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ONLINE ADDRESS

www.kingairmagazine.com

SUBSCRIPTIONS

King Air is distributed at no charge to all registered owners of King Air aircraft. The mailing list is updated bi-monthly. All others may subscribe by writing to: King Air, P.O. Box 1810, Traverse City, MI 49685, or by calling 1-800-447-7367. Rates for one year, 12 issues: United States \$15.00, Canada \$24.00 (U.S. funds), all other foreign \$52.00 (U.S. funds). Single copies: United States \$6.50, Canada/Foreign \$9.00.

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King Air (ISSN 1938-9361), USPS 16694 is published monthly by Village Press, Inc., 2779 Aero Park Drive, Traverse City, Michigan 49686. Periodicals Postage Paid at Traverse City, MI. POSTMASTER: Send address changes to King Air, Village Press Inc., P.O. Box 1810, Traverse City, MI 49685. Telephone (231) 946-3712. Printed in the United States of America. All rights reserved. Copyright 2021, Village Publications.

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A New Way to Produce

Growth-minded Stamoules Produce purchases first aircraft

by MeLinda Schnyder

Stamoules Produce wanted to expand its business into new areas and the family realized they needed an aircraft to help accomplish that goal. (Credit: Troy Ruff)





hen Textron Aviation asked the Stefanopoulos family if they would consider changing their order for

a Beechcraft King Air 350i to be the first customer to take delivery of the upgraded King Air 360, it was easy to say yes. The only question they had was why the company chose them since they are "just farmers out in the middle of California."

The first-time aircraft owners soon realized that the sales team at Textron Aviation had noticed shared storylines between the history of the family's Stamoules Produce Company and that of Beechcraft founders Walter and Olive Ann Beech.

Companies dating back to the late 1920s/ early 1930s, founders who were dreamers, untimely deaths, women leaders who stepped into roles that were unheard of in business at the time and longevity, at least partially



attributed to innovation within their industries and business practices.

Here's the story of Stamoules Produce and the Stefanopoulos family, who took delivery of the King Air 360 in November 2020.

Planting the Seeds

Spero Stamoules planted his first cantaloupe crop in 1927, using seeds he'd started collecting from plates while waiting tables at New York City's Waldorf Astoria Hotel after immigrating from Greece as a young man in 1903.

He eventually pursued his dream to farm using those seeds, but it took some time. He was a fruit merchant in San Francisco, then moved back to Greece during World War I. He married his wife Helen in 1921 and returned to the Bay Area with her in 1925. By 1927 he was farming on what is considered by some to be the world's most productive agricultural land – California's Central Valley.

He was one of the first cantaloupe farmers in Mendota and is credited with helping the town just west of Fresno become known by some as the Cantaloupe Capital of the World. Spero weathered the Great Depression by selling produce door-to-door and at farmers markets, then started to grow his operation big enough to supply wholesalers and restaurants in neighboring states and the East Coast. While riding the train in 1944 with the first load of his cantaloupes to travel to New York, he died of a heart attack on the platform at Grand Central Station. He was 54 years old and left behind his wife Helen and Peggy, the 13-month-old daughter they had adopted a year earlier.

"My mother continued on and fulfilled his dream," Peggy Stefanopoulos said on a video produced in 2020 by Textron Aviation. "His legacy lives on through my husband, Tom. We never changed the name. It's still Stamoules Produce."

Similarly, Walter Beech was an early aviation entrepreneur and started Beech Aircraft Company in Wichita, Kansas, in 1932 with his



Stamoules Produce has expanded its legacy crops in the past decade and are also developing its pistachio business. The company currently has nearly 17,000 acres in production and dispenses more than 14 million boxes of produce per year. (Credit: Troy Ruff)

wife Olive Ann and a small group of engineers and investors. Olive Ann became president of the company in 1950 when Walter died from a heart attack at age 59. She was the first woman to head a major aircraft company and went on to have a National Aviation Hall of Fame career.

Helen grew the farm to about 2,000 acres by 1960 and worked in the business the rest of her life; she died at age 85 in 1992.

Peggy married Tom Stefanopoulos, a Greek immigrant, in 1966 and they helped Helen run Stamoules Produce. They continue to lead the company alongside their adult children: Dionysos (Dio)





Spero Stamoules (left) and Walter Beech (right) were the founders of their companies, making their dreams into reality with innovative ideas in their perspective industries. Both suffered untimely deaths and their wives took over the companies and became leaders in their own right.

"This aircraft represents that we're 93 years strong, and we're moving forward."

- Dio Stefanopoulos, Stamoules Produce Company

Stefanopoulos, Spero Stefanopoulos and Elena Stefanopoulos.

