King Air

A MAGAZINE FOR THE OWNER/PILOT OF KING AIR AIRCRAFT

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Perfect Platform

New Mexico Firm Moves from Management to Ownership with King Airs

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Making the

CSI Aviation, long-time management and logistics firm, starts Part 135 operation with King Airs

by MeLinda Schnyder

Pick an airframe – from a Boeing 737 to a Cessna 172 – and it's likely CSI Aviation, Inc. has experience with it during the company's 37 years as an aviation management and logistics company serving government and civilian customers. When CSI decided to expand as a Part 135 operator two years ago, that intimate knowledge simplified the purchasing decision. "It was a pretty easy answer to what airframe we wanted for the required missions," said Thomas J. Dunn, senior vice president of Business Development & Marketing. "The King Air is a phenomenal airframe, and the capacity and capability in hot, humid and high elevations fit our needs really well."

Move

CSI Aviation's King Air B300 is one of two King Airs owned by the company. The aircraft are based at Albuquerque International Sunport with a flight department that includes five pilots, a dispatcher, a director of maintenance and a chief inspector. (PHOTO CREDIT: RON ELLEDGE)

Adding the Part 135 certificate and purchasing two Beechcraft King Air aircraft is the latest expansion for a business that started by facilitating charter flights and has transformed into a global operation solving complex aviation requirements for air charter services, aviation logistics and program management.

From bus charter to air charter

Allen Weh, a career Marine Corps Reserve Officer with undergraduate and graduate degrees from the University of New Mexico, was organizing bus charters for collegiate football teams when one of the schools asked if he could help them charter an airplane. He discovered a market for coordinating athletic air charters to transport NCAA football teams to away games, and CSI formed in 1979.

Weh continued to use his military and business contacts to grow the charter business from its headquarters in Albuquerque, New Mexico. "Our charter skills steered us into government contracts and that led to more specialized programs within the government base, actually managing an entire program instead of just managing an individual charter. That led to aircraft leasing, setting up ground handling and other specialized services," said Marc Ramthun, CSI's senior director of Sales.

Through nearly four decades in business, CSI now offers a laundry list of capabilities that generally fall into the segments of transportation, logistics and management. Often they take on complex projects that involve every segment. CSI customers include Fortune 500 corporations, federal agencies, hospitals and medical service providers, athletic organizations, the film industry and other industries such as energy and oil and gas. CSI has provided products and services to dozens of federal entities for more than 20 years and was the first aviation management company to obtain a long-term contract through the U.S. government's General Services Administration Federal Supply Schedule program.

Weh, who retired a colonel after active service that included three wars, remains CSI's CEO. He has built a team that combines commercial aviation experience and military experience, both veterans and current military. About 40 percent of the 40 employees are veterans, representing each branch of the military.

"The uniqueness for our company versus others is that we are extremely diversified while being small. We're global and we operate at all levels of aviation," Dunn said. "We do everything from Part 121 program management to Part 135 program management and, now, our own organic-based 135 operations built around the King Airs."

Blueprint for a flight department

CSI won a contract about 12 years ago that required the company to provide medical flight services. After a decade of contracting aircraft and coordinating these flights for commercial and government customers, CSI decided to acquire its own aircraft.

"We really began to see a need for additional medical flight service providers," Ramthun said. "With New Mexico being a rural state, there were numerous flights in the state last year using fixed wing aircraft. We saw this high demand first-hand and, it was a natural fit for us to expand to provide medical flight services in our own state and the surrounding region."

Moving from being a program manager to starting its own flight operation was an easy transition, Dunn said. "We're currently managing over 10 large Part 121 aircraft – 737s and MD83s – basically running an airline with

CSI Becomes OEM with Seeker Light Observation Aircraft

In 2014, CSI Aviation, Inc. acquired Seabird Aviation, an Australian company that manufactures SB7L-360 series light observation aircraft known as Seekers. CSI owns Seeker Aircraft, Inc. and its wholly owned subsidiary Seabird Aviation Australia Pty, Ltd. Seeker Aircraft, Inc., oversees the manufacture, distribution and support of Seeker models worldwide with headquarters in Albuquerque, New Mexico.

The Seeker has a distinct design featuring a high, fixed wing with a rear-mounted pusher engine and forward crew seating in a helicopter-like cockpit that allows for 270-degree visibility. The two-seat aircraft is purpose-designed to make cost-effective surveillance missions. In addition to excellent cockpit visibility, it offers short takeoff and landing capabilities, seven-hour aloft endurance, easy maintenance in the field and is easily configured to accommodate surveillance and sensor equipment.

In June, the FAA and the Australian Civil Aviation Safety Authority (CASA) issued Normal Category Type Certificates to the Seeker series, allowing the company to sell the Seeker for commercial operations in addition to individuals for personal use. The company expects a dramatic increase in North American sales. Seekers operate around the world, including military missions in the Middle East, wildlife management operations in Africa and low level observation flights to assist ground surveillance by the New Mexico State Police.

CSI says Seeker aircraft offer surveillance and reconnaissance capabilities similar to helicopters but at a fraction of the acquisition and operating costs. Previously it was only manufactured in Australia, but this year Seeker Aircraft, Inc. began a partnership with Erickson, Inc. of Portland, Oregon, for the North American manufacturing operation. The plane sells for under $500,000.

The Seeker fleet. CSI owns Seeker Aircraft, Inc., which manufactures SB7L-360 series light observation aircraft known as Seekers. (PHOTO CREDIT: EDGAR CHAPARRO)

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CSI Aviation formed in 1979 as an air charter broker and has grown into a global operation solving complex aviation requirements for air charter services, aviation logistics and program management. They expanded to become a Part 135 operator in 2014, when they purchased a King Air 200. They added a King Air 300 in June 2016. (PHOTO CREDIT: CSI AVIATION)

these aircraft," he said. "We manage everything about those flights. Most are flying five days a week, eight hours a day and we procure all the fuel, set up all the ground handling, coordinate all the international permitting, provide crew rotation and travel, and manifesting. So this is second nature to us."

CSI acquired its first King Air 200 in 2014 and added a King Air 300 in June 2016. Both are capable of medical flight configurations and are also used for corporate and government missions, including passenger and cargo transport.

Assistant Director of Operations John Fishburn leads a flight department based at Albuquerque International Sunport that includes five pilots, a dispatcher, a director of maintenance and a chief inspector. "All of our pilots are either in the military now or retired military pilots, with an average of 2,000 hours in the aircraft," Fishburn said. "We have a lot of military and civilian experience in the King Air aircraft."

The 1986 King Air 300 has 8,500 hours and is equipped with Garmin G750/650. It is CSI's primary medical services configured aircraft. The 2001 King Air 200 has 3,200 hours and is Garmin G1000-equipped.

While the King Air 200 gives the team maneuverability, the King Air 300 expands their reach to the entire U.S. "The 300 has longer legs than the 200 and we can go up to 14,000 pounds," he said. "The more powerful engines allow us to climb over weather." A recent flight transporting two corporate clients from Albuquerque to Angel Fire was perfect for the smaller King Air. "The airfield at Angel Fire is 8,360 feet. The King Air performed excellent during the RNAV GPS 17 approach to Angel Fire, which is in a valley surrounded by mountains up to 13,161 feet. The King Air was an excellent aircraft to get in due to the narrow and short runway," he said.

For medical flight missions, the King Air aircraft are equipped with Spectrum Aeromed patient configuration and patient loading system, Spectrum Aeromed installed IV poles, stretcher bridges and custom medical equipment mounts. The King Air 200 operates weekly missions transporting local doctors and medical equipment to outlying rural communities for scheduled clinics.

"The King Air is the ideal aircraft and has the performance needed to operate in this area of the country," Fishburn said. "New Mexico presents unique challenges for aviation. We have unexpected weather conditions, mountainous terrain, remote airfields and short

CSI Aviation of Albuquerque, New Mexico, chose to start its own Part 135 operation with King Airs because of their capacity and capability in hot, humid and high elevations, as well as their flexibility to handle corporate shuttles, military missions and medical services flights. (PHOTO CREDIT: EDGAR CHAPARRO)

CSI Aviation won a contract 12 years ago that required the company to provide medical flight services. After a decade of contracting aircraft and coordinating these flights for commercial and government customers, CSI decided to acquire its own aircraft for scheduled and emergency medical services flights throughout rural New Mexico. (PHOTO CREDIT: CLARISSA DUBOIS)

CSI Aviation's King Air B300 is fully equipped with Spectrum Aeromed equipment. Medical services flights are operated with two pilots, one flight nurse, one paramedic, the patient and typically one to two family members. (PHOTO CREDIT: CLARISSA DUBOIS)

runways in many rural airports. Single-engine climb capabilities are important when flying in and out of these high-elevation airports – so we invested in safety and performance with the King Air."

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Balancing Your Backups

PART 1

by Matthew McDaniel

[Author's Note: This two-part series will discuss a variety of navigation system failures and abnormalities, with ideas for training and handling them. While this installment will deal primarily with management of GPS abnormalities, the next installment will focus on the utilization of other navigation systems in GPS failure situations.]

It was a blustery spring afternoon in Wisconsin. I was scheduled to fly from Milwaukee's Mitchell International Airport (MKE) to Central Wisconsin Regional (CWA) in a Beech 1900D Airliner. Most King Air pilots will recognize the 1900 as the "big brother" of the King Air 350 and the Beech 99. That day, I flew as a line check airman with a brand-new first officer who was conducting his first leg of Initial Operating Experience (IOE). The weather was gloomy with overcast skies, rain and stiff winds from the south-southwest. At the time, CWA had ILS approaches to runways 35 and 8, but no precision approaches to runways 17 or 26. So, while ceilings were low, a non-precision approach would be the order of the day and we expected we'd be doing the LOC BC 26 upon arrival, in spite of the stiff crosswind that would present.

Upon checking in with Minneapolis Center, we were asked which approach we preferred at CWA. We responded that we were planning on the LOC BC 26, but that we'd need to get a little closer to pick up the ATIS and hear which approach was being advertised. When that happened, we were surprised to learn that the localizer utilized for both the ILS 8 and the BC 26 had become inoperative and that the airport was now using the VOR/DME-A approach instead (via the DME Arc and Circle to Land 17). Swell!

