King Air

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

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COVER PHOTO

A spectacular view of the arctic Northern Lights over a Keewatin Air King Air B200 on the ramp in Whale Cove, Nunavut, Canada.
Photo Credit: Matthew Leslie, Keewatin Air staff.

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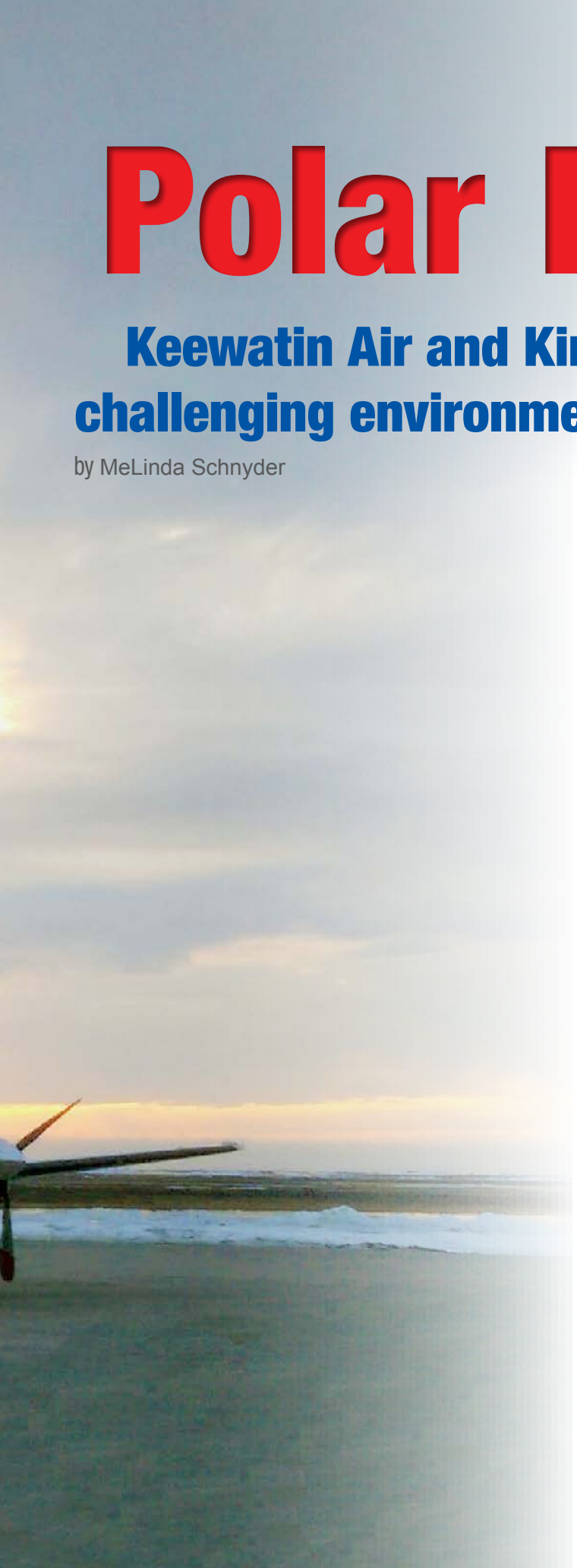
Keewatin Air's King Air B200, C-FZPW, on the ramp in Arviat, Nunavut. The company says the steadfast reliability and utility of the King Air is paramount to ensure residents can be transported efficiently and safely. (Keewatin Air staff)

Polar Lifeline

Keewatin Air and King Air B200s tackle challenging environment of Canadian Arctic

by MeLinda Schnyder



January in Northern Canada is extreme: 24 hours of darkness throughout most of the region, constant wind and several weeks of daily temperatures as low as minus 30 degrees Fahrenheit. It's also not unusual for the wind chill to drop temperatures as cold as minus 65 degrees during this month, which is one of the busiest for air ambulance provider Keewatin Air LP.

It's typically a busy start to the year for the Winnipeg-based company that will register 10,000 annual flight hours serving residents and travelers in the province of Manitoba and the Canadian Arctic territory of Nunavut – an area comprising 1,058,000 square miles, nearly four times the area of Texas.

Keewatin Air's President/Accountable Executive Wayne McLeod (left) and Person Responsible for Maintenance (PRM) Jason Kendall stand beside one of the company's King Air B200s.
(John Kliewen, Keewatin Air staff)

Keewatin Air operates a fleet of 12 air ambulance aircraft, including nine Beechcraft King Air B200 models, at seven stations throughout the region. Supporting the operations is a group of well-trained professionals. The company has 45 pilots and 45 aircraft maintenance designers strategically positioned throughout their northern bases of operations. Unlike many other air ambulance operators, they employ their own medical professionals and currently have about 65 registered flight nurses, respiratory therapists, critical and advanced care paramedics and psychiatric nurses.

"You have to wonder if when Beechcraft engineers were designing the King Air back in the day, did they think someone was really going to fly their aircraft into minus 65 degrees Fahrenheit and be loading patients on it and getting out of these short, gravel shale strips?" said John Kliewer, director of Business Development & Strategic Planning for Keewatin Air.

That's exactly what Keewatin Air does. Performance that impressed company executives when they got their first King Air, in 1995, is simply routine and expected operation today. Still, they give credit to the King Air platform for making it possible to grow the business into today's high-quality air service that provides safe, reliable and extensive 24-hour emergency air ambulance services for remote communities.

"There are very few aircraft that you could put the kind of hours and cycles on it that we do and have such a reliable product," said Wayne McLeod, a former chief pilot at Keewatin Air and now the firm's president.

"And all the way to the end of life for the airframe, right to 30,000 hours," added Jason Kendall, Keewatin's Person Responsible for Maintenance.

Helping shape Canada's medevac industry

Keewatin Air formed in 1971 to provide charter services using one single-engine Cessna 185 aircraft and quickly expanded by adding a de Havilland Canada DHC-2 Beaver.

In the early days of the operation, Keewatin Air would dispatch an airplane to a remote community to meet a nurse from the local nursing station, who would

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The hamlet of Qikiqtarjuaq, Nunavut, during winter 2018. The challenge of working in frigid weather and low light (the sun doesn't rise above the horizon during the winter in Canada's arctic) is what draws many people to the artic and Keewatin Air.

accompany the patient on the airplane until the patient arrived at the receiving hospital or facility. Oftentimes, the medical equipment and supplies coming from the nursing station were not suitable for air transport. Another issue was that the nursing station would remain short-staffed for several days while staff was ferried back. The cost of overtime and transportation for the nurses in these situations threatened the future of the nursing stations.

Sensing that this operational structure wasn't sustainable and knowing that these remote northern communities needed the nursing stations, Keewatin Air championed the idea with local authorities that the airline versus the nursing stations could be responsible for providing medical personnel.