Starting in the 1960s, the farm expanded into other fruits and vegetables – honeydews, mini watermelons, bell peppers, sweet corn and pistachios, to name a few – and they became more selfreliant. That includes employing the crews who weed and harvest versus contracting for that work to owning their own equipment and machinery and operating a large maintenance shop. They've designed much of their harvest equipment and employees manufacture it onsite. They also drill their own wells and install pipeline to make sure the crops are irrigated during droughts.

Adopting field packing has streamlined their process and they've also invested in technology and facilities that allows each crop to be pre-cooled, cooled and then shipped in a refrigerated truck within a 24-hour period.

Efficiency and quality has been the key to Stamoules' longevity and growth to nearly 17,000 acres in production. They produce more than 14 million boxes of produce per year, shipping to wholesalers throughout the United States, Canada and Mexico. While you won't see the brand name, you might purchase Stamoules-grown cantaloupe, honeydew melon, sweet corn or pistachios at a local grocery store, as part of a meal kit or it might be part of your meal at a local restaurant.

With the help of their parents, the third generation is guiding Stamoules Produce into a focus on growing pistachios for their newly developed brand – OPA Pistachios.

Adding a business tool

Developing that part of the business was a big reason the family decided it was time to invest in another business tool.

"You know it's time to get a plane when you want to expand your business into areas where >







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Katie estimates the King Air 360 will be flown about 150 to 200 hours a year to meet face to face with customers across North America on a consistent basis. (Credit: Digital Brand)





you haven't been before," Spero Stefanopoulos said on the Textron Aviation video.

Stamoules Produce employs anywhere from a few hundred employees to several thousand employees during the peak of harvest. Everyone is based in Mendota, from the employees working in the fields and the distribution facility to those at corporate headquarters.

In the past decade, Stamoules Produce has expanded its legacy crops while also moving toward significantly developing its pistachio business. The family now farms 11,500 acres of pistachios and is beginning the process of building a hullery. Instead of shipping off all of its pistachios to wholesalers or to be sold by The Wonderful Company, Stamoules plans to begin marketing its pistachios under its own brand that you'd be able to purchase in a grocery store.

When the family started to talk about purchasing an aircraft, they turned to Katie Stefanopoulos, a 7,500-hour pilot and wife of Dio. She said until now the company has relied mostly on handling relationships over the phone or during meetings at industry gatherings.

Katie's father was a charter pilot and her mother flew recreationally. Katie earned her pilot's license as a teenager and intended to pursue Company pilot Katie Stefanopoulos (center) holds the keys to Stamoules Produce's new King Air 360 at delivery. Shown here with her husband Dio (right) and brother-in-law Spero, third-generation family who help run the business. (Credit: Digital Brand)

law school after earning an undergraduate degree from University of California-Davis. Instead, she made piloting her career. She's been a flight instructor and flown cargo, medevac and charter flights, including about 500 hours in King Air aircraft. She was last a full-time contract pilot before having her son in 2019.

When it came time to decide what aircraft to buy, she narrowed down the field to two options based on the company's range, cabin size and short runway needs: the Beechcraft King Air 250 and the Pilatus PC-12. They took demo flights and the pilot of the King Air, a friend of Katie's, mentioned he could also take them up in a King Air 350. The size and feel of the 350's cabin was an instant hit. They contacted Beechcraft and started working on purchasing a 350 until the company gave them the option of being the launch customer for the King Air 360.

Katie is the company's pilot and said she expects to fly the King Air about 150 to 200 hours a year, allowing their sales team and company leadership to meet with customers across North America on a consistent basis for the first time.

"We'll have the owners going out, the sales team going out – they'll be meeting customers they've had a relationship with for years but had very little face-to-face time with, as well as meeting potential new customers in the pistachio market," she said. "It's nice to have that handshake and that face-toface time. It's amazing what you can learn about your customer that you just don't when you're talking on the phone."

They're also using the King Air to visit pistachio growers as Stamoules researches growing that segment of their business. Some of these farming operations would require a three-hour drive from a region's main airport, while the King Air can get them much closer to their final destination. That turns what would have been a one or two day trip flying commercially into a day trip.

They've had the King Air just a few months and the pandemic has slowed some of their travel. Most of the missions have been in the western U.S., to get the sales team acclimated to having an aircraft available, and so far passengers and the pilot have been pleased.

"It's such a great aircraft," Katie said. "We've got the whole Collins Aerospace Pro Line Fusion[®] avionics system, the autothrottle system and the interior is just beautiful. It's got that great hum to the engine. It's performed exactly the way we thought it would."

The King Air's custom paint scheme featuring generous use of orange, blue and purple – each a favorite color of the siblings – is quick to draw attention on the ramp.

"My husband Dio is an architect by trade and he loves coming up with creative designs," Katie said. "He put a lot of thought into it and I'm so glad we did it this way. I've always thought that if you take the time to buy a brand-new aircraft, why wouldn't you make it your own with the paint."