Of course, we had the proper equipment onboard to execute the DME Arc entry, the VOR/DME approach itself, and to fly the circling maneuver for landing on Runway 17. We were also technically "proficient" in such procedures as proclaimed by our airline's documentation stating we'd passed our most recent Proficiency Checks (PCs), which always included non-precision approach and circling procedures. But in normal operations, even back then (in the 1990s), we flew a real VOR approach very rarely, a circling approach even less frequently, and a DME Arc procedure almost never (including during simulator training events). After a thorough approach briefing, I flew the procedure and landed without incident or fanfare. Suffice it to say, the new first officer got more lessons than he'd probably bargained for that day. Not the least of those lessons was understanding the importance of having navigational backups and the skills to utilize them. The 1900s we flew were not equipped with autopilots, but they did have digital flight directors that proved invaluable in such operational circumstances. We made good use of them and other resources when our anticipated navaids for approach to landing became unavailable.

In today's IFR environment, GPS has become our primary source for enroute navigation, and even terminal navigation for operators lucky enough to have approach certified GPS equipment. WAAS-enabled GPS equipment has added an additional level of GPS capabilities, as well. These awesome navigational tools have made the lives of pilots exponentially easier, but they have not eliminated the need for backup equipment and procedures. Plus, they have complicated matters by introducing multiple GPS failure/downgrade situations that pilots often do not fully comprehend. Plenty of scenarios still exist that would force pilots to disregard their primary navigation systems and, instead, utilize their backup systems for enroute navigation, terminal navigation or both. After all, GPS signals can be degraded or fail for a variety of reasons.

RAIM

Receiver Autonomous Integrity Monitoring (RAIM) is the best predictor of adequate GPS signal strength for

Figure 1: A typical FMS/GPS unit's predictive GPS (or RAIM) page. Note that it displays the flight's destination (top left), ETA (top right), and the predicted availability of terminal/approach level GPS coverage at the ETA and plus/minus 5, 10, and 15 minutes of the ETA (the green "Y" indicating "yes"). A RAIM check of a specific waypoint (other than the destination) could be manually selected, as well.

terminal operations at the ETA. RAIM predictions can be acquired a variety of ways, including from Flight Service, the FAA website, or via the RAIM Prediction feature built into many IFR-certified GPS and FMS units. While WAAS GPS receivers perform RAIM checks continuously, non-WAAS units only perform an automatic RAIM check prior to commencing an approach. For non-WAAS users, the FAA recommends pilots perform manual RAIM checks before departure and as often as feasible before flying a GPS approach procedure (Figure 1). Additionally, non-WAAS GPS users must perform RAIM prediction checks prior to flying T and Q-Routes (GPS-based airways), or RNAV Arrival and Departure procedures (SIDs, STARs and ODPs). WAAS users are exempt from those requirements, assuming they are operating in WAAS coverage areas. Not only do WAAS-certified GPSs check RAIM automatically (within WAAS coverage areas), but they will also annunciate any RAIM-related problems. In the event a RAIM check fails, GPS approach procedures are not approved and the pilot must resort to visual or other means of approach navigation (VOR, LOC, etc.). Assuming the flight was planned legally, there should always be a non-GPS approach available at the destination and/or alternate airport (or VFR conditions forecast) to ensure the flight can be completed in the absence of available GPS navigation. For more specific details on GPS navigation and RAIM, refer to the Aeronautical Information Manual (AIM), 1-1-19.

GPS Downgrades or Component Failures

Degraded GPS signals can and do cause RAIM warnings. However, RAIM is generally black or white, in that it is (or is predicted to be) within acceptable levels or not. If the prediction is outside acceptable RAIM level, that would immediately eliminate the option of conducting any GPS terminal or approach procedures. But, when operating with WAAS, multiple

leveled problems can occur. Most common with WAAS units is not a GPS navigation failure, but a downgrade in capabilities. WAAS operations require an increasingly precise level of GPS guidance for the various types of WAAS approaches. When a WAAS receiver determines it cannot meet the tolerances of, say, a Localizer Precision with Approved Vertical Guidance (LPV) procedure, it will then determine if it can meet the tolerances of a lesser type of GPS approach. If it can, it will "downgrade" and advise the pilot of the highest tolerances it is capable of. Most common would be a downgrade from LP or LPV capabilities to LNAV-only capabilities. In many such cases, the same approach can still be flown, but the higher LNAV minimums must be respected (due to the less precise lateral guidance and the lack of approved vertical guidance). That assumes, of course, the approach in question publishes both LP(V) and LNAV minima. If not, it is likely that a separate approach exists with LNAV minimums. Plus, while many WAAS avionics incorporate for-reference-only vertical guidance into LNAV procedures (LNAV+V), both approved and reference-only vertical guidance is removed whenever the system determines a downgrade is required. It is imperative that WAAS GPS users brief each approach with the possibility of a signal downgrade in mind (Figure 2). Such downgrades will often not be detected until the Final Approach Fix (FAF) becomes the active waypoint and the GPS unit alerts the pilot of the downgrade

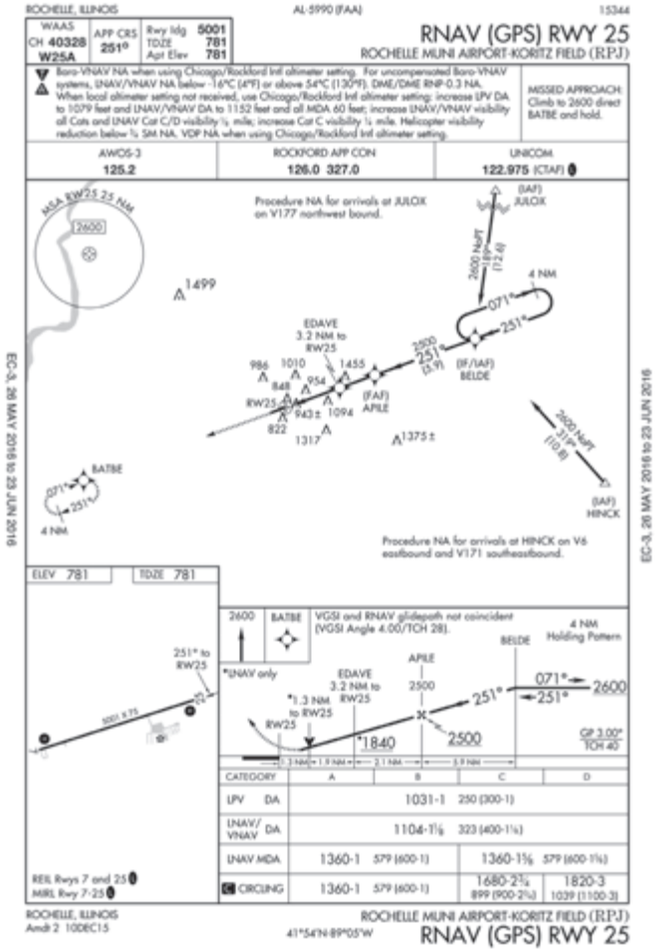


Figure 2: The RNAV (GPS) RWY 25 approach into Rochelle, IL (KRPJ) is a typical WAAS-type approach with multiple sets of minimums. While LPV minimums are published, if the WAAS service level is downgraded for any reason, the most common result would be a "Downgrade to LNAV" message. The approach could still be flown, using the published LNAV minimums, but no vertical guidance should be expected.

(and/or the Course Deviation Indicator (CDI) sensitivity is annunciated as "LNAV" versus the expected "LP" or "LPV"). This is not the time to re-brief the approach and fly it as a downgraded procedure. Better to abandon the approach and start fresh, briefing the downgraded or alternate approach procedure to be used subsequently. In the rare event that a downgrade or RAIM-induced failure occurs inside the FAF, the IFR-certified GPS will continue to function to the best of its ability for five minutes thereafter to give the pilot an opportunity to safely initiate a missed approach procedure.

To practice dealing with such procedures, find a knowledgeable CFI and/or simulator instructor who's well versed in creating such scenarios with the equipment in your aircraft. Most WAAS-enabled GPS units (whether independent, part of an FMS unit or incorporated into an integrated avionics system) allow WAAS features to be manually de-selected. An instructor knowledgeable in your navigation system should be familiar with a variety of ways to force degraded capabilities and ways in which you can best utilize the capabilities which remain.

One requirement of stand-alone IFR GPS installations is an external/separate CDI for each GPS unit. These external CDIs are usually incorporated into a Horizontal Situation Indicator (HSI), Electronic HSI (EHSI), or traditional Nav-Heads (combo OBS/CDI instruments). They must be installed within the scope of a "normal instrument scan." However, in the event of an external CDI failure, most stand-alone GPS units incorporate an internal digital CDI. While this CDI is not approved for primary navigation purposes, it can be used in lieu of the external CDI in emergency situations. For emergency and abnormal situations that might call for it, GPS users should know how to make their system display its backup CDI, how to determine its lateral limits (needle sensitivity), and how that CDI may or may not be coupled to installed Flight Director (F/D) and/or Autopilot (A/P) systems. Modern integrated flight deck systems need not have external CDIs, as those systems have built-in redundancies that traditional panel-mounted GPS installations do not. Such systems generally have multiple GPS units, with each unit capable of displaying its navigation signal on multiple pilot-selectable CDIs and bearing pointers. While this lessens the chance of single-point failures in such advanced systems, pilot proficiency in system programming is vital when dealing with abnormalities that require using secondary navigation sources and/or non-standard arrangements of navigation instruments/indicators.