The first Keewatin Air Medevac/Emergency Air Ambulance division was born in 1986 when the company hired experienced registered nurses and purchased proper air ambulance medical equipment. In 2003 Keewatin Air signed its first formal service contract to provide air medical services for the Government of Nunavut. This included providing flight nurses and establishing numerous northern bases to improve reliability in the harsh Canadian Arctic.

"To improve the quality of our services, and establish a network of team collaboration, Keewatin Air developed an aeromedical cross-training program for nurses and pilots, and also provided this same training to medical personnel in the community," McLeod said. "These collaboration efforts helped ensure proper and efficient preparation of the patient for transport and improved the overall transportation experience for all stakeholders."

Over the next few years Keewatin rapidly evolved while continually improving its operations, including creating an internal training program; developing comprehensive medevac policies, procedures and medical care protocols; producing a Total Quality Management Program (TQMP) including an extensive statistical data management program; and establishing an effective human resources program.

Employing all staff required to provide air ambulance services is a different approach and is what sets Keewatin Air apart from other providers.

"We find this allows us to set the bar high and provides all of our staff – from maintenance to pilots to medical crews – the understanding of what goes into a medevac mission," McLeod said. "Our pilots and medical crews are cross-trained to develop an understanding of what

each other's challenges and responsibilities are, allowing us to manage each flight for a better patient outcome."

Another key to creating a successful team is employee satisfaction, and one way Keewatin Air builds the longevity of its workforce is to allow employees to live anywhere in Canada. They report to their base location and work for two weeks, then have two weeks off and can return home.

"By allowing our staff to live where they want to, they can maintain their family and social lifestyles as they rotate in and out of their home," McLeod said.

In the late 1980s and early 1990s, Keewatin Air also changed its aircraft platform. They were flying Beechcraft Model 18 Twin Beechs with Tradewind and Westwind modifications, then Swearingen Merlin IIA aircraft. In 1996, they purchased their first King Air: a 1981 model B200. That airplane is expected to retire in 2019 when the airframe reaches 30,000 flight hours, and the King Air is now solidly entrenched as the backbone of Keewatin Air's operations.

The current fleet

On average, Keewatin Air transports about 1,700 patients and flies more than 2.3 million miles of

All of Keewatin Air's King Air B200s have been completely redone and outfitted with industry leading air ambulance interiors. Keewatin provides services and support that usually can only be found in major center hospitals. (Kyle Wedge, Keewatin Air staff)

medevac missions each year. It has provided contracted air ambulance services for the Government of Nunavut since 2003. McLeod said the company is always looking for new opportunities to expand its operations providing the high-quality medical care to other areas of Canada.

Keewatin Air has four base locations in the Nunavut territory: Rankin Inlet, Iqaluit, Cambridge Bay and Igloolik; two in the province of Manitoba: Winnipeg and Churchill; and one in the Northwest Territories: Yellowknife.

The flight deck of a Keewatin Air King Air B200 highlights the latest in Garmin avionics, the G1000NXi. The company says combined with the King Air platform, they have equipped the aircraft with the best tools to safely fly in the challenging terrain and adverse weather conditions found in the arctic.
(Christian Beyrend, Keewatin Air staff)

The area of operations is very large and their crews can experience more than one weather system when conducting a day's operation. Winds and low visibilities are something they experience every day. Summer sees 24 hours of daylight and the winter months bring 24 hours of night. Extreme cold is the norm, and blowing snow reduces visibilities. It is a good day when visibilities

Keewatin Air's King Air B200, C-FSKO, at Hall Beach, Nunavut, Canada in July 2018. When the snow melts, the gravel and shale stone remain. (Artemiy Sorokin, Keewatin Air staff)

are above 5 miles. The eastern side of Nunavut is mountainous, and runways are at very near to sea level in the valleys, which makes approaches challenging.

In addition to the nine King Air B200 aircraft, Keewatin Air has one Pilatus PC-12, two Learjet 35A and two Cessna Citation 560 Ultra aircraft.

A memorable mission that shows the scope of Keewatin Air's work happened from one of its busiest bases, Iqaluit. A single pilot flew a medical crew 2.5 hours to the community where a woman in premature labor with twins required medical evacuation. The crew assisted the local health center in delivering the babies at 28 weeks, when they were small enough to fit in the palm of your hand. The newborns and the mother were then transported 2.5 hours on the King Air B200 back to Iqaluit, the territory's only city, where they were taken to the hospital, stabilized and then moved again on a three-hour flight in a Learjet 35A to a specialized facility in Ottawa.

The King Air fleet has doubled since 2010, with the latest acquisition being a 1985 model added in 2017. Keewatin Air

Keewatin Air's King Air B200, C-FZPW, standing-by on the ramp in front of the terminal building at Iglulik, Nunavut, Canada. The King Air fits perfectly with Keewatin Air's mission to serve the remote expanse of the Canadian Arctic.
(Matthew Leslie; Keewatin Air staff)

typically looks for midlife airframes and plans to operate them until they hit 30,000 hours.

The average age of their King Air fleet is 26 years. All have PT6A-42 engines, including two that have 3-bladed propellers. The aircraft all feature high float gear, ram air recovery systems, Frakes Aviation exhaust stacks, dual aft strakes and dedicated air ambulance interiors.

In 2014, Keewatin Air partnered with Elliott Aviation to upgrade all of its King Air aircraft to Garmin 1000 avionics as soon as the system could operate in the high arctic of Canada, specifically north of 65 degrees latitude.

Their aircraft were the first King Air B200 featuring 3-bladed props to get the upgrade. Over the course of the project, Keewatin Air found its breadth and depth of operations were helpful to Garmin.

"We work collaboratively with Garmin on identifying issues whether it's from operating in the high arctic or operating aircraft with 3-bladed propellers as opposed to 4-bladed King Air 200 aircraft," McLeod said. "There are a few different areas that we've assisted with research for their systems."

In 2018, Keewatin Air completed the NXi upgrade to the G1000 system.

"With the harsh environment and challenging terrain we operate in, as well as the experience levels in the flight crew members, we have found the upgrade to the G1000 avionics platform has ensured that our flight crews have the most advanced, state of the art environment to safely meet the needs of our customers," McLeod said. "The G1000 NXi installation has also brought our maintenance department to a new level with the ability to review data related to any flight, which assists in more effective troubleshooting of any issues that are encountered. As approach criteria and complexity continue to change, the G1000 system is able to ensure that Keewatin Air remains up to date with any changes."

Challenging maintenance conditions

Keewatin Air has an extensive background in maintaining King Air aircraft and its in-house team handles everything from engine changes and prop replacements to landing gear overhauls and all phase inspections.

They operate maintenance personnel out of all seven bases, including heavy maintenance at the Winnipeg headquarters. The largest contingency of 10 AMEs works 12-hour shifts to provide 24-hour coverage at the busiest station, Iqaluit, where there is a 20,000-square-foot hangar built in 2010.

In total, there are 45 maintenance staff, from parts procurement specialists and quality assurance staff to maintenance planners and line staff. The team is accustomed to dealing with high volume and life-critical deadlines, as well as the effects of the environment.

