utilize other heat treatments for the same affect, such as PPG Surface Seal curing kits (heating blankets), which operate at a controlled temperature range.

Please contact PPG directly to purchase the blanket kit at *aerospace transparencies@ppg.com*.

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

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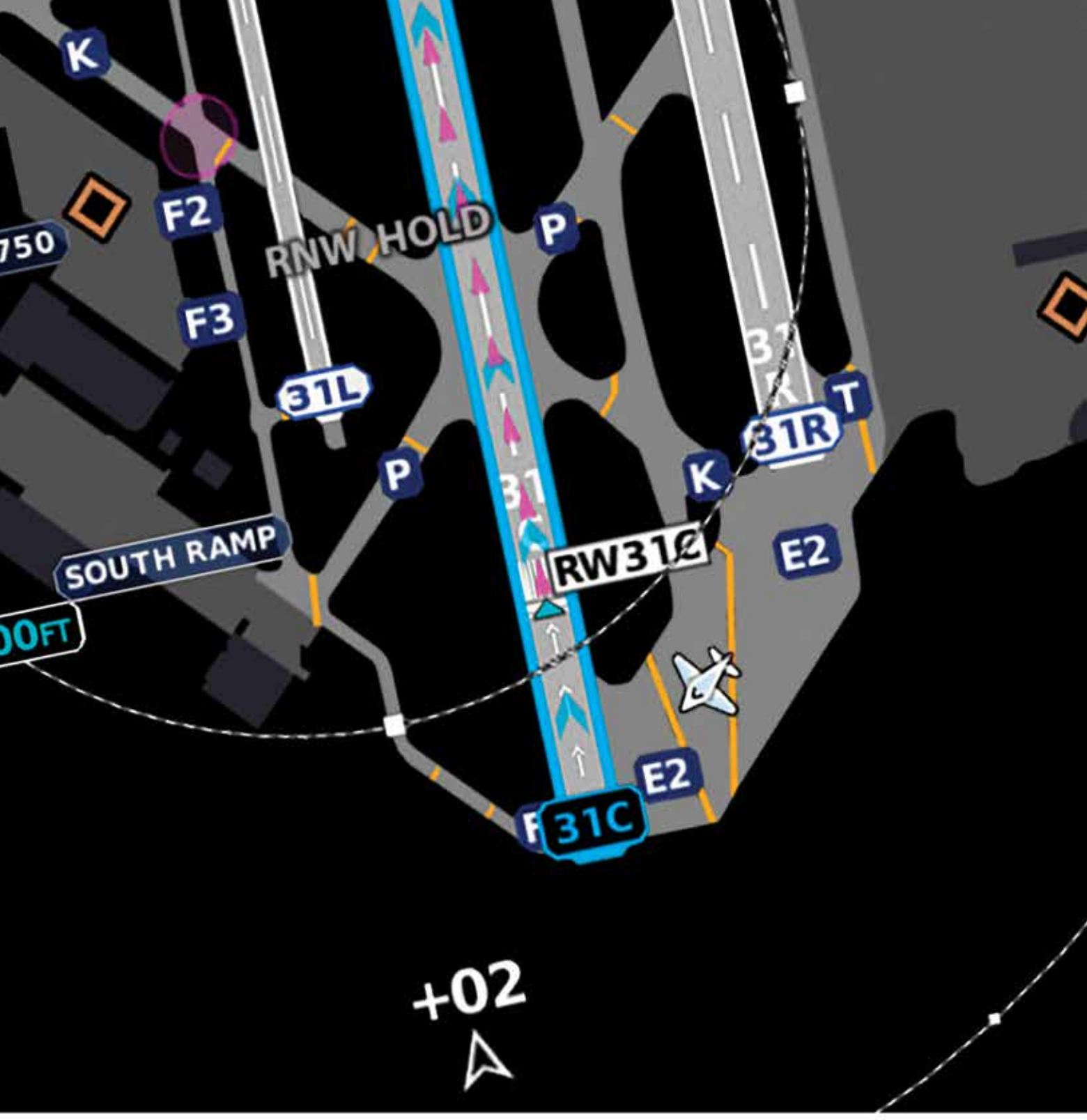

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