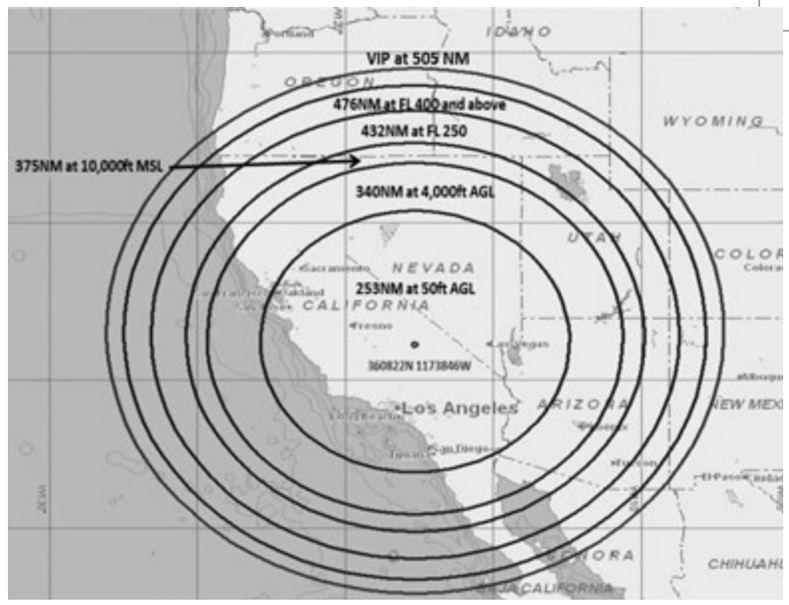


Figure 3: A portion of FAA Flight Advisory CHLK 16-08 advising of GPS testing causing unreliable or unavailable GPS signals over a huge area and altitude spectrum across the southwestern United States.

Complete GPS Loss

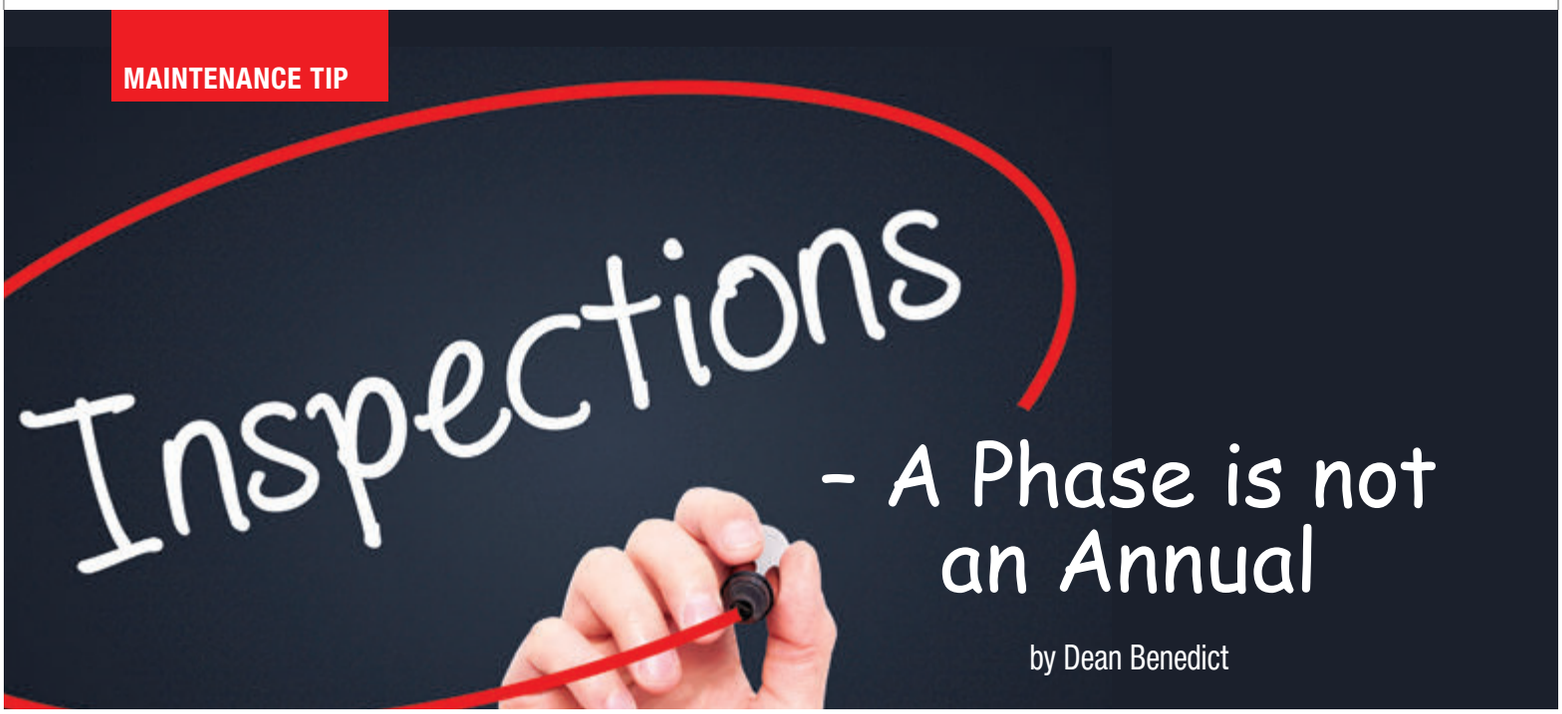
GPS is also subject to inference, rendering signals unreliable or unavailable. Such was the case throughout most of June 2016 in a multi-state area in the southwestern United States, due to GPS testing periods. In those instances, the FAA issued a Flight Advisory (Figure 3), as well as multiple NOTAMs related to the times, areas, and altitudes of the GPS outages.

Complete GPS failures are rare, to be sure, but no electronics are failure proof. Individual GPS units can lose power, become overheated, or simply stop functioning. Often, modern GPS units are components of an integrated avionics unit. Thus, the failure of such an integrated unit induces the failure of the GPS it contains. GPS receivers that are not experiencing power or heat problems, can still be rendered inoperative by losing communications with their antenna via loose or broken connections or through software glitches. Obviously, any such failures would require the pilot to consult backup navaids. While such backups often include secondary GPS units, that would not help in situations of shared antennas, identical software bugs, satellite outages, external avionics cooling fan failures, GPS interference or testing, or the loss of shared power sources. Thus, reverting to "old school" forms of navigation will sometimes be the only options left.

In Part Two, we will discuss several forms of non-GPS backup navigation and how to incorporate them into your typical missions in order to maintain proficiency in their use. KA

Matthew McDaniel is a Master & Gold Seal CFII, ATP, MEI, AGI & IGI. In 25-plus years of flying, he has logged over 16,000 hours total, over 5,500 hours of instruction-given, and over 2,500 hours in the King Air and BE-1900. His company, Progressive Aviation Services, LLC, (*www.progaviation.com*), has specialized in Technically Advanced Aircraft and Glass Cockpit instruction since 2001. Currently, he also flies the Airbus A-320 series for an international airline and holds eight turbine aircraft type-ratings. Matt is one of less than 25 instructors in the world to have earned the "Master Certified Flight Instructor" designation for seven consecutive two-year terms. He can be contacted at (414) 339-4990 or *matt@progaviation.com*.

MAINTENANCE TIP



– A Phase is not an Annual

by Dean Benedict

Any time an aircraft broker calls me about a pre-buy inspection and asks, "How much would an annual cost for a King Air?", it makes me wonder if this is their first shot at selling one.

A few months ago, I was invited to speak at the local Flight Standards District Office (FSDO) for their Inspection Authorization (IA) renewal class. My audience was full of A&Ps renewing their IA certificates, plus half of the people from the FSDO was there for the free food. Afterwards, while chatting with the attendees around the refreshment table, one guy asked me how many signoffs I get each year for my own IA renewal. I said it averaged around five to eight per year. "Really? I figured you'd have a lot more with all those King Airs you do!"

King Airs Don't Get "Annual Inspections"

As soon as I said King Airs don't get annual inspections, he cut me off abruptly and declared loudly, "Every aircraft must have an annual inspection per FAR 91.409(a)(1). Do I need to show you?" Suddenly this casual conversation was going ugly.

As I paused and took a deep breath, I mentioned the numerous exceptions and options that follow 91.409(a)(1) for nearly two full pages. Ultimately he realized that the King Air Phase Inspection program is a factory-recommended program per 91.409(f)(3). This is acceptable in lieu of an annual inspection, and an IA certificate is not required for the logbook signoff.

I received my IA certification in 1985 and have always had more than enough eligible signoffs for automatic renewal from the FAA – Dukes, Barons and Bonanzas make up the bulk of them. The only time I list a King Air on my IA renewal summary is when I have Form 337s (Major Repairs or Alterations) to report.

I've been working with aircraft owners transitioning from the piston to the turbine world for 45 years. I help wean them off of the annual inspection idea and get them thinking in terms of phase inspections, special inspections, and tracking cycles in addition to hours.

King Airs have special inspection items due at a variety of calendar intervals – 12, 24, 30, 36 months, etc. Just because something is due every 12 months doesn't mean it's the equivalent of the annual inspection required by piston-powered aircraft. I'm surprised when people, who I think should know better, call everything an annual. It's a nomenclature issue.

Normally I don't kick up a fuss about nomenclature and proper language, but this one is a sticking point for me. So remember: King Airs don't get "annual inspections," but they all need some kind of maintenance on an annual basis.

Why can't I just get a Phase I-IV every other year?

You can! Beech calls it the "Biennial Inspection Program." There are three requirements to be eligible for this program. First, if you are flying less than 200 hours in a 24-month period, an average of 8.5 hours per month, or less (this program is for low-usage King Airs). The second requirement is an interim inspection at the 12-month mark in alternate years between the biennial Phase I-IV. There's a checklist for it in the maintenance manual; essentially, it's a thorough operational check on the aircraft. Obviously, any discrepancies noted must be remedied. The third requirement is a declaration in your logbooks that the aircraft is on the Biennial Inspection Program. You can't go two years without a phase and then suddenly decide you are doing the biennial program.

I don't come across a lot of King Airs on the biennial program, but when I do, they are usually in bad shape. Oftentimes the interim inspection hasn't been done; or if it has, it's been pencil whipped. Special inspections are ignored or glossed over. Too many owners think it's

a Phase I-IV every other year and little else. If you follow the biennial program *correctly* with interim inspections, special inspections, etc., it doesn't save much money in the long run. I'm not a fan.

I've had many low-usage customers that could qualify for the biennial program, but they choose the Alternate Phase Inspection Program – two phases each year, completing all four phases in a two-year period. When the owners go to fly their King Air, they want to have confidence in it. They prefer an airplane that is looked at regularly and thoroughly. The *less* they fly, the *more* they want this assurance.