"Temperature and environment are totally against us at all times up there," Kendall said.

Frequent landing on gravel shale airstrips require daily attention to the fleet's props and landing gear. In the summer, there is constant wind as well as flies and mosquitoes to deal with. In the winter, little things that take 20 minutes can take two hours due to the cold.

"Changing a tire – which seems so easy down south – can be quite a chore," he said. "You basically get one chance to jack up the aircraft because the cold temperatures affect the hydraulics of the jack. If you don't get it on the first try, you'll have to wait until you either warm up the jack you are using or get another jack, which could be another 4 to 6 hours, or even longer.

"And we've had guys get frostbite on all their fingers just by changing a set of wheels, and that is even with wearing fully insulated gloves."

The King Air makes the ideal partner in Keewatin Air's air ambulance operations because it can operate safely in this harsh environment while handling the distances between communities.

"The King Air has been the backbone of our company for over 20 years now and we look forward to providing our customers a continued reliable service," Kendall said. "We continue to look at improvements and advancements in systems and equipment to ensure that the standard does not diminish." KA

NOTAM for Super Bowl LIII, Public Input Request for Florida Airspace Changes and MVY Runway Closure

by Kim Blonigen

Air Traffic Procedures NOTAM for Super Bowl in Atlanta Area

Those who may be flying to the Atlanta, Georgia, area Jan. 29-Feb. 5 will want to familiarize themselves with the Federal Aviation Administration's (FAA) air traffic procedures NOTAM for the area on those dates. Super Bowl LIII will take place Sunday, Feb. 3, 2019, at Mercedes-Benz Stadium in Atlanta, Georgia.

During the above weeklong timeframe, reservations will be required for arrivals and departures at the 24 Atlanta area airports (list on NOTAM). Reservations can be made through your FBO of choice at the given airport.

The FAA has published a webpage that contains all air traffic management related information for all Atlanta-area airspace and airports. It will be updated as additional information becomes available and can be accessed at *https://superbowl.faa.gov*.

FAA Asking for Input on Florida Airspace Changes

The FAA is planning a series of public meetings early this year to solicit public input as it develops new flight paths for operations over Central and South Florida as part of its Next Generation Air Transportation System (NextGen) airspace modernization initiative. Through its South-Central Florida Metroplex effort (which is noted to currently be in the "Design Phase"), it is using data collected from the "Study Phase" and redesigning flight paths and updating procedures to increase efficiency with satellite-based routes.

This project focuses on the four major airports in the region – Miami International (MIA), Fort Lauderdale-Hollywood International (FLL), Orlando International (MCO) and Tampa International (TPA) – but will also involve procedures changing at various satellite airports.

The public meetings have not been scheduled yet but will be posted on the agency's community involvement webpage and social media platforms.

As part of the South-Central Florida Metroplex initiative, the FAA recently implemented 55 new performance-based navigation (PBN) routes between the southern part of the U.S. East Coast and major international airports in Florida and the Caribbean.

Satellite-equipped aircraft can now fly the new routes that begin at the North Carolina/South Carolina border and flow south. The new routes will augment the existing structure of conventional jet routes. Flights on these routes are said to be more direct, more efficient and safer.

The FAA is also designing high-altitude PBN routes from the Northeast to join the new routes.

MVY Main Runway Closed for Reconstruction

Martha's Vineyard Airport (MVY) will close its main runway from mid-January through May 2019 for a full-depth reconstruction of Runway 6/24. Although ILS will also be out of service, 3,300-foot Runway 15/33, with RNAV approaches to each end, will remain open during the restoration project. The airport will be fully closed for three days (currently scheduled for April, exact dates will depend on weather) to rebuild the intersection of the two runways.

The $10.27 million reconstruction will make no changes to the dimensions of the 5,504-by-100-foot runway or its weight bearing capacity, which serves aircraft up to an Airbus A320.

When determined, the project's precise dates will be published in a NOTAM. For further information please contact Geoff Freeman at (508) 693-7022 or *GFreeman@mvyairport.com*. KA

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The Amazing History of BB-1

by Tom Clements

I was fortunate to be employed by the Beech Aircraft Corporation's Training Center during most of the development and certification process for the most popular King Air of all time, the model 200. I was the first ground and flight instructor for this model and had the privilege of learning directly from the engineers and test pilots. I want to tell you about this model's development and, specifically, about BB-1, the very first member of this family of airplanes. Of course, I do not know every detail of the development process and, if I did, it would take an entire book to thoroughly present the entire story. So, this article only covers some of my personal experiences with the great model 200 and, specifically, the story of BB-1.

The King Air made its appearance in 1964 as the model 65-90, better known as the "Straight 90." The A90 came in 1966 to replace the 65-90, and in 1968 the A90 was superseded by the B90. The success that the King Air obtained encouraged Beech to develop a larger version. Picking the tail, landing gear and wings from their "parts bin" – systems that had been previously designed, certified, and manufactured for the Model 99 Airliner – they combined it with a King Air fuselage lengthened by 4 feet and the model 100 was born. Customer deliveries of that larger King Air commenced in 1969 and an enhanced version, the A100, replaced it in 1972.

Although the 100-series enjoyed moderate sales success – customers really liked the roomier interior due to the extra length added – it did not have eye-opening performance. Much like the B90, powered by the 550 SHP PT6A-20 engine, the 100 and A100, powered by the 680 SHP PT6A-28, were not known for their stellar climb nor blistering speed. Rarely could the full-rated horsepower be utilized except at sea level on cooler days. The 99/100 wings – about 5 feet shorter than the B90 wings, but the same span as on the 65-90 and A90 wing with a drooped center section leading edge – were optimized for low altitude operation on the unpressurized model 99 and performance suffered when used much above 20,000 feet. It became obvious that the 100's cabin size was popular and if it could be combined with much improved performance, Beech would have a real winner on their hands. Thus, was the impetus for designing the model 200.

At first, this new King Air had the internal Beech designation of "Model 101." After all, it was exactly the same size as the 100 just with more performance. Even now, most factory parts unique to the 200 begin with the "101-" part number prefix. It was not until just before the model had its official public debut that Mrs. Olive Ann Beech herself suggested the name be changed to "Super King Air 200." Some of the Beech employees – and I was one! – turned their noses up at this idea, thinking the name was too long and pretentious. But when I first flew it … wow, it really was "super!" (As a side note, when the Beech Model 18 got its 4-inch higher cabin in the mid '50s with the change

to the E18S model from the D18S, it was known as the "Super 18." So, the "Super" moniker was not without precedence in the Beechcraft lineup.)

Here is a list of the major changes made to the 100 that turned it into the 200:

- **More power:** The 680 SHP PT6A-28s were replaced with the new and longer PT6A-41 of 850 SHP. To mount this engine to the airframe, a new engine mount was developed that held the engine in four instead of three places to accommodate the greater weight and torque. A new cowling needed to be made to house the longer engine and the new design included elimination of the electric heating element on the cowling lip – replacing it with an exhaust-gas heated, stainless steel lip – as well as a different and more efficient ice protection system.