Stamoules hangars the aircraft at Fresno International Airport until the company builds a hangar on the farm to go with the runway they installed in 2020. "This aircraft represents that we're 93 years strong, and we're moving forward," Dio said when the family took delivery of the King Air in Wichita.

Spero added: "We believe that our grandparents are looking down at us, probably enthralled with what's happened in our business and the direction it's going to go."



KING AIR GATHERING



King Air Gathering • Sept. 23-26, 2021 Register Now!

by Kim Blonigen

pace is limited and over half the available spots have already been filled for the 2021 King Air Gathering (KAG) being held Sept. 23-26 at the Beechcraft Heritage Museum in Tullahoma, Tennessee. If you are thinking you might like to attend, you may not want to wait much longer to register.

Below is a summary of the agenda:

Thursday, Sept. 23:

Those flying their King Airs to the event will land at the Tullahoma, Tennessee, Regional Airport (THA) located adjacent to the museum and have reserved parking.

Starting at **1 p.m.** and running every hour until 5:00, there will be guided museum tours (normally tours are only self-guided) from "special" tour guides – four people who have personal knowledge of Beechcraft history.

5:30-7:30 p.m. – Enjoy meeting other King Air owners and pilots at a Welcome Cocktail Reception sponsored by Blackhawk Aerospace. Heavy hors d'oeuvres will be provided compliments of the King Air Academy.

Friday, Sept. 24:

After welcoming comments, the first seminar will be one that you won't want to miss.

9:30 a.m. – Bruce Landsberg, vice chairman of the National Transportation Safety Board (NTSB) will discuss



An overhead view of the ramp full of King Airs at KAG III

on Garmi connect a interactive avionics u 3 p.m. – A the curren premiums 3:30 p.m. pilot will and provio 4:30 p.m.

recent King Air accidents, more specifically the one at ADS since the final report has been released. He will also share best practices for the King Air community.

11 a.m. – Ed Phillips, Beechcraft historian and author, as well as being a pilot and mechanic, will share the early years of Beech Aircraft and how it survived through the tumultuous years.

11:30 a.m. – Don Cary, retiree from Beech Aircraft will discuss how the company prepared for the new era of pilots (one was hiring Tom Clements!) and aircraft when the King Air was introduced.

12 p.m. – Lunch will be provided by Pratt & Whitney and there will be extra time allotted to visit the ramp full of King Airs, as well as looking around the museum and gift shop.

1:45 p.m. – Breakout session: Choose between two sessions with experts from each field – one focusing

on Garmin avionics, certified autopilots and how to connect and configure them and the other will be an interactive presentation for Collins Pro Line and Fusion avionics users.

3 p.m. – An aviation insurance specialist will discuss the current state of the aviation insurance industry, why premiums are so high and what you can do.

3:30 p.m. – Breakout session: EFBs for the King Air pilot will be broken out by Garmin Pilot or Foreflight and provide interactive, informational sessions for each.

4:30 p.m. – James Raisbeck, founder of Raisbeck Engineering, will share how his company and all of the King Air improvements came to be.

5 p.m. – The inaugural "King Air Hall of Fame" awards presentation.

6 p.m. – Dinner and entertainment hosted by Stevens Aerospace & Defense Systems. Enjoy Nashville-style barbecue cooked right on the property and local Nashville entertainment of dueling pianos!

Saturday, Sept. 25:

8:30 a.m. – Bill Crutchfield, president and CEO of Crutchfield and also a King Air pilot and owner, will provide advice on safety and insurance that any pilot can benefit from, but specifically the aging King Air pilot.

9 a.m. – Textron Aviation Senior Air Safety Investigator Peter Basile will present how the King Air compares to the industry and common themes he has observed.

10 a.m. – Tom Grunbeck from IS&S will discuss the ThrustSense Autothrottle, the latest safety device available to the King Air.

10:30 a.m. – Textron Aviation's Manager of Turboprop Product Support Kim Burton will provide recent changes in King Air maintenance requirements and the top 10 questions (and the answers) her group receives regarding the King Air.

11:30 a.m. – Dean Benedict, King Air maintenance expert, will discuss logbook reviews, pre-buy inspections and acceptance flights.

12 p.m. – Lunch will be provided by Pratt & Whitney and there will be extra time allotted to visit the ramp full of King Airs, as well as looking around the museum and gift shop.

1 p.m. – Tom Clements, King Air expert, pilot and author will share his thoughts on some of the King Air systems and making every approach a stabilized approach.

2 p.m. – **Breakout session:** Attendees can choose between a technical level interactive discussion on PT6A engines or a discussion on one of the many misused or misunderstood modes of the 10 installed legacy King Air autopilots.

3:15 p.m. – Special Speaker: Back by popular demand Robert "Hoot" Gibson, USN Retired, former fighter pilot, test pilot, and Navy astronaut who spoke at the King Air Gathering II in Dayton, Ohio, has been requested back to speak as numerous KAG attendees have been requesting it. Don't miss his memorable way of sharing stories.