Whatever inspection program you are using; it should be declared in your logbooks. I wrote about maintenance inspections back in 2010, but I find myself discussing it every day.

The 200-hour Phase Inspection Program

High-use King Airs must have a phase inspection every 200 hours. A King Air that flies around 33 hours/month or more is going through a phase inspection every 200 hours. That high usage rate will get through all four phases within a 24-month period. Completion of the four phases every two years is a requirement for all King Airs, no matter how much or how little it flies.

When average usage fluctuates between 16-17 hours/month and 32-34 hours/month, you have got to keep an eye on when that 24-month deadline comes around. An example of a King Air averaging 22 hours/month: It has its Phase I inspection and flies 200 hours, which takes about nine months.

It goes through a Phase II and flies another 200 hours over nine more months. Now it's 18 months into the 24-month period for all four phases. The Phase III can be completed and put down again after six more months for the Phase IV; or the Phase III and IV can be done

right then, and the aircraft would not have to be down for another 200 hours (obviously, the 24-month parameter resets from that point). Either choice is acceptable, but the latter saves downtime.

The Alternate Phase Inspection Program

The majority of King Airs out there (Part 91, at least) are on the Alternate Phase Inspection program mentioned previously. Provided your average usage stays around 16.5 hours/month or less, you qualify for this plan. Since you're doing two phases every year, it may *seem* like an annual inspection on a piston aircraft, but it's not. The four phases are *not* identical. Each phase has a checklist of items to be inspected and plenty of items show up on every one, but then there are items for each inspection that are unique to that phase.

All the other Stuff

Besides the Phase Inspection Program, King Airs have a plethora of items/components subject to Special Inspection, Overhaul or Replacement. Some are calendar-based, such as the hydrostatic test on the oxygen bottle, due at 36 or

60 months depending on the bottle. Some items are hourly based, such as the instrument air filter 600-hour replace or the 1,000-hour starter generator overhaul. Others are cycle-based, such as the 5,000-cycle flap flex shaft replace.

Major items like landing gear, props and engine maintenance are all in addition to whatever phase program you are using. If one or both of your engines are on the M.O.R.E. program, you've got even more engine maintenance requirements specific to that program that need compliance. It's all got to be done.

Don't Forget your POH!

STCs have operational and maintenance requirements – some are quite vital, such as the difference in prop idle when four-blade props are installed. All STCs come with Instructions for Continued Airworthiness (ICA) which are placed in the POH. The ICA gives the pertinent maintenance requirements. That's got to be done too.

Bring the Logbooks to Maintenance

I can't emphasize enough that even if you return to the same shop every time, the mechanic needs those logbooks and your POH for reference. Inevitably, when the logbooks aren't there, something pops up on inspection and your mechanic needs to research something. It's a real pain when they aren't brought to the inspection, so please remember them.

This discussion has been focused mostly on the Part 91 crowd. Although elementary in nature, it never hurts to review the basics. Per FAR 91.403(a), "The owner or operator of an aircraft is primarily responsible for maintaining that aircraft in an airworthy condition…" That said, I wish you many happy and safe hours in your King Air! KA

Dean Benedict is a certified A&P, AI, with over 40 years of maintaining King Airs. He owned and managed Honest Air Inc., a maintenance shop specializing in Beech aircraft with an emphasis on King Airs, for 15 years. In his new venture, BeechMedic LLC, Dean consults with King Air owners and operators on maintenance management, troubleshooting, pre-buys, etc. The Honest Air operation merged with Apex Aviation (KHND) where Dean oversees all King Air and Beechcraft activity. He can be reached at *drdean@BeechMedic.com*.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Latest Aviation News

by Kim Blonigen

Congress Passes FAA Funding Extension

The House and Senate passed legislation extending funding for the FAA through September 30, 2017, as Congress continues to debate a full FAA reauthorization bill. The extension bill, which was signed into law by President Obama on July 15, includes several priorities advocated for by the general aviation community, while rejecting controversial proposals for creating a privatized air traffic control system, funded by user fees.

NBAA President and CEO Ed Bolen responded to the bill by saying, "Although a long-term FAA reauthorization bill that included important certification reforms would have been the best outcome in this debate, we commend House and Senate leaders for recognizing that resources must continue to be provided for the agency's critical safety, infrastructure, modernization and other programs."

Bolen also said that the FAA reauthorization debate is far from over, and much work remains to ensure the U.S. has the largest, safest, most efficient and diverse transportation system in the world. First and foremost, remaining fit for the fight on ATC privatization, when it reemerges.

Registration Open for Annual Safety Standdown

The 20th annual Safety Standdown in the United States being held September 27-29, 2016 in Wichita, Kansas is now open for registration and space is limited.

Safety Standdown is a global, year-round program that promotes knowledge-based aviation safety training along with personal discipline and responsibility as essential elements of aviation professionalism and safety. Bombardier initiated and continues to sponsor the Standdown, which includes training seminars and workshops that are free and open to all pilots, crewmembers, maintenance technicians and managers regardless of aircraft or manufacturer, on a first-come, first-served basis.

For those who can't attend in person, Bombardier will be live webcasting the general sessions and select workshops. Remote attendees can also interact and ask questions of presenters in real time.

For a specific agenda and more information on the Standdown, or to register, go to *www.safetystanddown.com*.

Aircraft Management Fee Tax Relief Bill Approved by House Panel

The U.S. House Ways and Means Committee approved a bill that clarifies that aircraft management fees are not subject to the 7.5-percent air transportation tax, making it clear that management services provided to assist an aircraft owner in the operation of its aircraft are not subject to the ticket tax imposed on commercial air transportation. The approval clears the bill for full House consideration. KA

TAWS Procedures

by Tom Clements

For a few years now, all King Airs with six or more installed passenger seats are required to have a Terrain Awareness and Warning System (TAWS) onboard and operational. This is a stand-alone system in some installations and is integrated into the GPS navigator in other installations. I have a homework assignment for you: Go to the *Supplements* section of your King Air's POH and find, then read, the supplement dealing with your exact system. After doing this, I bet you will discover a few things you did not know or had forgotten. There's good info there!

If TAWS is a part of your latest, greatest, factory-installed Pro Line or Fusion system, its description can be found in the *Systems* section of the POH, not in the *Supplements* section.

Thanks to space shuttle flights, the entire earth has been mapped in great detail and that detail can now be included on a tiny chip in your TAWS unit. Amazing! GPWS – Ground Proximity Warning System – a system that preceded TAWS, was primarily based on radar altimeter readings so it knew your height above the ground right beneath you and it could calculate your rate of closure to terra firma. But it had no look-ahead capability – it couldn't see that cliff looming up ahead – and it also lacked an airport database. But by combining a chip with knowledge of all terrain and airports with an exceedingly accurate GPS navigator that knows the airplane's exact position both horizontally and vertically, as well as the track and speed of the airplane, it is now possible to look well ahead and to accurately predict whether the existing flight path is safe or not safe. EGPWS – *Enhanced* GPWS – is the name Honeywell assigned to their version of this advanced system. The FAA and other manufacturers use the moniker TAWS.

There would be absolutely no reason for a TAWS system if pilots never made mistakes! It's only when scud-running suddenly turns into solid IMC, or when a pilot misreads a chart and descends too soon, or when a pilot fails to follow the assigned flight path that TAWS is a necessary life-saver. Let's face it, we are human and humans can and do make mistakes. CFIT – Controlled Flight Into Terrain – has been a consistent leader of reasons for aviation-related fatalities and TAWS is a Godsend that helps reduce the likelihood of this cause of death. Will it ever completely eliminate CFIT? I doubt it because mistakes will still be made, but it surely improves the odds of survival by a huge amount.

How about giving yourself a little educational fun? On your next deadhead leg in excellent visual conditions, head directly for a convenient mountain. Oh, you don't have one of those in Kansas, you say? In that case, just casually descend toward a wide open wheat field with no farmer nearby. I want you to actually experience both a TAWS Caution and a TAWS Warning in your exact airplane. This will always include verbal calls and in most installations it will include a visual presentation of the dangerous terrain. The caution you will hear probably is this: "Caution, Terrain! Caution, Terrain!" If we ignore that and continue toward the danger, then we should hear a warning: "Terrain ahead! Pull Up! Terrain ahead! Pull Up!" Now remember, we are doing this in good weather with plenty of visibility and we have an easy escape route, right? Right!

Descending toward the Kansas wheat field, the Caution we hear may be "Too Low! Terrain!" Continuing our descent will then lead to the "Terrain ahead! Pull Up!" warning as before.

Your system's instructions will tell you that using the visual display to steer toward lower ground is not the correct procedure. Sometime you may have a system without a visual display or else it is malfunctioning. So the proper procedure is to climb like a homesick angel! Now is the time to use your *four friends* – Power, Props, Flaps, Gear – and get the heck away from the terrain. In the majority of the cases, your airspeed will likely be quite high … cruising or descending. Also, your prop levers will probably be set for cruise RPM and your flaps and gear will be retracted. But not always. **So always do all four steps:** Power levers aggressively forward to torque or temp limits. Prop levers smoothly forward to the stops for maximum propeller speed. Flaps: Make sure they're up. Gear? Same thing.

And as you are doing these steps be honking back on the control wheel to get the airplane into an optimum climb profile. Now is not the time to bring the nose up to 12 or 15 degrees and to wait for Vx to be achieved. No! Pull that sucker up to 25 degrees! Only when you see the airspeed approaching 120 KIAS should you drop the nose to maintain that speed … probably the 12 to 15 degrees I mentioned before.

Now if you are exceptionally sharp and know the exact Vx number that is correct for your airplane, your weight, and your existing altitude, wonderful! Go for that number! But, dear readers, if you target 120 KIAS

for every King Air ever built, you won't be too far off. It's simple, it works, and it provides a comfortable margin above stall speed.

Yes, there may be that one-time-in-a-hundred in which the caution or warning activated when airspeed was not high. If you are already near 120, then obviously you cannot convert a lot of kinetic energy into potential energy by zoom-climbing out of trouble. Now the nose will indeed need to stay near 12 degrees as you complete the four friends procedure.