- **Larger propeller:** To efficiently absorb the 850 SHP, a three-blade propeller with longer blades needed to be fitted. Although it is getting somewhat rare now to see a model 200 with three-blade propellers, this was the only factory-offered propeller for all of the 200s and the first 10 years or so of B200 production. Four-blade props did not become factory standard on the B200 until 1993.

- **Longer wingtips:** For decades and decades, Beech has provided a shorter and a longer wingtip, the piece that attaches outboard of the wing spar's end. The shorter one is on all Bonanza models except the B36TC. The longer one is the tip on Barons. The 99/100-style wing uses the shorter tip but for the 200 Beech reverted to the longer tip of the B90.

- **Wider wing center section:** The larger propeller would not fit where the model 100 propellers sat without (A) hitting the fuselage, and (B) providing almost nil ground clearance. Instead of making a very minor increase in center section width – enough so the propeller would not hit the nose – the designers decided to widen it by 50 inches (25 per side) to not only accommodate the propeller but also to make the cabin quieter by moving the propeller tips farther away. The new engine mount, mentioned previously, raised the propeller 4 inches higher to make for satisfactory ground clearance. With both the wider center section and the longer tip, the 200 has a ten-foot longer wingspan than the 100-series.

- **The T-Tail:** I have written an entire article about the reasons behind the choice of the T-Tail. To recap, the overriding reason is to maximize rudder effectiveness. With more powerful engines sitting 25 inches further out on each side, Beech knew that keeping VMCA down to a reasonable number would be a challenge. Theoretical calculations, wind tunnel tests, and then flight tests in BB-1 all proved that VMCA could be kept at 91 KCAS (identical to that of the 65-90!) thanks to the T-Tail. By moving the horizontal stabilizer to the top of the vertical stabilizer (A) it prevented the bottom half of the rudder from being "blanked" of wind by the horizontal stabilizer in the high angle-of-attack situation associated with VMCA, and (B) it provided an "end plate effect" that maximized the rudder's effectiveness by not allowing air to escape past the rudder's top.

- **Increased pressurization:** By installing double-pane cabin windows, beefing up the door attaching hardware, and going through extensive cyclic pressure testing, Beech managed to increase the maximum differential pressure (ΔP) from 4.6 psid to 6.0 psid. The 4.6 value was used in everything from the A90 through the A100. With 6.0 psid, the cabin would be about 4,000 feet lower for a given airplane altitude. This made it feasible for the 200 to routinely cruise in the 25,000- to 30,000-foot range, much higher than the previous King Air models.

- Improved electrical, fuel and environmental systems.

- Although not obvious to pilots, much attention was given by the designers of the 200 to improve maintenance accessibility. Replacing a blown 325-amp current limiter takes a lot less time in a 200 than in a B90!

- Again, not obvious unless pointed out by someone, more metal bonding and less riveting is used in the manufacturing of some parts, specifically the rudder and the inboard flap sections.

- **A new, stronger, main spar:** Known as the "super spar" at Beech, the bathtub fitting in which the lower forward wing bolt resides is now an integral part of the lower spar cap, no longer a separate, riveted-on piece. (This was changed again in 1985 when the fitting was totally redesigned to have the bolt under shear-loading instead of tension-loading.)

Throughout 1972, rumors were rampant around the Beech workforce concerning the progress on this fancy new model. We all were anxiously anticipating the day when BB-1 would makes its maiden flight. That day finally came Oct. 27, 1972. Most of the workforce was permitted to leave their stations and gather near the south end of Runway 18-36, where BB-1 was being

prepared for its maiden flight. As the time grew near, Chairwoman of the Board, Mrs. Beech and President Frank Hedrick arrived on-site in Mrs. Beech's "Beech blue" Cadillac to take their positions of honor. Jim Webber, the head of Beech's Experimental Flight Test department, was in the left seat and Bud Francis, who was slated to become the head of the 200 flight test project, was in the right seat.

BB-1, N38B, was painted all white with black numbers. If you looked closely, you would have observed two noticeable differences between BB-1 on this day and the later 200s to come. First, the junction of the horizontal and vertical stabilizers at the top of the T-Tail was smooth, with no "bullet" projecting forward. Second, the ailerons were identical to the ones on the A100 and B90, ending where the wingtip began. (Some turbulence originating at the T-Tail junction was eliminated by the "bullet" that was installed during the flight-test program. The longer wings and more powerful engines made the original ailerons a bit lacking in effectiveness and this problem was eliminated when the 200's ailerons were redesigned to extend all the way to the end of the wing. The trailing edge of the wingtip extension was cut away and a third aileron hinge point was added.)

The engines were started, pre-takeoff checks completed, and then she taxied down the runway to the north end, made a U-turn and took off southbound, climbing out over the assembled crowd before turning east and climbing out of sight. What a thrill to witness the first time a 200 entered the bright blue sky!

About an hour later BB-1 returned to Beech Field. The crowd had moved to the north end of the runway to get a better view of the landing. Jim came in low over the wires and then used maximum reverse to show off the short stopping distance of this newest King Air. It was most impressive! BB-1 did a 180 and taxied back to its parking spot near the crowd. As the engines spooled down and Mrs. Beech and Mr. Hedrick stood by the door to welcome the crew, a worrisome murmur began to be heard in the crowd. What the …? Was the prototype going to burn up right before our eyes? White smoke had started to pour out of both sides' exhaust stacks! About the time the cabin door started down, the smoke stopped and we all breathed a welcome sigh of relief.

You see, the 200 was the first King Air model in which residual fuel in the nozzle manifolds would no longer be permitted to dump onto the ramp at shutdown. Allowing it to drip into the hot combustion chamber liner was the cause of the white smoke … fuel "steam" you might say. Some work remained for the engineers to perfect that initial Environmental Protection Agency (EPA) Kit!

A month later BB-2, the second prototype, had its first flight. This airplane sported a complete paint job and interior, very different from the stark non-upholstered interior of BB-1. BB-2 was the first to carry the N200KA registration number; you likely have seen its picture. It was used for systems integration and icing tests. BB-2 was actually the first 200 that I ever flew, getting instruction from test pilot Mike Preston on a cross-country flight to and from Colorado. Later, I flew BB-1 with Bud Francis. I have written about some of the things I learned from Bud in that airplane … such as the power of the T-Tail and the tendency to "self-rotate" at the initiation of a highspeed abort.

When the 200's Federal Aviation Administration (FAA) certification program was completed – the Type Certificate was issued in November 1973, just 13 months after first flight – BB-1 was tied down on the grass by a Beech hangar and flown very rarely. BB-2 kept being fairly active as the first factory demonstrator.

BB-2 had a complete paint job and interior and was used for systems integration and icing tests.