4:30 p.m. – Wrap Up

KAG attendees will have time to talk with specific King Air product and service providers.



Don't miss the opportunity to attend the King Air Gathering at the historical Beechcraft museum. Besides the wealth of knowledge that will be shared, being able to talk face to face with King Air product and service providers and other King Air owners and pilots, all attendees also receive a year's membership to the museum.

To register and for more information, go to kingairgathering.com.



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Over-servicing the Oil

by Dean Benedict

he rate of oil consumption on a PT6 engine is a vital statistic for proper maintenance and accurate troubleshooting. Pratt & Whitney's guideline regarding oil consumption for PT6s is 1 quart for every 10 hours of operation. This rate of consumption is the maximum allowable and it applies to every type of PT6 engine found on King Airs.

If the engine is being overserviced, the excess oil is blown overboard, giving the impression the engine is using more oil than it really is. To accurately track the rate of oil consumption, you must ensure each engine is getting the amount of oil it needs and no more.

Whenever I hear an owner or pilot complain of oil mess all over the struts, flaps, gear doors or beaver tails, I suspect they are putting in too much oil. My first question is "Where are you keeping your oil levels?" and my second question is "When are you checking it?"

Finding the level

Every PT6 is slightly different. Like fraternal twins, they look alike but have different personalities, quirks and mannerisms. Preferred oil level is a trait that varies from engine to engine. One engine likes to run at 3 quarts down and another stays at 1.5 quarts down. I've found many PT6s running at between





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NOW AVAILABLE FOR SELECT BEECHCRAFT KING AIR C90 AND E90 SERIES AIRCRAFT. VISIT GARMIN.COM/GFC600 FOR ADDITIONAL INFORMATION, MODEL COVERAGE AND CERTIFICATION PLANS. 2 and 3 quarts down. (To be clear, that's between the 2nd and 3rd hashmarks below "Max Cold" on the stick on a cold engine.) Some engines stake their claim at 3 or even 3.5 quarts low.

Many times there will be a disparity between your engines – the left side is happy at 2-down, but the right side prefers 2.5-down. There is nothing wrong with this. I know it's painful for those who want both of their engines to be perfectly matched along every parameter, but they are not identical twins. As long as each engine makes book figures, you are good to go.

If your King Air is new to you, you need to fly the airplane for a bit to see where your engines want to be oil-wise. If you just had an engine overhauled, you need to fly it for a while to see if the preferred level has shifted. If it goes from 1-down to 2-down fairly rapidly, don't worry right away. Maybe it will go to 2.5down and stay there. Your engine will tell you its preferred level. Once that level is ascertained, don't add oil until the engine has gone down a quart *below* that level.

Finding the preferred oil level for each of your engines is crucial to monitoring engine oil consumption. All oil added in excess of that level is just blown out the breather, making a mess and wasting money.

When to check

Pratt & Whitney recommends the oil level on a PT6 be checked within 20 minutes after shutdown. I know this flies in the face of everything drilled into your pilot psyche from when you first learned to fly. Checking the oil is a vital part of the all-important preflight routine. So why would the engine manufacturer recommend doing it after a flight?

Here's what happens in a PT6: After running, the oil has collected in the oil tank located above the oil filter housing; however, if the oil is able to get around the housing and travel down to the accessory gear box and the bearing areas below, it will go there. It's called oil migration, and it's common in PT6s. Therefore, Pratt says to get an accurate read on the amount of oil in the engine, you need to check it before the oil starts to migrate, and that is within 20 minutes after shutting down.

Checking cool or checking hot?

In reality, the engines are still pretty hot after 20 minutes. You must exercise caution to check the oil without burning yourself. >



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Further, at the end of a flight, there's plenty of chaos with line service instructions, passengers, baggage and ground transportation. Let's face it, at the end of a trip checking the oil on a hot engine isn't everyone's favorite thing to do.

Far more important in my book, is just checking the oil regularly. Whichever way you choose to do it, whether it's post-shutdown or before the first flight of the day, just do it that way consistently.

Funny thing about Pratt's recommendation, if you only check your oil levels within 20 minutes after shutdown, while the engines are hot, you would never know whether or not you had an oil migration problem. It could go undetected for years.

More on migration

Imagine you are preflighting your King Air and checking the oil, which is off the stick on one side. That's a red flag! But if your first instinct is to dump a couple quarts in and check the stick again. you could be over-servicing that engine and wiping up the mess at the end of your trip. Why? Migration. The oil is still in the engine, it's just hiding below and appears to be off the stick.

Instead of adding oil, try motoring that engine for about 30 seconds and check the stick again. Chances are, the oil will be back on the stick at the level you were expecting and you are good to go. You have a minor oil migration problem that can be easily remedied at the next phase inspection. Until you get the problem addressed, keep motoring that engine each time you check the oil on that side. Motoring gets the scavenge pump to move the oil back into the oil tank where it shows up on the stick.