If you are uncomfortable experiencing this practice scenario by yourself, then seek an experienced instructor to fly with you and/or request a TAWS scenario during your next simulator session.

I believe that practicing the terrain evasion maneuver is important to ingrain the proper steps into your memory and to experience the actual zoom-climb. However, knowing what's to come and being prepared to conduct the proper steps bears very little resemblance to the state of mind that will likely exist when you hear that caution for the first time while in IMC. It is common to have an initial reaction of "Wait, that can't be right! I know I am at a safe altitude according to this approach plate. I wonder why it's squawking at me?!" That reaction, friends, can get you killed.

Remember: Humans make mistakes. Maybe today you are making one of yours, and maybe it is about to have a tragic ending. The proper, safe, reaction is *always* to quickly and properly execute the terrain evasion maneuver. Analyze why the caution or warning occurred *later* … and, yes, maybe it was indeed an error. But *now*, climb like a space shuttle launch!

TAWS includes some neat features that are not always dependent upon imminent terrain impact. It announces when you are 500 feet above the landing runway or the terrain below you. It chastises you if you deviate too much below a glideslope. It has a "Don't sink" call if the after takeoff flight path starts going down instead of up. It also includes cautions caused by being close to landing without gear and flaps extended. You should know how to disable the flap caution when you are executing a low ILS approach to a long runway and have decided to land with approach flaps.

In fact, you should know how to disable the entire system! There are two cases in which this is so desirable as to be nearly mandatory. First, landing at some private ranch strip that is not in the TAWS airport database will yield a myriad of cautions and warnings that are nothing but distracting to you and scary to your passengers. Second, giving your passengers a nice, calm air tour of some alpine mountaintops or deciding to cruise down a remote isolated coastline only a few hundred feet above the sand … the pleasure of these types of airborne adventures is rapidly lost when all you hear are incessant cautions and warnings!

One last comment: The earth's surface – the terrain map that the TAWS contains – does not change much (at least we hope that's the case!) so the need for regular and often database updates for new terrain does not exist. On the other hand, many items in the database do indeed change: perhaps a new airport is built, existing airports change as runways are added or removed, previous database errors are corrected, obstacles – also in many databases – can and do change as new towers are erected or old ones are demolished. Thus, updating the TAWS database in accordance with the POH Supplement's instructions is important. If no guidelines are given, I recommend getting it done no less than annually.

TAWS is indeed a lifesaver … but only if pilots heed its messages and execute the correct procedures. Fly safe! KA

King Air expert Tom Clements has been flying and instructing in King Airs for over 43 years, and is the author of "The King Air Book." He is a Gold Seal CFI and has over 23,000 total hours with more than 15,000 in King Airs. For information on ordering his book, go to *www.flightreview.net*. Tom is actively mentoring the instructors at King Air Academy in Phoenix.

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

Wichita Builds the B-29

During 1943-1944, the "Peerless Princess of the Prairie" became the epicenter of Boeing's struggle to give General Henry H. "Hap" Arnold the Superfortress bombers he needed to inflict horrific destruction upon the homeland of Japan.

by Edward H. Phillips

The Imperial Japanese Navy's surprise attack on the United States military base at Pearl Harbor, Territory of Hawaii, on December 7, 1941, galvanized isolationist America into the most formidable arsenal of war the world had seen up to that time. Although President Franklin D. Roosevelt believed Hitler's Third Reich in Europe was the Allies' primary adversary, he realized that the fight against Japan would have to be waged across the vast expanse of the Pacific Ocean. America's goal, set forth in Roosevelt's famous speech before Congress on December 8, was total victory over Germany, Italy and Japan.

As 1942 began, the United States was swept up in the process of rapidly transitioning from a nation at peace, to a nation at war on a global scale. Wichita, Kansas, had been building military airplanes since 1940, with Beech Aircraft Corporation, Boeing-Stearman, Cessna Aircraft Company and other smaller firms already hard at work when the first bombs fell upon Pearl Harbor's "battleship row." The military training aircraft being built in the city played a critical role by training thousands of much needed pilots, bombardiers, navigators and gunners as the Army and Navy expanded by leaps and bounds to "get men to the front" and start fighting the enemy.

Of all the weapons of war produced by the United States, one would emerge to stand tall above the others – the Boeing B-29 *Superfortress* heavy bomber. Although designed to operate at very high altitudes, the B-29's most difficult mission would be fought on the plains of Kansas as Boeing struggled mightily to compress a five-year program into three, while making major modifications to the airplane on the assembly lines in Wichita. By war's end, nearly 4,000 *Superfortress* bombers had been produced by three airframe companies – Boeing, the Glenn L. Martin Company and Bell Aircraft. The bombers built by these manufacturers eventually equipped 40 strategic bombing groups (21 located at forward combat bases) with more than 2,100 aircraft. During 1944-1945 raids by hundreds of the bombers would unleash death and destruction upon Japan's major population centers, killing people by the tens of thousands and burning entire precincts to the ground. Finally, in August 1945, a lone B-29 would deliver the knockout blow that finally brought Japan to its knees and ushered in the Atomic Age.

First, however, some background on the B-29 program will be helpful in setting the stage for Wichita's role in the overall initiative. Design and development of the *Superfortress* began in 1939 when the Army Air Corps expressed its interest in a new heavy bomber to replace the B-17 "*Flying Fortress*" that had entered full-scale production. At the War Department in Washington, D.C., the Air Corp's boss, Major General Henry H. "Hap" Arnold, appointed Colonel Walter G. Kilner to form a committee to establish exactly what the Air Corps wanted in its next-generation heavy bomber. Late in 1939 Arnold received approval to

The *Superfortress* bristled with defensive armament, including four turrets with 0.50-caliber machine guns with 11,500 rounds of ammunition, and a 20mm cannon in the tail with 100 rounds. The turrets were remotely controlled through a sophisticated system of scanners. (WICHITA STATE UNIVERSITY LIBRARIES, SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES)

More bad news for Japan. A B-29 emerges from Plant II in preparation for combat readiness checks. Laboring in two, 10-hour shifts, Boeing workers were completing 4.2 bombers per day in 1945. Of the 35,000 people dedicated to manufacturing the B-29, 40 percent were women. By October 1945, Boeing had built 1,644 of the heavy bombers. (WICHITA STATE UNIVERSITY LIBRARIES, SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES)

proceed with the proposal and invited the Boeing Airplane Company, Douglas Aircraft Company and the Consolidated Aircraft Corporation to submit designs.

Of these three, Boeing's Model 341 and Consolidated's XB-32 were declared winners, but priority was given to the Model 341 with Consolidated's design serving as a backup in case Boeing faltered. A key feature of the Model 341 was its wing design that combined the high-speed, low-drag, long-range characteristics of the Davis airfoil that already equipped Consolidated's B-24 bomber. The Boeing wing would add large flaps along the trailing edge that would help generate lift for takeoff as well as provide optimum handling qualities at low approach and landing airspeeds. The disadvantage of the wing, however, was its high loading of 69 pounds per square foot of area.

In addition to the new wing, Boeing engineers planned to incorporate a modified version of the empennage installed on the B-17E. The long, slender and circular fuselage was designed to contain three pressurized compartments while the bomb bay, which could accommodate up to 10 tons of bombs, would remain unpressurized. The R-3350 static, air-cooled radial engines selected to power the B-29 were built by Wright Aeronautical Corporation and featured 18 cylinders capable of producing 2,200 horsepower. In 1939, the R-3350 was among the most sophisticated and powerful piston engines available in the United States, and derived its power from high compression ratios, higher RPM and supercharging that produced nearly one horsepower per pound of weight. By the end of 1939, Wright Aeronautical had built less than 100 of the engines and problems with cooling soon appeared and persisted for the next four years. The R-3350 radials installed on production bombers turned massive four-blade propellers built by Hamilton Standard.

By September 1940, the Air Corps had approved Boeing's design and gave the company permission to proceed. One year later, as the war in Europe continued unabated, Boeing received an order for 250 bombers. That order was doubled six months later. The XB-29 first flew in September 1942 with veteran Boeing test pilot Eddie Allen at the controls. Although the new bomber flew well, the R-3350's cooling problems continued, causing multiple engine failures early in the flight test program. A second prototype B-29 crashed into a factory building in December 1943 after an engine fire raged out of control. Eddie Allen, the entire flight crew and 19 people in the building, died.

General Arnold ordered a thorough investigation, which revealed that the intake and exhaust valves in certain cylinders were prone to overheating that caused the valve heads to separate from the valve stems. The debris was ingested into the engine and often caused a fire that, if not extinguished, spread to the magnesium alloy accessory section, which burned fiercely and weakened the main spar, burning through it in some cases. Meanwhile, the XB-29 and YB-29 prototypes continued to fly but were still beset with a long list of engine problems, including unsatisfactory cowl flap performance, rerouting of oil lines and tubes, redesign of intake and exhaust valves and many other issues too numerous to mention.

Meanwhile, Boeing was orchestrating a three-phase program for the B-29: Not only was the remaining XB-29 built ***without*** the benefit of detailed engineering drawings and parts, but the design, tooling and flight testing were all being conducted ***simultaneously***! America's entry into World War II was still six months away, but the rush was on to get the Superfortress into production. To make matters worse, the Air Corps demanded costly and time-consuming changes and revisions to changes that hampered progress. In addition, political pressures were mounting, beginning with the White House all the way down through Congress to General Arnold. As time passed and the B-29 was not yet ready for production, it was Arnold's unwavering confidence in Boeing's bomber that kept the program alive.

The evening of May 17, 1941, found Julius Earl Schaefer, general manager of Boeing-Wichita, talking on the telephone with a reporter. Schaefer was stunned to learn of a national effort to build $100 million-worth

of airplanes, many of which would be built in Wichita. It was the first time Schaefer had heard the news, but the next morning he received an official directive from the War Department directing him to purchase, with the utmost haste, "jigs, dies, fixtures and all critical materials essential to production of the B-29 at Wichita." As if that revelation was not stunning enough, the directive added that delivery of the first airplane was scheduled for February 1, 1943, only 21 months away.