In 1975 BB-1 was brought back into the Experimental Flight Test hangar; the two turboprop engines were removed and two JT-15D turbofans were installed in their place! Was this the first "Beech jet?" No, not really, since Beech had marketed and sold the MS.760 – a twin-engine, four-place, French-made jet, back in the late 50s and early 60s. But BB-1 was now the prototype PD 290, Preliminary Design 290, the name given to this experimental project.

Bud again was the chief program test pilot and he told some hair-raising stories about trying to get that prop-less wonder stopped on the 5,000 feet of Beech's Runway 18-36! Little tires with no antiskid and a lot of residual jet thrust made for a challenge.

Although we may never know the complete, correct story, speculation is that the main reason why there was a PD 290 project was to get Wall Street speculating

BB-1 fitted with JT-15s, flown with a "blown wing" where the exhaust flowed freely from the engine's exhaust duct over the top of the wing."

about a Beechcraft jet. The hope was that this would drive the stock price higher, as it did, before Olive Ann sold the company to Raytheon.

When fitted with the JT-15s, BB-1 was flown in two configurations. One had the jet's exhaust constrained within a duct that terminated at the trailing edge of the wing; the other was a "blown wing," as shown in the picture above, wherein the exhaust flowed freely from the engine's exhaust duct over the top of the wing. I have heard – as the aeronautic guidelines would suggest – that the latter configuration created more lift but also more drag.

After BB-1 flew the PD 290 tests, it was again relegated to the forlorn grass tie-down area.

Gerald Mobley was the chief pilot for Guardian Air Transport of Billings, Montana, an air ambulance operation that was using King Air 100s and 200s in the 1980s. Gerald believed that they were losing some business because of the public's perception that being transported in a "light airplane" was uncomfortable and unsafe. He had the thought that if Guardian could show a mock-up of their actual BE-200 air ambulance interior to the end users – showing how roomy it was, the stretcher installation, exhibiting plenty of room for the flight nurses and even a seat for a relative of the patient – that Guardian would likely gain plenty of new customers. In his quest to find a 200 fuselage to make into the mock-up, he contacted Beech. He ended up purchasing BB-1 from Beech, having the wings and tail removed, cutting away the left side of the fuselage, mounting the assembly on a flatbed truck, and taking the rig to all of the county fairs they could find in Montana. He said that the program was quite successful in alleviating the public's worry.

Still later, when BB-1 had finished its roll as a movable air ambulance mock-up, Stevens Aviation bought the remains and used the cockpit portion as its Garmin G1000 simulator. Within the past year or so, it has been upgraded to the G1000NXi configuration. I, personally, have spent quite a few hours teaching both myself and some colleague pilots about the workings of this marvelous system while sitting in the "front office" of BB-1. She still sits at the Stevens' facility in Nashville, Tennessee, when she's not on the road at some aviation trade show.

Go give her a loving pat sometime when you are in the area. She is the

The BB-1 cabin at Stevens Aviation in Nashville, Tennessee, recently upgraded with the Garmin G1000XNi.

grandmother that started it all … started the BE-200 down the path of being the most popular executive turboprop ever manufactured. 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.

Beechcraft — The Early Days

Weary of "flying a desk," in 1932 Walter H. Beech dared to put wings on his name and build the finest business airplane money could buy.

by Edward H. Phillips

"I'm just a country boy. Go get a picture of me when I first came to Wichita. I've made good and I'm not afraid to say so," Walter Beech told newspaper reporters in August 1929. At that time, he was president of the Travel Air Company that was known as one of America's leading manufacturers of private and business airplanes. The company's success under Walter's leadership had not gone unnoticed on Wall Street. In March of that year Travel Air had set a record for sales in a single month of $300,000, and by June the factory was producing as many as 25 biplanes and monoplanes per week but could not keep pace with demand.

In the wake of skyrocketing profits that were fueling merger mania within the aviation industry, by the summer of 1929 Travel Air had become a major subsidiary of the giant Curtiss-Wright Corporation based in St. Louis, Missouri. As part of the agreement Walter Beech was appointed president of the Curtiss-Wright Airplane Company and was responsible for all commercial sales. In addition, he was elected a vice president of the parent corporation. At the time of the merger one share of Travel Air stock that was worth $100 in 1925 was now worth $4,000. Almost overnight the merger had made Beech a member of the nation's exclusive millionaire club.

Only a few months later the stock market crashed in flames and sales of new airplanes entered an unrecoverable tailspin. For example, in 1930 airframe manufacturers in the United States built 1,937 new commercial airplanes. In 1931 that number decreased to 1,582 and by 1932 plummeted to about 550. Despite that downward spiral, during 1930-1933 Curtiss-Wright developed a line of small, light airplanes and amphibians such as the CW-1 "Junior" and the CW-3 "Duckling" that was also known as the "Teal." Selling for less than $1,500, these ships were a tough sell, even for a master salesman such as Walter Beech. When production halted in 1933 only about 270 had been built.

Although there was weak demand for slow, unsophisticated open-cockpit aircraft such as the CW-3, Beech believed there was potential for a fast, four-place airplane with a long cruising range. He reasoned that it would fill a gap between large transports such as the Curtiss T-32 "Condor" and small aircraft such as the CW-3. The concept seemed sound; what he needed was an airplane that met all the requirements. In early 1931 a young engineer at Curtiss-Wright, Theodore "Ted" Wells, had been working on the design of a cabin biplane featuring negative-stagger wings and powered by a static, air-cooled radial engine. Wells had worked at Travel Air and was one of only two engineers who were relocated to St. Louis when the Travel Air campus was closed in 1931. The negative-stagger wing configuration, although unconventional, afforded the pilot excellent visibility from the cockpit. The ship would use conventional landing gear housed in large fairings to reduce drag.

In September 1929 the Travel Air Company boasted five buildings and an excellent flying field. Located on East Central Avenue 5 miles east of downtown Wichita, Kansas, the factory was producing as many as 25 airplanes per week.
(Textron Aviation)

In 1929 Walter Herschel Beech played a key role in merging the Travel Air Company into the giant Curtiss-Wright Corporation. At age 38 he was among an elite group of young executives destined to become future leaders of America's aviation industry. (Mary Lynn Oliver)

The engine Ted chose to power his flying machine was the Wright Aeronautical R-1510 that produced 710 horsepower. Ted calculated that the biplane would be capable of speeds approaching 250 mph, fly 1,000 statute miles nonstop and land at only 60 mph. In 1931 no such airplane existed. Not even the United States Army Air Corps possessed an aircraft that could match the gusto of Ted's machine.

Wells showed his preliminary drawings to Walter Beech, who in turn proposed that Curtiss-Wright build the ship. His idea was flatly rejected by company brass, but Walter realized that Ted's airplane had great potential despite arriving smack in the middle of the worst economic debacle America had experienced. In 1932 Wall Street was still in shambles, tens of millions of people were unemployed, civil unrest was on the rise and mobsters like Chicago's infamous Al Capone were making both headlines and millions of dollars selling bootleg liquor. Crude oil sold for 10 cents a barrel, a loaf of bread cost a nickel, and worst of all, the people had lost confidence in themselves, President Herbert Hoover, the federal government and their future.