Oil migration is an oil leak inside the engine. A common culprit is the o-rings between the oil filter housing and the engine case.

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During every phase inspection the oil filters and chip detectors are pulled, inspected and reinstalled. Maintenance technicians make every effort to be careful, but some oil filters are a pain to get out and get back in. The process of removing and reinstalling a stubborn oil filter can jostle the filter housing just enough that the o-rings lose some of their seal.

Keeping it clean

When it comes to lubrication in general, I would say you can't have too much of it. The one exception seems to be the oil in a PT6. If you continually have oil on your gear doors, struts or flaps, then most likely you are over-servicing your engines. Be aware that oil migration makes an engine appear to have lost oil when it has not. Above all, ascertain the preferred oil level for each engine and stick with it. This gives you an accurate picture of the oil consumption rate. As an added bonus, you will have a cleaner aireraft. 🖾

Dean Benedict is a certified A&P, AI with over 45 years of maintaining King Airs. He's the founder and former owner of Honest Air Inc., a maintenance shop that specialized in Beech aircraft with an emphasis on King Airs. In his new venture, BeechMedic LLC, Dean consults with King Air owners and operators on maintenance management and supervision, troubleshooting, pre-buys, etc. He can be reached at *dr.dean@beechmedic.com* or (702) 773-1800.

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Rudder Boost History and Usage

by Tom Clements

sometimes get questions along the lines of "Why doesn't my King Air have the rudder boost system?" Many pilots flying an E90 or C90 receive a demo flight in a newer C90GTx and observe that the newer model has rudder boost whereas their airplanes do not. "It must be due to the higher power of the PT6A-135A engine as compared to the -20, -21 or -28 that we have," is the common reasoning. And yet, all engine variants installed in C90s and E90s are limited to the same 550 SHP value. This article will attempt to shed light on this question and give some insight into the design and history of the rudder boost system. I wrote an article "Rudder Boost Ramblings" featured in the August 2020 issue of this magazine but there still seems to be a lot of confusion.

As I am sure you know, King Airs have the deserved reputation of being easy airplanes to fly with excellent handling characteristics. Even when operating OEI – One Engine Inoperative - they handle very nicely with plenty of trim authority to make "Hands Off" - and even "Feet Off" flying quite easily accomplished. If this were not so, we'd probably see much fewer King Airs being used in the multiengine primary trainer role. Also, this good reputation applies even to the most basic of King Airs, those without such great "options" as yaw dampers, autopilots, rudder boost or autofeather.



A rule found under the requirements for FAAcertified airplanes addresses the maximum force a pilot is expected to apply to the flight controls. When it comes to the rudder, the highest force allowed - the push on either pedal – is limited to a maximum of 150 pounds. Do you weigh more than 150 pounds? Stand on one leg and do a slight knee bend and return to the fully upright position. That wasn't that hard, was it? You just experienced at least the magnitude of force being discussed.

All King Air models with the original wing center section dimension - that is, all of the 90- and 100-series - have a worst-case rudder force requirement that remains comfortably below the Federal Aviation Administration (FAA) limit. What is the worst case? Almost always, it is found while doing VMCA flight testing.

When the model 200 King Air - the Super King Air, as

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it was originally named – was being designed, a lot of improvements were envisioned from its predecessors: More power to yield faster airspeeds and better rates of climb, a wider center section to provide room for the larger-diameter propellers and to move the propeller are further away from the fuselage for less noise, more pressurization differential to allow the cabin altitude to be lower at higher cruise altitudes ... and on and on.

When the design team realized that an additional 170 SHP (850 SHP for the 200 versus 680 SHP for the A100) was going to be placed 25 The rudder boost system was not designed to act alone during loss of engine power. You must also supply rudder pedal force.

inches further from the airplane's centerline, concerns arose about rudder force and effectiveness. As I have related in the "The King Air Book – Volume II," in the chapter about the T-Tail design, the primary reason for going with that major change of the empennage was to maximize rudder effectiveness when it was most needed ... at slow speeds, including VMCA.

A very pleasant event that is forever seared into my brain's memory bank occurred in 1973 at the Beechcraft factory. Bud Francis, chief experimental test pilot for the 200 program, gave me (as I prepared

to be the first factory 200 instructor) a one-on-one lesson about the new rudder boost system. He used chalk on a blackboard to help illustrate what the test program had shown and the changes that this new system brought about. Although the maximum rudder force during the test program remained below the FAA limit, it only missed it by 3 pounds ... 147 pounds required of the 150 pounds limit! Believing that King Airs should retain their "easy to fly" reputation (and, I speculate, anticipating the morepowerful model 300 to come), the decision was made to make the newly-designed rudder boost system standard equipment on the model 200-series. However, the KOEL (Kinds of Operation Equipment List) in the POH – as well as the MMEL (Master Minimum Equipment List) - show that rudder boost is never a required flight control ... in the 200-series.