The shocking news came at a time when the Wichita Division of Boeing was unprepared to tackle anything the size and complexity of the *Superfortress*. The factory was already hard-pressed to deliver hundreds of PT-13-, PT-17- and N2S-series primary trainers that were desperately needed by the Air Corps and the United States Navy to train pilots. Far more shocking, however, was that no facility existed to build the B-29. Schaefer's situation could be summed up like this: Wichita had been called upon to obtain tooling that did not exist, install them in a phantom factory, manufacture the world's most sophisticated bomber whose design and systems were constantly in flux, and build it with non-existent, unskilled labor that had no training or experience for such a task. Furthermore, General Arnold and the Air Corps wanted the first B-29 delivered on-time, or better yet, ahead of schedule.

The challenge facing Boeing-Wichita was breathtaking. To succeed, Schaefer and his management team would have to declare "war" on the B-29 itself. Wichita had been selected as the site to build the super bomber because it was located in the nation's heartland, safely away from both coasts and enemy attacks. The B-17 was in production at Boeing's main factories in Seattle, Washington, and there was no room there to handle production of the giant bomber. Southern California was already busy with aircraft manufacturing, and the East Coast was not a candidate. Fortunately, Boeing's Wichita team had a nucleus of personnel that could tackle the task. Still, the Air Corp's rigid timetable coupled with the sheer scope of the program caused many people to doubt it could be done.

The first step was building a factory whose square footage boggled the imagination. In June 1941, ground was broken for a huge manufacturing and assembly complex designated as Boeing-Wichita Plant II. After the attack on Pearl Harbor in December, the pace of construction accelerated significantly and the initial part of the factory was completed by the Cleveland,

General Henry H. Arnold shakes hands with J. Earl Schaefer on January 11, 1944, at Boeing's sprawling Plant II facility in Wichita, Kansas. Next to them is B-29A number 175 – the last bomber Arnold wanted to activate the 20th Air Force. Arnold's inscription on the fuselage reads: "The end of a good job splendidly done, thanx from the AAF." On November 11, 1944, the crew was forced to land the bomber in the Soviet Union and remained there until the end of the war. Arnold's B-29, however, eventually served as a template for the Tupolev Tu-4 heavy bomber. (WICHITA STATE UNIVERSITY LIBRARIES, SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES)

Ohio-based Austin Company in January 1943. As fast as Austin Company employees finished one area within the facility and began another, Boeing moved in and began installing the first of 130,000 pieces of tooling. When Boeing finally took possession of Plant II, the Austin Company had built more than 2.8-million square feet of floor space – almost 180 acres – all under one roof.

It should be mentioned that all of the feverish activity in Wichita caught the attention of Air Corps General K.B. Wolfe, who telephoned Schaefer in June 1942 to inform him that in addition to building a factory for the B-29, Boeing-Wichita had been chosen as prime contractor to build 750 Waco CG-4A troop gliders. Schaefer would, however, receive help from Walter Beech and Dwane Wallace who led the Beech Aircraft Corporation and the Cessna Aircraft Company, respectfully. Their combined workforces would build subassemblies and ship them across town to Boeing-Wichita for final assembly. Wolfe got his 750 gliders, on-time and ready for the D-Day invasion of Adolf Hitler's "Fortress Europe" two years later.[1]

What Julius E. Schaefer needed next was people to build the B-29. The call went out from coast to coast for patriotic Americans to leave their families, their homes and their professions and relocate to Wichita – fast! They came by the thousands from every state in the Union – housewives, church pastors, taxi cab drivers, farmers, oil field workers, clerks, and teachers, to name only a few occupations. Last but not least, they were willing to work a minimum of 80 hours a week. Many were native mid-westerners. Few of those who arrived in the "Peerless Princess of the Prairie" in 1942 and 1943 knew anything about airplanes, radial engines, propellers, tooling, materials and the thousands of processes involved in building a super bomber.

Workers were trained in special classes based on their demonstrated abilities and were quickly sent to the production line. Although some people were assigned to build the PT-13 and PT-17 trainers, the majority went to work on the B-29. To house the new workforce, Boeing, the Army and the City of Wichita rapidly erected what amounted to military barracks that offered only the bare essentials of home. Many communities in the surrounding area also helped by improvising living quarters and taking in boarders. Merchants kept their shelves stocked with necessities, and shuttle service took laborers to and from Plant II.

Gradually, the back shops began to hum with activity as thousands of parts began flowing into the main assembly area. A large number of these parts were fabricated by hand because tooling and fixtures had yet to be delivered. Quality, however, did suffer and was reflected in the fact that the empty weight of some bombers was hundreds of pounds higher than others, chiefly because of variations in materials, processes and manufacturing tolerances. It is important to remember that Boeing was still making changes to the airplane's design while Plant II workers were trying to build airplanes.

In addition, the B-29 was not only the largest airplane to be manufactured in Wichita, it also was pressurized, and that technology presented its own set of unique challenges. Special seals around the cockpit windows and gun sighting blisters had to be matched perfectly to prevent air leaks, and it took workers time and plenty of mistakes to determine exactly how it had to be done. The wing was another area plagued by design difficulties during the early production phase. In Seattle, Boeing engineers scheduled static tests of the wing structures while wings for the initial batch of bombers were being built in Plant II. In the wake of the static tests, modifications to the wings were ordered, resulting in chaos on Plant II's sprawling production line as workers struggled to incorporate the changes with a minimum of disruption. New tooling for the wings was eventually built and sent to Wichita, but production continued to be hampered by further changes until the final specifications were implemented.

Plant II was a massive enclosure, but the ramp outside boasted more than 1.5-million square feet and soon became "home" for bombers awaiting modifications. In the winter of 1943-1944, the temperature often dipped well below freezing, and occasionally, driven by a bone-chilling wind chill factor, fell below zero. Yet, the work went on and the work was done despite the harsh conditions. More than 1,200 technicians were pulled off the assembly lines and sent outside to complete modifications to the bomber's airframe. The lessons and pitfalls of mass production were being learned the hard way by Boeing-Wichita. A new bomber that was supposed to have a five-year development and testing period ***before*** production began, was being designed, developed, tested and manufactured in only 36 months, all with a largely unskilled/semiskilled workforce, and before final engineering drawings and blueprints had been delivered to Plant II.

Another major problem centered on faulty electrical connectors, commonly called "cannon plugs," that featured multiple contact points and facilitated electrical connections throughout the B-29's 10 miles of wiring. After assembly, the plugs often failed but had worked perfectly during sub-assembly tests. The problem was traced to vibration on the ground and in flight that caused the metal pins to come loose. Once a fix had been developed, workers removed, rebuilt and reinstalled approximately 586,000 plugs, a task that consumed an incredible 40,000 man-hours.

While all those plugs were being rebuilt, it soon became apparent to pilots that the glass windows in the cockpit were distorting their forward view. They had to shift their vision from one pane to another in an attempt to see what lay ahead. The distortion went undetected by the supplier, who was producing and checking the windows according to strict specifications. The distortion was eventually removed, but the glass in 75 bombers had to be replaced, and the production line slowed to a crawl awaiting new windows for installation.

By late 1943, still very early in the B-29's production run, Plant II was operating three seven-and-a-half-hour shifts, six days a week. General Arnold, however, was not

"Doc" Flies Again

by Edward H. Phillips

"*Doc*," a World War II Boeing B-29A *Superfortress* heavy bomber, flew on July 17, 2016, for the first time since 1956, before touring the nation to educate current and future generations about the air war over Japan during 1945.

The four-engine airplane recently completed a 16-year, $5-million restoration/remanufacturing program that returned the bomber to airworthy condition. The work was guided by "Doc's Friends," a nonprofit organization dedicated to educating the "world about the rich heritage of aviation," according to Jeff Turner, retired Chief Executive Officer of Wichita, Kansas-based Spirit AeroSystems. The company was a major contributor to the restoration effort.

Built near the end of World War II, *Doc* was one of 1,644 B-29 bombers delivered to the United States Army Air Forces at Boeing's massive Plant II facility in Wichita. When the war in the Pacific ended, the bomber was operated as a training platform for B-29 air crews and eventually was placed in outside storage at the United States Navy's weapons testing facility at China Lake, California. After 42 years of sitting in the dry desert, a group of aviation history buffs acquired "*Doc*," disassembled the B-29 and slowly initiated a full restoration. In 2000, the airplane was shipped to Wichita where restoration work continued for the next 16 years.

During that time, a small army of enthusiasts spent more than 300,000 man-hours making the bomber airworthy again. James Murphy, project manager, said the teams of men and women included 90-year old "Rosie the riveter" Connie Palacioz who, at age 18 in 1945, drove rivets into Doc's airframe as it progressed slowly down the production line.

"Doc," a B-29A saved from the U.S. Navy's weapons testing facility at China Lake, California, in 1987, completed a 16-year, 300,000 man-hour rebuilding program and took to the air for the first time since 1956, on July 17, 2016. (BRETT SCHAUF VMG LLC, COURTESY *"DOC'S FRIENDS"*)

The flight lasted about seven minutes and the crew reported an overall successful flight. Doc took off from McConnell Air Force Base in Wichita, Kansas, and returned to the same runway. In the coming days, the ground and restoration team will review all of the flight data and gauge readings, and they will also perform a full check and inspection of the plane's systems and control surfaces.

Doc is one of only two B-29s that are currently airworthy, the other is "Fifi." The bomber will be permanently based at Wichita's Dwight D. Eisenhower National Airport. Boeing, Bell Aircraft and Martin Aircraft manufactured more than 3,600 Superfortress bombers during 1943-1945.

To learn more about Doc's journey, go to *www.b-29doc.com*.