Ted's radical cabin biplane embodied every characteristic Beech wanted in a business aircraft – high speed, long range, good visibility for the pilot; comfortable seats that rivaled those of a Cadillac sedan, and a low landing speed.[1]

To Walter's way of thinking, if Curtiss-Wright did not want to build Ted's airplane, then Beech would tap into his financial assets and take the biggest gamble of his life – start his own airplane company. Facing an uncertain future in St. Louis, Beech preferred to risk failure than fade into oblivion behind a desk. Having the full support and financial savvy of his wife, Olive Ann, Walter asked Ted about creating their own company. Wells readily agreed, and the determined trio severed their ties with the old and set a new course for the future.

Beech had been contemplating resigning for more than two months. The value of the stock he had obtained in 1929 had fallen to a mere $0.75 cents per share by January 1932. In addition, Curtiss-Wright lost $450,000 in 1931, and Walter knew there was little prospect for advancement under the existing economic conditions. The die was cast, and early in March 1932 Walter submitted his resignation to the Curtiss-Wright Corporation and laid plans to return to Wichita, Kansas – the birthplace of his aviation career. One month earlier he had visited the city, affectionately known as the "Peerless Princess of the Prairie," to quietly present his bold idea to important officials of the defunct Cessna Aircraft Company. They were pleased to learn that their old friend was

In 1930 Walter Beech and Olive Ann Mellor married. Two years later the couple risked their financial future to form the Beech Aircraft Company, and one year later they came perilously close to failure.
(Mary Lynn Oliver)

returning home but baffled by his plans to re-enter the airframe manufacturing business amid the ravages of the Great Depression.[2]

The local press swarmed around Mr. and Mrs. Beech when they arrived in Wichita. Walter told reporters that he had returned for the sole purpose of forming the Beech Aircraft Company and to conduct "ambitious experiments" that he predicted would "revolutionize commercial aviation." By the end of March Ted Wells had arrived and soon after K.K. Shaul, who had served as comptroller for the Travel Air Company, joined the tiny workforce. As originally formed April 19, 1932, officers of the Beech Aircraft Company included:

- Walter H. Beech, president
- Ted Wells, vice president of engineering
- K.K. Shaul, treasurer
- Olive Ann Beech, secretary

As April progressed, Beech was busy hiring ex-Travel Air, Cessna, Swallow and Stearman employees that had proven skills in woodworking, welding and sheet metal. Their talents were deemed essential and would be put to the test building Ted's new biplane. William "Pete" Hill was hired as company test pilot, and Jack Wassall had resigned from Curtiss-Wright to join Wells in the engineering department.[3]

As preparations for building the first airplane continued unabated, early in May the Wichita Chamber of Commerce hosted a lavish dinner to honor Walter and Olive Ann Beech. It was held in the Spanish Ballroom at the Hotel Lassen in downtown Wichita. As part of the festivities, telegrams congratulating Beech on his daring adventure were read during the dinner from Walter's longtime friends including Jimmy Doolittle and Arthur Goebel as well as important aviation officials. Walter and Olive Ann were humbled by the affair and deeply appreciated the way Wichita had welcomed them home. As Olive Ann told one reporter, "It's great to be back in Wichita. It seems more natural to live and work here. I hope that our stay will be a long one this time" (it certainly was!).

The banquet was enjoyed by all, but Walter was anxious to get back to work building the first Beechcraft. Throughout the month of May and into June construction

Theodore "Ted" Wells was among the first graduates of Princeton University's prestigious aeronautical engineering program. He worked for Travel Air in 1929-1930 and in 1931 began designing a cabin biplane that would become the first Beechcraft.

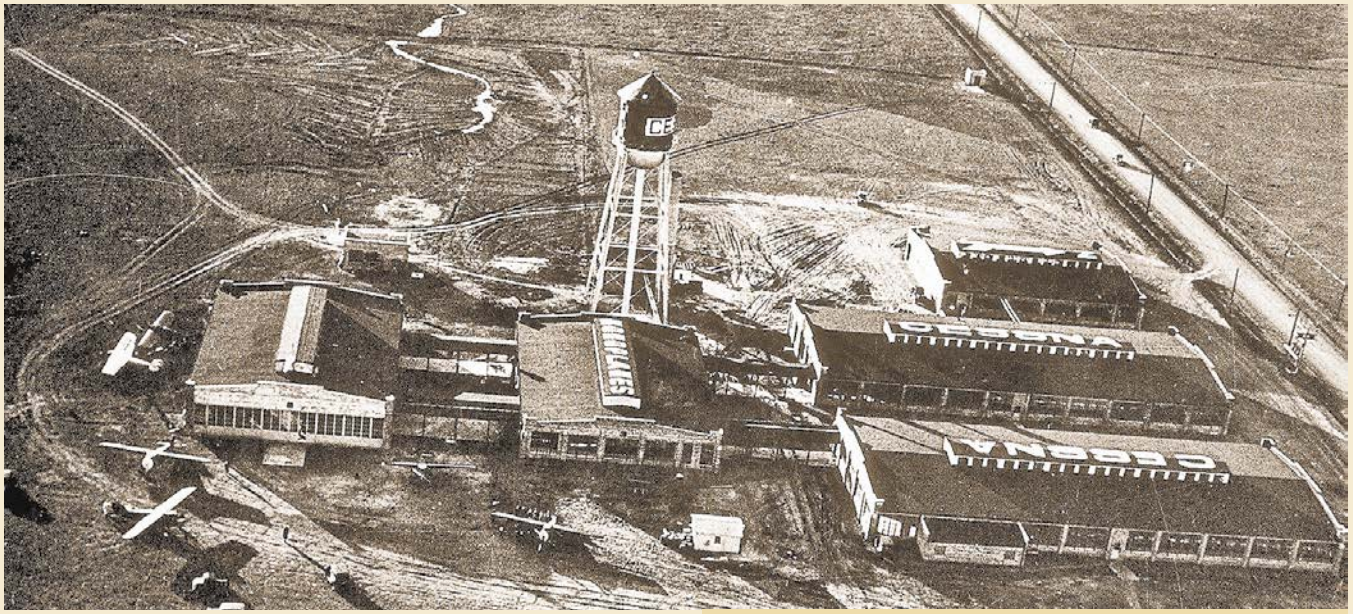
of numerous jigs, fixtures and tooling progressed smoothly. Raw materials were on order and suppliers lined up to supply the many ancillary components such as pumps, wheels, brakes, spruce, instruments, steel tubing and many other parts. Meanwhile, Wells and Wassall were busy creating hundreds of technical drawings and blueprints that would bring the biplane to life.