How much rudder force should the boost system apply? Bud explained that the choice was made that it



would apply enough force to allow "feet on the floor" flying with no rudder trim input while flying at VYSE (Blue Line) with the left engine feathered, the right engine at its full 850 SHP, and with the proper five degree bank into the good engine. The force value selected was close to 50 pounds. This brought the worst-case situation from 147 down to an easily-handled value of about 100 pounds.

Since the required rudder force decreases as the differential power decreases, there will come a point - as airspeed increases, making the rudder more effective, and as engine power reduces when a climb is no longer required - in which every ounce of required rudder force is being supplied by the boost system, even with no rudder trim input. In this situation, to maintain proper airplane coordination with feet on the floor, the "dead foot, dead engine" rule would cease to apply. Instead, we'd have to start pushing on the "wrong" pedal or crank in opposite rudder trim. Bud explained that this was the point that the design team selected at which rudder boost would stop working, and stop supplying any rudder pedal force.

An educational and fun demonstration I have conducted during many flight training sessions is to be in the situation of an engine shut down with propeller feathered, full power on the other engine, and at Blue Line airspeed in a clean configuration climb. As mentioned above, in most cases the rudder trim wheel is very close to being centered. I tell the student to put both feet on the floor, to hold heading using ailerons only, and to start reducing the engine's power a little at a time.

Let's assume the left engine is the one shutdown. As the right engine power is reduced, the airplane wants to turn right – due to the right rudder force being supplied by the RB system – so the student dutifully turns the control wheel to the left, counter clockwise, to maintain heading. Another minor power reduction leads to the same outcome. Soon it becomes obvious that airplane coordination is lacking. We are banked noticeably toward the dead engine with the skid ball displaced to the left. But then, as power is slightly reduced again, suddenly the heading swings left and the student roles the control wheel clockwise to get back on the assigned heading. Well, looky there! We have "raised the dead" and are again flying in relatively correct coordination ... because the rudder boost just stopped working. Cool!

No, I am not advocating flying with feet on the floor and/or not using rudder trim! However, realize that rudder boost is helping when needed but is turning itself off when no longer desirable.







More than anything else, here is what I want you to retain about the rudder boost system: Pretend it's not there!

I have come to worry that some King Air pilots think this great system - and especially when combined with the wonderful autofeather system - makes it easy for the pilot to handle an engine out emergency without forceful control input. Wrong! Fly the airplane! Step on a rudder pedal forcefully to maintain heading. Pitch for proper airspeed. Conduct the engine failure memory drill. Yes, you can rest assured that the rudder boost and autofeather systems are reducing your force inputs, but you still need to input whatever is necessary! It's a rudder boost system, not a rudder replacement system!

More about rudder boost history: Once Beech had designed this fine system and the parts that made it up were readily available, the decision was made to make it standard equipment across the spectrum of newly-designed King Air models. Hence, all models that were developed and certified after the model 200 have RB as standard equipment: F90-series, C90A and after series, and the 300-series. Only the 300-series require it. Personally, I wish the later-90 series did not have it. Why? Because much too often I have observed pilots undergoing training use too much rudder input, not realizing that rudder boost was helping with a lot of the force. Again, this is shown by flying with the dead engine down, not raised up. In my first book, "The King Air Book" I made the crazy comment that a C90A needs rudder boost like a fish needs a bicycle ... but it's true. Sure, if it's there use it, enjoy it, but please keep a close

eye on the changing rudder force/ rudder trim needed to fly properly coordinated.

The system in the 200-series and all of the later C90A and F90-series that have it, is an "all-or-nothing" system in which the pedal force applied is constant when working and zero when idle. The force that rudder boost applies comes from pneumatic servos in the tail of the airplane and the trigger that tells the system to operate measures differential engine power indirectly by looking at the difference (ΔP) between unregulated bleed air (P_3) pressure. It is easy to change the point at which RB activates in the various models by varying the value at which the ΔP switch activates. Also, by adjusting the pressure going to the pneumatic servos the rudder force can be easily changed to the value needed for a particular model ... less for a C90A than for a 200.



As for the model 300, the maximum rudder force required at V_{MCA} can reach 180 pounds so rudder force assistance is definitely a required item. No longer are pneumatic servos used nor is there a ΔP switch. Instead, the same electric servos that supply yaw damping by moving the rudder also supply the needed rudder boost force. P₃ pressure from both engines is fed to the autopilot computer and the boost force increases as the difference in P₃ pressure increases. Hence, the force applied varies as needed, no longer an all-or-nothing force.