Built in Wichita, "Doc" was delivered to the United States Army Air Forces in March 1945 and completed a series of modifications at Birmingham, Alabama, before being assigned to Barksdale Field, Louisiana. The bomber was one of an eight-airplane group at the field known as "Snow White and the Seven Dwarfs," hence the nose art and name. (BRETT SCHAUF VMG LLC, COURTESY *"DOC'S FRIENDS"*)

Boeing not only built, but rebuilt the B-29. Bombers parked outside of Plant II underwent a myriad of modifications to wings, engine cowlings, bomb bays, rudders, cockpit glass and electrical wiring. (WICHITA STATE UNIVERSITY LIBRARIES, SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES)

satisfied with progress and the work week was increased to two, 10-hour shifts, six days a week. Many key workers, such as foremen and lead men, and certain specialists and technicians, often worked consecutive shifts for as many as three days, catching a few minutes of sleep when they could be spared from the production line. Despite the physical and emotional strain imposed by 80-hour work weeks, Boeing-Wichita workers maintained that brutal pace throughout 1944 and into 1945, when the factory downshifted to a 55-hour work week.[2]

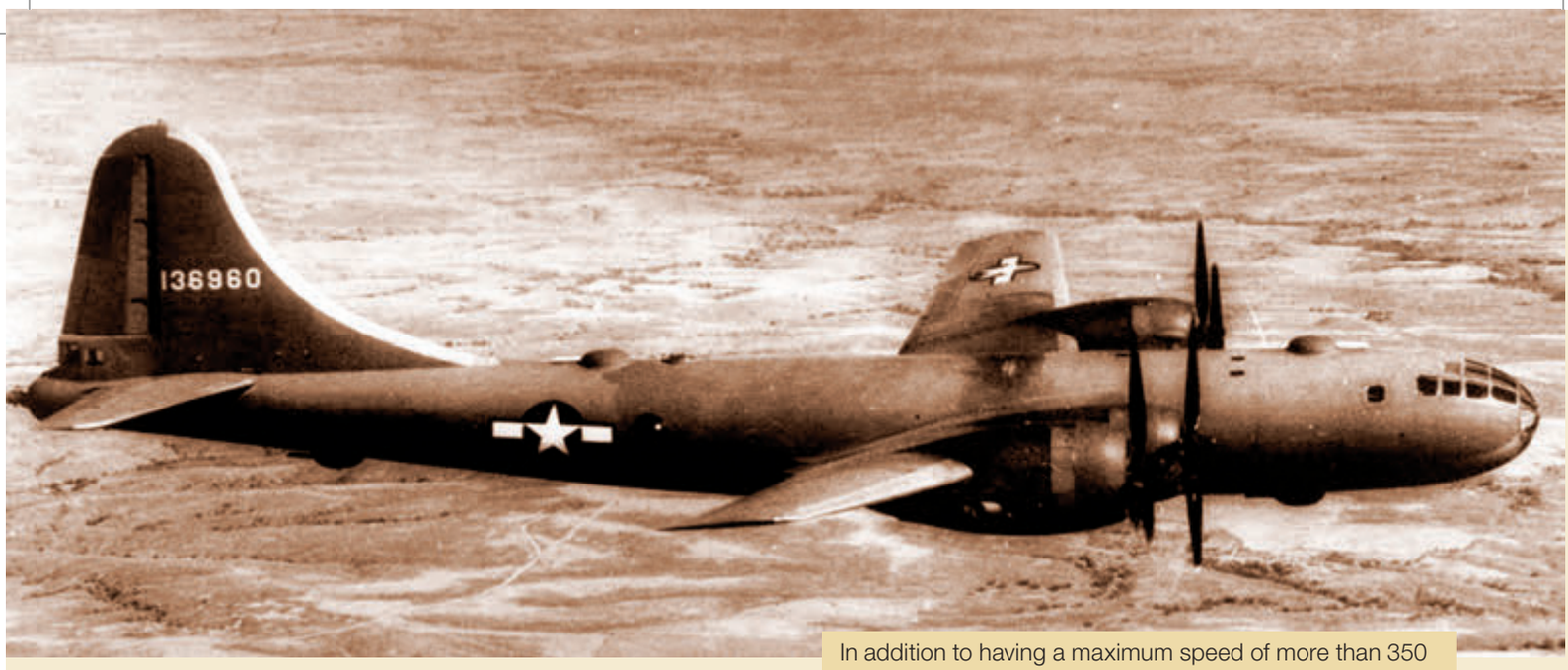
Throughout the critical years of 1943-1945, building the B-29 was a "battle" in itself with its plethora of problems. General Arnold, however, was determined to get the B-29 into combat against the Japanese. Not only was he commander of the Army Air Forces, but he was committed to creating and equipping a new 20th Air Force that he hoped would vindicate the theory of long range strategic bombardment. All he needed was the right bomber – the B-29.

The sole purpose of the new air force was straightforward: bomb Japan into submission. In Europe, both the Eighth Air Force and the Royal Air Force's Bomber Command were paying a high price in a vain attempt to prove that bombing alone could bring the Third Reich to its knees. Meanwhile, a great deal of political wrangling was occurring in London and Washington regarding the overall efficacy of strategic bombing campaigns. Losses of heavy bombers and their aircrews were often unacceptably high for both the Eighth Air Force (daylight missions) and Bomber Command (nighttime missions), but the raids never stopped.

Arnold's plans were to bomb Japan from bases in the China-Burma-India (CBI) Theater of Operations, and "Hap" had concluded that he needed a minimum of 175 of Boeing's mighty B-29s to do the job. He possessed a talented staff that had already drawn up plans for striking Japan's industrial cities, led by General K.B. Wolfe, a veteran of Eighth Air Force operations. On January 11, 1944, Arnold flew to Wichita and paid a visit to J. Earl Schaefer. As he was escorted through Plant II, he liked what he saw – dozens and dozens of B-29s moving down the assembly lines. He was, however, looking for one *Superfortress* in particular, number 175, and he found it entering final assembly. "This is the airplane I want," he told Schaefer, "and I want it by the first of March." It was completed on February 28th.

The 20th Air Force was scheduled to depart the United States for China in March, but when Arnold went to Salina, Kansas, where the bombers were being prepared for departure, he received a nasty shock; not one B-29 was ready to go! Arnold was livid. He learned that the bombers still lacked vital parts and the best estimate was that it would be months before the first B-29 would be ready for the long flight to China. President Roosevelt wanted Japan bombed. Arnold assured him that the B-29 was the weapon to do just that. Plans had been approved. Red tape eliminated. Crews had been trained. Bases were waiting in the CBI Theater, but the bombers were going nowhere.

Arnold soon concluded that it was not only parts that were keeping the B-29s on the ground, organization and management of the modifications was poor at best. To correct these problems, Arnold brought in General Bennett Myers, who immediately took steps aimed at getting the bombers on their way to China. In addition to Salina, facilities were established at Walker, Pratt and Great Bend, Kansas. Air Corps technicians, logistics experts and other personnel were sent to Kansas and began unclogging the technical logjam. Boeing in Seattle dispatched 600 technicians, and more help was sent from B-29 manufacturers Martin and Bell. Soon, flight crews were flying bombers from one modification site to another, providing them with valuable flight time in the



In addition to having a maximum speed of more than 350 mph, the B-29 could carry eight tons of bombs and had a combat radius of 2,000 miles. In February 1945, Boeing-Wichita delivered the 1,000th B-29. By the end of the war in the Pacific, hundreds of the bombers had dropped more than 170,000 tons of high explosive and incendiary ordnance on the homeland of Japan. In August 1945, the Enola Gay and Bockscar dropped atomic bombs on Hiroshima and Nagasaki to end World War II. (WICHITA STATE UNIVERSITY LIBRARIES, SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES)

Superfortress. They also took delivery of new bombers and flew them to the centers for modifications. One of the key modifications centered on removing the factory-installed R-3350 radial engines and replacing them with much improved R-3350-23A that featured more durable valves, better lubrication and other important upgrades.

The Army Air Corps told parts suppliers to stop all non-essential work and fulfill their obligations for the B-29 first. Trucks, trains and airplanes stuffed with new parts soon began arriving at the four sites. As the days passed, Boeing and an army of skilled technicians and workers were gradually reengineering the B-29 out in the open, despite the horrid working conditions brought on by the frigid Kansas winter. Back in Wichita, Boeing employees did their part by working 21 consecutive 10-hour shifts per day to help meet General Arnold's schedule.

The last B-29 built at Boeing-Wichita was flown away by a Ferry Command crew on October 10, 1945. The *Superfortress*, however, was soon replaced by the Boeing B-47 *Stratojet* bomber that, as with its four-engine predecessor, was built in Wichita. (WICHITA STATE UNIVERSITY LIBRARIES, SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES)

The "Battle of Kansas," as the modification program became known, was won by Americans who sacrificed time off, rest and physical nourishment to help get the B-29 into the war. Because of their gallant efforts, the 20th Air Force was officially activated on April 4, 1944. A majority of the B-29s that flew the initial raid on Japan, specifically against the steel mills at Yawata on June 15, 1944, were built in Wichita and modified at the Kansas sites. Arnold's new air force, later led by the cigar-chomping General Curtiss LeMay, went on to drop more than 170,000 tons of high explosives and incendiaries on the Japanese homeland. More importantly, the hordes

of B-29s sent to bomb Japan paved the way for the *"Enola Gay"* to usher in the Atomic Age in August 1945.

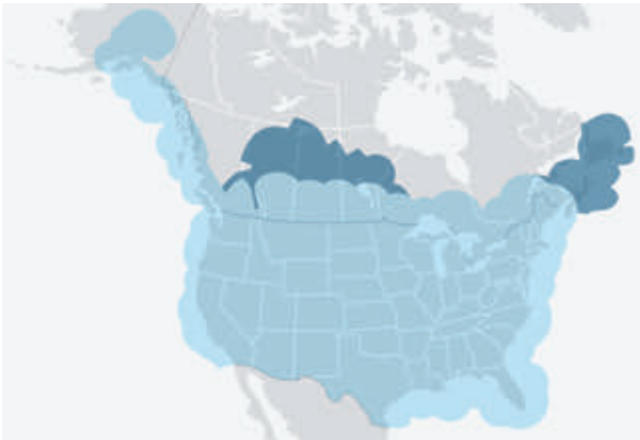
With Japan on the verge of total capitulation, General Arnold told workers at Boeing-Wichita, in part: "What I told Earl Schaefer in Washington, I want to tell you people at Boeing, Wichita and Kansas. You were given a job to do and the way you finished the job met our greatest expectations. For myself and on behalf of the Army Air Forces, I say to you, well done, and thanks from the bottom of my heart." KA

NOTES:

1. It took Boeing-Wichita workers an average of 157,000 man-hours to build the first 100 bombers, but by 1945 it took only 17,000 man-hours to complete the last 100 airplanes. Production of the B-29 peaked at 4.2 bombers per day and 100 per month – a phenomenal feat of American industrial might that neither Germany nor Japan could hope to equal. The last B-29 built in Wichita rolled down the runway on October 10, 1945.
2. According to the Kansas State Historical Society, during the war Boeing, Beech Aircraft, Cessna Aircraft and Culver Aircraft manufactured more than 25,800 military airplanes along with sufficient spare parts to construct another 5,000. Boeing-Wichita built 1,644 B-29s and produced equivalent spares to build another 125 bombers.
3. In December 1944, Arnold was promoted to General of the Army, a five-star rank he shared with his contemporaries in the Army and Navy. When the Army Air Forces became the United States Air Force, he served as its first leader. Born in 1886, Arnold died in 1950.