In July Wells applied to the Aeronautics Branch of the United States Department of Commerce (DOC) for issuance of two Approved Type Certificates (ATC) – one for the Beechcraft Model 17J and the other for the Beechcraft Model 17R. The airframes of the two aircraft were almost identical, but the 17J would be powered by the Wright R-1510, 14-cylinder radial engine rated at 650 horsepower, while the Model 17R would use the proven Wright R-975E-2, nine-cylinder powerplant that produced 420 horsepower. Eventually, a decision was made to forego building the Model 17J because the R-1510 had not been certified. Back in the halcyon days of Travel Air, both Beech and Wells had experience with the DOC in obtaining an ATC, but neither man could have foreseen the coming struggle to certify the new Beechcraft. That struggle would not only strain their personal and professional relationships, it would also degrade relations with DOC officials and push the infant Beech Aircraft Company toward insolvency.

Basic specifications for the Model 17R include:

- Wingspan of 34 feet 4 inches and use the U.S. Navy's N-9 airfoil section to reduce drag
- Total wing area: 323 square feet
- Length: 24 feet 3 inches
- Height: 8 feet 8 inches
- Empty weight: 2,677 pounds
- Gross weight: 4,500 pounds
- Estimated maximum speed: 201 mph
- Estimated cruise speed: 180 mph
- Fuel capacity: 145 gallons
- Range: 800-1,050 statute miles
- Landing speed: 60 mph
- Standard-equipped price: $18,000

Late in July the fuselage, empennage, wing panels and flight controls were completed and ready for static testing. Errors discovered by DOC inspectors, however, delayed authorization for the tests until corrections were made, and late in August the static tests were authorized. It took another two months before the Model 17R was ready for final assembly in the Cessna factory. For seven months Walter Beech had watched over its construction like an expectant father and he anxiously awaited its first flight, as did company pilot "Pete" Hill



In February or March 1932, Walter Beech leased two buildings from the Cessna Aircraft Company to build the first Beechcraft. The campus had been closed since 1931 and its president, Clyde V. Cessna, locked out of his own factory. (Textron Aviation)

who was looking forward to flying the biplane on its maiden voyage into the skies above Kansas.

As time for the first flight approached, reporters flocked to the Cessna factory armed with a barrage of questions. One of those questions was: "Mr. Beech, how many have you sold so far?" The answer was, zero. Another reporter asked about the price. Walter replied, "About $15,000-$18,000." Beech readily admitted that the Model 17R was an expensive machine and a costly gamble, but his faith in the bullish biplane remained unshaken.

During a business trip late in October, Walter had tried in vain to secure a buyer for the Beechcraft, but he did have plenty of prospects. Businessmen from across the nation, many of whom Beech had known from his days at Travel Air, expressed interest in the Model 17R but not one red cent was forthcoming in the form of a deposit.

Finally, late in October the powerful Beechcraft was prepared for its first flight. Resplendent in its paint scheme of Insignia Red and Maroon, the Model 17R was a flying machine like no other. If its performance matched Ted's predictions, Walter Beech would add another impressive accomplishment to his long list of achievements in aviation.

Wearing its assigned DOC registration of 499N on the lower left and upper right-wing panels, November 5, 1932, the first Beechcraft took off from the sod runways adjacent to the Cessna factory. At the controls for that historic event was "Pete" Hill, and the flight proved to be routine. On Nov. 7, with the R-975 roaring at full throttle, the airplane attained an indicated airspeed of 199.5 mph, and two days later, with Walter Beech at the helm, the biplane hit the magic 200 mph mark.

Beech was quick to inform the local press about the flights, and by Nov. 11 the Model 17R was front page news. Beech told the *Wichita Eagle* newspaper that the airplane possessed the speed of the famous Travel Air

In 1934 NC499N was sold to the Ethyl Corporation for about $12,000 – a lot of money during the Great Depression. A number of modifications were made to the airplane to meet the buyer's requirements, including a full-swiveling tailwheel and moving the Wright radial engine forward 3 inches.
(Textron Aviation)

Type "R" racer of 1929 and could haul a good payload over a long distance at high speed. Yet, he said, the Beechcraft could be flown by average pilots thanks to its demonstrated landing speed of only 60 mph. Always keen to gain good publicity, Walter invited the public to the municipal airport for their first look at Ted Wells' creation. More than 1,500 people attended and watched as Hill made a series of flights with passengers, diving at full throttle with the Wright radial screaming at the top of its lungs as he flashed past the crowds. They loved it … and so did Walter Beech.

He knew his airplane company had a machine that was in a class by itself. No other fixed-gear, 4-5-place cabin biplane could approach, let alone match, its performance and comfort. The bullish Beechcraft was an excellent design. All it needed was a sale to prove its commercial viability. An old friend from Oklahoma would soon place his trust and his money in the Model 17R. Why would anyone risk their hard-earned cash in the Great Depression on an unproven airplane built by a struggling startup company? Because of one man and his reputation – Walter H. Beech. KA

Notes:

1 It is easy for today's pilots to forget that in 1932 any commercial airplane that landed at 60 mph was considered "a hot ship." Biplanes of the era, as well as many monoplanes, landed at a gentle speed of about 35-40 mph (without the aid of wing flaps). Landing at low speed was an asset because many pilots operated from unimproved, short, sod fields.

2 In 1932 the Cessna Aircraft Company board of directors had locked Clyde Cessna out of his own factory. Undaunted, he and his son Eldon started the C.V. Cessna Aircraft Company specializing in custom-built air racing monoplanes. They built those ships in Walter Beech's closed Travel Air facility. Beech may have sought space in the Travel Air factory to build the first Beechcraft, but Curtiss-Wright apparently refused to cooperate, so he turned to the Cessna company for help.

3 Wassall was a graduate engineer who had been a shop foreman at Curtiss-Wright in St. Louis. He lacked experience in designing aircraft, but Wells was glad to have his assistance.

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.

Ice Shield® Launches new Pressure Sensitive Adhesive Installation Application for Wing Boots

Ice Shield De-Icing Systems has announced the launch of Ice Shield PSATM, a Pressure Sensitive Adhesive (PSA) installation application that will reduce installation labor and allow minimal aircraft downtime when replacing wing de-ice boots, a Peel.Stick.Fly.™

Ice Shield's PSA product line will provide a faster, neater and easier installation compared to the traditional contact cement installation. Ice Shield PSA boots can be inflated just two hours after installation for a quick turn, getting the aircraft back to service in about the time the log book entry is completed.

Ice Shield PSA parts are offered for most of its catalog of certified Ice Shield wing boots, allowing customers to have a choice of either the PSA application or traditional contact adhesive application. All Ice Shield customers have unlimited access to expert technical support and first-class customer service, plus all PSA parts are covered under the standard Ice Shield No-Hassle warranty.

The company says the new Ice Shield Pressure Sensitive Adhesive parts are manufactured with the same world-class quality and reliability provided by Ice Shield since the brand launched in 1999. Also, it is Ice Shields guarantee that all of its PSA parts are guaranteed to be delivered within 72-hours or less.

Ice Shield PSA products are not available for sale or shipment to Canada, U.K., Germany, or France. Ice Shield standard wing boots are available for sale and shipment worldwide.