Measuring the difference in unregulated P_3 pressure and using it as a substitute for an actual differential power measurement is satisfactory in almost 100% of the cases. But how about a reduction gearbox (RGB) failure? If the N₂ shaft coming from the power turbines no longer connects to the N_p shaft connected to the propeller, then we have a catastrophic reduction in engine power and yet – at least until the engine destroys itself – we have normal P₃ output. That may explain why the model 350 (B300) replaces the P₃ sensors with actual torque sensors ... the best way to go, by far. I am surprised that Beech did not do this right from square one, but it was not to be.

Regardless of the details of your particular rudder boost system, remember what I am asking you to do ... pretend it's not there when you encounter a suspected loss of engine power! Rudder boost allows your feet to not supply *all* of the rudder force, but it alone is *not* enough.

King Air expert Tom Clements has been flying and instructing in King Airs for over 46 years and is the author of "The King Air Book" and "The King Air Book II." He is a Gold Seal CFI and has over 23,000 total hours with more than 15,000 in King Airs. For information on ordering his books, contact Tom direct at *twcaz@msn.com*. Tom is actively mentoring the instructors at King Air Academy in Phoenix.

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





IN HISTORY

The "Cookbook" King Airs

During the 1970s and 1980s, the Beech Aircraft Corporation served up the E90 and F90 King Air using special ingredients drawn from their library of recipes.

by Edward H. Phillips



The external appearance of the E90 King Air was essentially identical to the C90, but the latest addition to the Beechcraft royal family cruised at a higher airspeed and could climb to more than 27,000 feet. A total of 347 airplanes were built. (Special Collections and University Archives, Wichita State University Libraries)

s the decade of the 1970s arrived, the Beech Aircraft Corporation had built more than 1,300 King Air business and military airplanes since the introduction of the Model 90 in 1964. Of these, the 1,000th King Air had been delivered in 1972 and eight years later in 1980 the 2,000th *King Air*, a Model 200, took to the skies. Sales remained strong as did the company's bottom line thanks to guidance provided through the steady hand of CEO Olive Ann Beech, President Frank E. Hedrick and the board of directors.

By the early 1970s, the Model 90 series had become to the corporate world what the Beechcraft Bonanza had become to the private pilot – the best value for the money – and in 1972 Beechcraft engineers unveiled plans for yet another upgraded version of the venerable King Air. Designated as the Model E90, the airplane benefited from an increase in cruise speed to 285 mph at an altitude of 16,000 feet and a higher service ceiling of 27,620 feet.

First flown Jan. 18, 1972, the E90 could fly up to 1,870 statute miles at

its maximum range power setting. Although outwardly the E90 appeared to be a "clone" of the Model C90 upon which it was based, the new King Air sported Pratt & Whitney Canada PT6A-28 turboprop engines each developing 680 shaft horsepower (shp). The engines, however, were each flat-rated at 550 shp. Cabin pressurization remained at 4.6 pounds per square inch (psid) providing passengers and cockpit crewmembers with a comfortable environment.

The Federal Aviation Administration (FAA) issued Beech Aircraft Corporation

Type Certificate 3A20 for the E90 April 13, 1972, and during that first year of E90 production, the Wichita factory built 22 of the airplanes. That number, however, had swelled to more than 340 by 1981 when production shifted to the Model C90-1. The last Model E90 to roll off the assembly line was serial number LJ-347.

If Beechcraft management had learned one lesson since the company's inception in 1932, it was the realization that product development was essential to survival in a capricious marketplace that was rife with competition. During the past 50 years, Beechcraft engineers had become highly proficient at blending the advantages of one airplane with those of another to create a "new" product.

For example, the turbine-powered Model 65-90 was an outgrowth of the Queen Air series, just as the Model 50 Twin Bonanza had provided a basic platform for development of the Model 65. Taking that practice one step further, in the late 1960s Beech Aircraft Corporation combined the lengthened fuselage and pressurized cabin of the Model 100 King Air with a new, wider wing center section and unleashed the Model 200 Super King Air into the business aviation marketplace. The airplane's spacious cabin and its signature T-tail empennage configuration – the first for a Beechcraft airplane – pushed Beech Aircraft's pursuit of perfection to new heights.

Continuing the company's highly successful "cookbook" approach to creating new products, in 1978 engineers combined the T-tail design of the Super King Air with the fuselage and wings of the Model E90. The result was designated the F90 King Air and the preproduction prototype, serial number LA-1, made its first flight Jan. 16, 1978, under the command of company test pilot Marv Pratt. The FAA issued Type Certificate A31CE to the F90 May 18, 1979.

The F90's market niche would be as a step-up airplane from the E90, and the latest King Air was well equipped to induce corporate aviation to take that step. Although its cabin, which could accommodate up to 10 passengers, was essentially the same as the E90, the F90 possessed major systems and performance improvements compared to its sibling. Chief among these were installation of Pratt & Whitney Canada PT6A-135 engines, each rated at 750 shp. In an effort to reduce noise levels in the cabin,



the turboprop engines were mated to new four-blade, full-feathering and reversing propellers turning at a maximum 1,900 rpm or 1,500 rpm at cruise.