Additional note: As of 2016, only two B-29s are airworthy and flying – "*Fifi*," owned and operated by the Commemorative Air Force (former Confederate Air Force), and just recently added "*Doc*," owned and operated by Doc's Friends in Wichita, Kansas (see sidebar).

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.



Gogo Business Aviation Expands in Canada

Gogo Business Aviation has expanded its coverage on the eastern seaboard of North America and in central Canada, providing approximately one hour of additional air-to-ground inflight connectivity in both locations for business aircraft.

The expanded coverage on Canada's east coast is primarily between Halifax, Nova Scotia and Gander, Newfoundland – approximately 450 additional nautical miles of new coverage. In central Canada the expanded coverage is available in northern Alberta and Saskatchewan, and central Manitoba, providing additional connectivity for flights crossing over the polar cap region into Canada – primarily flights between Europe and Canada, and Europe and the West Coast of the United States.

The expanded coverage will benefit a host of Gogo customers, especially those who fly internationally between North America and Europe and cross over Canada's east coast or through central Canada; domestic flights between the East and West Coast of the United States with routes over Canada; and domestic flights throughout Canada; and flights between Canada and the United States.

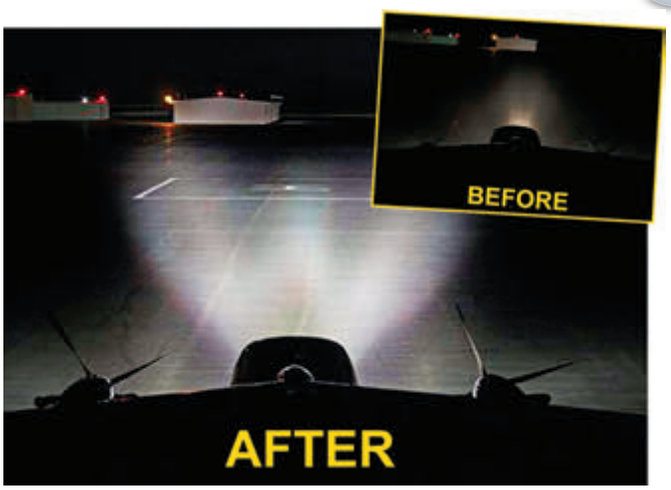
More information can be found at *business.gogoair.com*.

LoPresti Aviation Offering Rebate on Boombeam HID Lighting for King Air

There is still a small amount of time left to qualify for a $750 rebate offered by LoPresti Aviation, which is available for purchases made through August 15, 2016.

According to LoPresti the Boombeam HID Lighting:

- Produces 1,300 percent more light, engineered specifically for each model aircraft.
- More closely approximates the color temperature of Natural Daylight.
- Reduces electrical load and heat.



- Five year/5,000-hour warranty; a proven system based on time-tested experience.
- Decreases AOG time for lighting issues – no filament to break.

For more information, contact LoPresti Aviation at (772) 562-4757 or *www.LoPrestiAviation.com*.

New Garmin® Navigation Databases Bring Cost-effective Solutions to the Cockpit

Garmin announced a new, cost-effective Garmin Navigation Database, single navigator bundles and all-inclusive OnePak database options for select Garmin avionics and portables. OnePak database packages allow customers to download databases to multiple Garmin avionics and one portable in a single aircraft for one low price. The Garmin Navigation Database and OnePaks are initially available for North America. These new packages and data services give pilots additional database purchase options, added flexibility and more simplicity associated with database management.

The Garmin Navigation Database offers a trusted and convenient path to incorporate the latest database information within select Garmin avionics. Data such as instrument procedures, frequencies and airport data are included in this database, which offers cost-effective solutions for VFR and IFR flight. For example, U.S. coverage of the new Garmin Navigation Database starts at $129 for a single update and $299 for an annual subscription for the GTN™ 650/750 touchscreen series or GNS™ 430W/530W navigators.

Database subscription bundles are available for a single Garmin navigator such as the GNS 430W/530W starting at $449, which includes the Garmin Navigation Database, Obstacles and Terrain. A single navigator bundle for the GTN 650 starts at $499 and includes the Garmin Navigation Database, Obstacles, SafeTaxi® and Terrain.

Pilots are offered significant savings with OnePak annual database subscriptions, which combines the Garmin Navigation Database with many other Garmin databases to provide additional data options that suit their needs. For one annual price, databases within OnePak subscriptions can be downloaded to multiple Garmin avionics and one qualifying portable in a single aircraft. A variety of economical regions are available, such as the United States OnePak for $649, which includes the Garmin Navigation Database, AOPA Airport Directory, IFR enroute charts, VFR sectional charts, Obstacles, SafeTaxi, Terrain and Basemap for compatible products. The purchase of a U.S. or North America OnePak subscription also provides existing Garmin Pilot subscribers with an upgrade to Garmin Pilot IFR Premium with coverage in the U.S. on Apple or Android mobile devices at no additional cost.

The Garmin Navigation Database bundles, single navigator bundles and OnePaks are compatible with the following certified avionics:

- GTN 650/750 touchscreen navigators
- GNS 430W/530W navigators
- G500/G600/G500H glass flight displays
- G1000®, G2000®, G3000® and G5000® Integrated Flight Decks

For global customers, PilotPaks offer cost-effective worldwide coverage. To purchase and download the new Garmin Navigation Database, single navigator bundles or OnePak database subscriptions and to view additional database pricing or coverage information, visit: *www.flyGarmin.com*.

Simple wireless database updates with the GTN 650/750

With a GTN and the newly announced Flight Stream 510, pilots receive the added benefit of wireless database transfer using a mobile device, further streamlining the database update process. Flight Stream 510 is a small, patented Wi-Fi® and Bluetooth®-enabled MultiMediaCard (MMC) that enables communication between the GTN 650/750 series and two compatible Apple or Android mobile devices operating Garmin Pilot. Wi-Fi connectivity is specifically for Database Concierge wireless database transfer and Bluetooth allows for a wide variety of additional capabilities such as flight plan transfer and more. Customers can easily incorporate wireless technology into their aircraft with the latest GTN software update and Flight Stream 510, as no wiring changes or complex installation considerations are required.

GNS 430W/530W all-in-one card programmer

GNS 430W/530W customers in North America can now purchase, manage and update database subscriptions

of all types from the flyGarmin® website using Garmin's USB Aviation Data Card Programmer. GNS 430W/530W database types that are available include the new Garmin Navigation Database, Obstacles and Terrain. The Garmin USB Aviation Data Card Programmer for the GNS 430W/530W is available for purchase on *www.garmin.com* for $69.95.

For additional product information, visit: *www.garmin.com/aviation*.

Scheme Designers Now Offering 3D Renderings with Custom Design Schemes

Scheme Designers of Cresskill, New Jersey, announced that customers who commission a custom paint scheme for their aircraft may now also opt to receive photo-realistic, three-dimensional artistic renderings of their aircraft with their new custom scheme.

The company says the new tool allows customers to visualize all angles of their aircraft's custom livery with stunning realism to fully envision the results of their artistic choices, as well as show the aircraft in any flight configuration to help clients visualize how their new scheme will appear on their aircraft.

In the course of developing a custom paint scheme for an aircraft, Scheme Designers' artists work hand-in-hand with aircraft owners to bring their unique vision to life on their aircraft. Usually, several iterations are reviewed and a vast number of variables are considered along the path to scheme finalization. Artists work to optimize color combinations and bring out the beautiful lines of each aircraft model, to accommodate unique design considerations such as access panels, inlets, antennae, window placement, and other details that affect the final scheme and outcome. More information can be found at *www.schemedesigners.com*.

King Air Technically...

RECENT SERVICE BULLETINS, ADVISORY DIRECTIVES AND SAFETY COMMUNICATIONS

From Beechcraft and Hawker Communiqué ALL-02

Issued: July 2016

ATA 00 – Service Document Updates Owner Advisory

Textron Aviation is introducing Owner Advisories (OA) for Beechcraft and Hawker products.

Textron Aviation continues to incorporate best practices across all models, divisions, and personnel. An OA is another example of integrating these practices within service documents.

An OA is a separate document that will accompany each released Service Bulletin (SB).

The OA will contain a reference to the subject SB as well as the SB's *Reason Statement* and *Compliance* recommendation. Additionally, the OA will contain supporting information including estimated *Labor Hours* and Kit *Material* availability information associated with completion of the SB. Instructions for placing orders with Textron Aviation Parts Distribution will be listed as well.

If applicable, *Warranty* information including *Parts and Labor* coverage will be noted within the OA.

An OA is a quicker method of distributing revised information to owner/operators. Should any of the preceding information need to be modified; an OA can be reworked and redistributed within one or two business days. Revising entire SBs takes considerably longer. The introduction of OAs is another example of how Textron Aviation is streamlining processes to disseminate technical information to owner/operators as quickly and effectively as possible.

For questions or comments regarding this Model Communiqué, please contact Technical Support at 1 (800) 429-5372 or 1 (316) 517-9330. For Beechcraft/Cessna/Hawker subscription information, contact the Technical Manual Distribution Center (TMDC) at 1 (800) 796-2665 or 1 (316) 517-6215.

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

ADVERTISING INDEX