To learn more about Ice Shield PSA, contact the customer service team at 1 (800) 767-6899, email *info@iceshield.com*, or visit the website at *www.iceshield.com/PSA*. A list of Ice Shield authorized distributors is available at *www.iceshield.com/Locations/Distributors* and factory trained Installation centers are listed at *www.iceshield.com/Locations/Installers*.

Jet Shades Offers First Removable Sun Protective Panels for Pilots

Jet Shades, the exclusive manufacturer of removable tinted cockpit window panels, now offers a complete line of standard solutions to protect pilots from heat, glare

and ultraviolet rays while flying. The panels fit almost every private aircraft model and can be custom-made.

Jet Shades are "push-in-place" tinted window panels made to cover the top portion of the windshield and fill the cockpit side windows completely for total pilot protection. The patent-pending design offers numerous benefits to pilots and crew, including:

- Protection from 99 percent of harmful ultraviolet radiation that causes skin cancer
- A consistently cool and comfortable cockpit no matter the temperature outside
- Elimination of more than 80 percent of sun glare for optimal instrument visibility
- Reduction of pilot fatigue

The lightweight panels are made from optical-quality polycarbonate, which is virtually unbreakable and will not shatter or scratch like acrylic or glass. Through a proprietary process, the company treats the polycarbonate to block infrared waves, ultraviolet waves, visible light and solar energy.

"As a pilot in Florida, I always struggled with the effects of the sun beating mercilessly through the windows while flying," said Kevin Duggan, Founder of Jet Shades. "Since FAA regulations mandate certain light transmission levels for cockpit windows, which limit tinting possibilities, and adhesive films and suction cups visors can be damaging, Jet Shades provide much-needed shade without altering – or even touching – the cockpit windows. The relief they provide is flight-changing."

With their flexible design, the panels simply push into place into the window trim and are secured by friction tabs for a snug fit, even in severe turbulence. Since no clips or other fasteners are needed, the panels can be quickly and easily installed and removed, even during flight when autopilot is engaged.

Panels are available for almost any aircraft, including jets, turbo props, props, experimental/homebuilt planes, helicopters, and more. Prices start at $599 for a cockpit set. Full sets that include panels for cabin windows can also be purchased. The products can be ordered directly from *jetshades.com* or from authorized dealers.

For more information, visit *jetshades.com*.

Executive Aircraft Maintenance Relocates to PHX

Executive Aircraft Maintenance (EAM) has relocated from Arizona's Scottsdale Airport to a larger facility at Phoenix Sky Harbor International Airport. The Class III FAA Part 145 repair station will now be a tenant of Swift Aviation at Sky Harbor and occupy a 40,000-square-foot hangar. With the increase in space, the company plans to focus on larger aircraft, in addition to the smaller airframes it has maintained over its decades-long history.

Currently, the company's capabilities include Beechcraft, Gulfstream, Bombardier Challenger, Embraer Legacy and Cessna Citation inspections and line maintenance, as well as extensive sheet metal repairs and modifications. The company also offers modifications from Raisbeck and Blackhawk.

As an authorized dealer for most cockpit and cabin avionics equipment, it can perform work ranging from repairs and simple installations to full cockpit retrofits. EAM specializes in ADS-B installations for aircraft up to midsize jets from all the major avionics manufacturers, as well as cabin connectivity systems and autopilots.

King Air Technically...

From Beechcraft Service Letter # MTB-24-01

Electrical Power – Enhanced Clearance for Pedestal Wire Harnesses

Date: December 6, 2018

Effectivity:

King Air 90 (applicable variants within defined LJ serial range), LJ-1 thru LJ-2146;

King Air E90, LW-1 thru LW-347;

King Air F90, LA-2 thru LA-236;

Super King Air B200GT, BY-1 thru BY-312;

Super King Air B200CGT, BZ-1;

Super King Air B300C, FM-1 thru FM-75, FN-1;

Super King Air B300, FL-1 thru FL-1030;

Super King Air 300, FA-1 thru FA-230, FF-1 thru FF-19;

King Air 100 and A100, B-1 thru B-94, B-100 thru B-204, B-206 thru B-247;

Super King Air 200/B200, BB-2, BB-6 thru BB-185, BB-187 thru BB-202, BB-204 thru BB-269, BB-271 thru BB-407, BB-409 thru BB-468, BB-470 thru BB-488, BB-490 thru BB-509, BB-511 thru BB-529, BB-531 thru BB-550, BB-552 thru BB-562, BB-564 thru BB-572, BB-574 thru BB-590, BB-592 thru BB-608, BB-610 thru BB-626, BB-628 thru BB-646, BB-648 thru BB-664, BB-666 thru BB-694, BB-696 thru BB-797, BB-799 thru BB-822, BB-824 thru BB-870, BB-872 thru BB-894, BB-896 thru BB-990, BB-992 thru BB-1051, BB-1053 thru BB-1092, BB-1094, BB-1095, BB-1099 thru BB-1104, BB-1106 thru BB-1116, BB-1118 thru BB-1184, BB-1186 thru BB-1263, BB-1265 thru BB-1288, BB-1290 thru BB-1300, BB-1302 thru BB-1384, BB-1389 thru BB-1425, BB-1427 thru BB-1447, BB-1449, BB-1450, BB-1452, BB-1453, BB-1455, BB-1456, BB-1458 thru BB-1683, BB-1685 thru BB-1716, BB-1718 thru BB-1720, BB-1722, BB-1723, BB-1725, BB-1726, BB-1728 thru BB-2021;

Super King Air 200C/B200C, BL-1 thru BL-23, BL-25 thru BL-57, BL-61 thru BL-72, BL-124 thru BL-170;

Super King Air 200CT/B200CT, BN-1 thru BN-4;

Super King Air 200T/B200T, BT-1 thru BT-38;

B100, BE-1 thru BE-137;

A100 (U-21F), B-95 thru B-99;

A100-1 (U-21J), BB-3 thru BB-5;

A200 (C-12A/C-12C), BC-1 thru BC-75, BD-1 thru BD-30;**A200C (UC-12B)**, BJ-1 thru BJ-66;

A200CT (C-12D, FWC-12D, C-12F), BP-1, BP-7 thru BP-11, BP-19, BP-22, BP-24 thru BP-71;

A200CT (RC-12D, RC-12H), GR-1 thru GR-12, GR-14 thru GR-19;

A200CT (RC-12G), FC-1 thru FC-3;

A200CT (RC-12K, RC-12P, RC-120), FE-1 thru FE-9, FE-25 thru FE-36;

B200C (C-12F), BP-64 thru BP-71, BL-73 thru BL-112, BL-118thru BL-123;

B200C (UC-12F), BU-1 thru BU-12;

B200C (UC-12M), BV-1 thru BV-12;

B200C (C-12R), BW-1 thru BW-29.

Reason: New anchors in the pedestal provide enhanced clearance for wire harnesses.

Compliance – OPTIONAL: This service document can be accomplished at the discretion of the owner.

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

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