Maximum cruise speed increased to 307 mph from the E90's 285 mph, and initial rate of climb was 2,380 feet per minute (fpm) - another significant advantage over the E90. In addition, maximum certified altitude increased to 31,000 feet. Also, the F90 was the first King Air to use the company's completely new, state-of-the-art, 28 VDC multi-bus electrical system. The circuitry featured five separate buses, automatic load shedding and solid-state current sensors that provided protection against ground faults (electrical shorts) and quickly isolated a faulty bus, thereby reducing pilot workload.

Initial customer demand for the F90 proved to be strong and 202 airplanes were built between 1979 and 1983. These included seven in 1979, serial numbers LA-2 through LA-8. Production peaked at 75 airplanes in 1981. It is interesting to note that the F90 prototype, serial number LA-1, was later converted to the experimental G90 King Air and given serial number LE-0. The G90's chief modification compared to the F90 centered on a modified, steeply-sloped windshield installation. The G90 was not placed into production.

For the 1983 model year, Beech Aircraft engineers incorporated technical improvements applied to the C90-1 into the F90-1. These included pitot-type engine cowlings with improved air intake characteristics, particularly at high altitudes, and the use of tapered exhaust stacks. The F90's PT6A-135 engines were replaced with PT6A-135A versions that each retained a rating of 750 shp. With a span of 45 feet 10.5 inches, the F90-1's wings contained main fuel cells that held 388 gallons of jet fuel with another 41 gallons available from auxiliary



tanks installed in the wing center section.

First flight of the F90-1 prototype, serial number LA-91, occurred Jan. 5, 1981, with Vaughn Gregg at the controls. That event was followed nearly a year later by the first flight of a type-conforming production airplane, serial number LA-202, Dec. 7, 1982, flown by pilot Don Benes of the company's production flight test department.

Beech Aircraft Corporation had built only 33 examples of the F90-1 when the decision was made, in 1985, to stop production. That decision was based chiefly on the fact that demand for the F90 and F90-1 had declined steadily through the mid-to-late 1980s with only 11 airplanes built in 1983, 1984 and 1985. In 1986 only one airplane, serial number LA-237, was built.

Although the F90 series represented a major improvement

Beech Aircraft Corporation capitalized on the advantages of the Model 200 Super King Air's T-tail arrangement by applying it to the F90 and F90-1. Production of both versions totaled only 237 airplanes. (Special Collections and University Archives, Wichita State University Libraries)

over the E90, it was built in much smaller numbers than its stable mate but continued to serve its owners and operators as a unique version of the legendary Beechcraft King Air.

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.

Dimming Control for Cockpit Map Light Now Available for All King Air models

PWI announced that it now offers an LED Variable Dimming Control System for the cockpit map light of all King Air models of aircraft.

The PWI LED Variable Dimming Control System includes two PMA-certified LEDs for the overhead map lights, as well as an STC/PMA-approved Variable Dimming Controller. PWI also offers just the Variable Dimming Controller for those King Air owners who have already purchased PWI LED map lights.

The company says the installation of the Variable Dimming Control System is adaptable to owner preferences. They can decide whether to replace the existing LED light controls or add the new Variable Dimming System on to the current cockpit instrumentation.

The system can be ordered with either the 303, 1495 or the 1308/1309 LED reading lights. Installing PWI LEDs give King Air owners more than 30,000 hours of light as well as being energy efficient. LEDs are less expensive over the life of the aircraft, saving owners



from repeated bulb purchases. The Variable Dimming Controller is compact in size and ultra-lightweight, yet sturdy. The LED Variable Dimming System is easy to install and both the LEDs and the Dimmer Controller are certified by the Federal Aviation Administration (FAA). Specific information regarding the PWI LED Dimming Control System can be found at: https://pwi-e. com/led_dimming_control_system/

The LED lights have a three-year warranty and the controller has a one-year limited warranty.

PWI is the OEM for most King Air interior lighting. For more information, contact PWI at +1 (316) 942-2811 or contact sales at sales@pwi-e.com.



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-Henry Maier, President and CEO, FedEx Ground

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Weight Per a/c	288.8 lbs	268 lbs	313.8 lbs
тво	4500 HR. 72 Months	4000 HR. 72 Months	4000 HR. 72 Months
Noise	77.7 dB	80.4 dB))))	81.2 dB
Vmca Flaps Up	92 KCAS / 86 KIAS	96 KCAS / 91 KIAS	92 KCAS / 86 KIAS
In Field Repairable	Up to 1"	Up to 0.25"	Up to 0.25"
Quickest In Field Repairs	0	\mathbf{Q}	
In Field Blade Replacement	<u>()</u>		
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