



Critical Comms

The Importance of Clear Hearing in Aviation

eBook



About Lightspeed Aviation

On a mission to save lives

Lightspeed Aviation is a leading manufacturer of premium aviation headsets and helmet products. Since the first product was introduced in 1996 at AirVenture in Oshkosh, WI., the company has established a reputation for leading innovation in the aviation headset marketplace with a number of “first to market” advances, technologies, and features.

In 2022, the company launched a new category of aviation products called “Safety Wearables”. Layering life-saving technologies on top of their award-winning audio and ANR platform, Lightspeed ushered in a new era of aviation safety. With this, the company continues to live its mission of “creating products that protect and save lives”.

Additionally, Lightspeed is a passionate supporter of initiatives to encourage the next generation of pilots through its support of programs like Young Eagles and Ray Scholars. The company is proud to have participated in helping countless young people experience everything from a discovery flight to getting a Pilot Certificate.

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The Importance of Hearing in Aviation

When we take to the skies, we know the risks as well as the rewards. From infancy, humans learn that what goes up must come down, and pilot training teaches us many ways to come down in a safe way. We learn to land where we intend to, to anticipate and handle weather, to check that our aircraft is in working order before we take off. But there's another risk that we don't learn about in pilot training: hearing loss. And it's a serious risk that can keep our flights from ending safely.

Life takes its toll on our hearing: noisy work environments or hobbies, loud music, and the natural effects of aging. According to the World Health Organization, it is estimated that over 1.5 billion people globally live with hearing loss. Flying also takes a toll: pilots are subjected to the same noise frequency and intensity for extended periods of time, which can lead to hearing loss or hearing-related conditions such as tinnitus. The most common type of hearing loss occurs at higher frequencies, making it difficult to understand speech, especially in a noisy environment such as a cockpit.

Hearing issues can lead to accidents and even loss of life if hearing impedes a pilot's ability to hear directions from ATC or the sound of problems with an aircraft. Less serious, but still sad, it can cause failure to meet the hearing standard for a pilot's license. Protecting and optimizing hearing should be a top-of-mind concern for everyone who flies.

This eBook explains the effects of aircraft noise on hearing and how technologies such as Active Noise Reduction (ANR) can help protect it, and it examines the safety issues surrounding intelligibility and the ability to accurately hear comms in the cockpit. We've also included some stories from pilots who deal with hearing loss and how they've been able to compensate and fly safely. We hope this information will inform and inspire you to protect and optimize your hearing and the hearing of those who fly with you.

CHAPTER 1

Passive vs. Active Noise Reduction in Aviation Headsets

The relative quietness of a premium Active Noise Reduction (ANR) headset in today's market is undisputed. But how much does ANR really reduce noise versus passive noise reduction (PNR). Can we point to a number that shows exactly how much more ANR protects our hearing and justifies the extra cost over PNR?

The short answer is that we can't point to just one number because the noise reduction from ANR is much more sophisticated than what PNR provides. The longer answer is that in addition to protecting hearing, the more advanced noise reduction from ANR makes for a safer, healthier flying experience.

How Noise Reduction Ratings (NRR) Are Calculated

Decades ago, the U.S. Occupation Health and Safety Administration (OSHA) established safety standards for noise in the workplace: employers are to protect workers from noise exposure at or above 85 decibels averaged over eight working hours (dBA). To measure the effectiveness of noise protection gear, OSHA established a standard measurement called Noise Reduction Rating (NRR). NRR ratings involve a complicated set of measurements over eight specific frequencies from 125hz to 8,000hz, using a logarithmic weighting schedule to adjust for the damaging nature of that spectrum of noise. The measurements are made with and without the noise reduction mechanism, and a formula is applied to calculate an NRR between zero (no noise reduction) and 33. NRR protection of 28 or higher is recommended for environments with loud, high frequency noises such as a machine shop, sawmill, or an indoor shooting range. The important thing to realize about NRR is that it is a measure of passive noise reduction: the ability to block sound.



140 dBA
Jet Engine



80 dBA
Train



40 dBA
Whisper



Active Noise Reduction emits a signal to cancel out noise



Passive Noise Reduction seals off the ear to physically block out noise

The Mechanisms of Passive vs. Active Noise Reduction

Noise reduction (also called “attenuation”) in PNR vs. ANR headsets is an apples-to-oranges comparison because the technologies are so fundamentally different. Passive noise reduction is achieved by creating an isolating cavity around your ears, formed by ‘cups’ that have ear seals to block the noise. The three largest drivers of isolation are the cavity volume and mass of the cup around your ear canal and the performance of the ear seals. The mass and rigidity of the cups blocks more sound, just like a cement wall stops more sound than a wood-framed one. More volume inside the cup allows the vibrations transmitted into the cup to dissipate and disperse before reaching your ear canal, while the tighter the ear seal, the less sound makes it inside the cup.

Active noise reduction headsets don’t just block noise, they actually cancel it out...effectively eliminating selected frequencies of noise within the ear cup. A microphone inside the ear cup measures the noise inside, a processor calculates the sound wave needed to cancel out that noise, and an ‘anti-noise’ signal wave is generated that is specifically 180 degrees out of phase from the sound wave inside. The peaks of existing noise sum with the ‘valleys’ of the anti-noise signal to reduce (cancel) that element of sound. Because there is a slight delay to measure, calculate, and send the cancelling wave, ANR blocks constant noise such as the engine rumble in an aircraft more completely than intermittent, impulse noises like a rifle shot.

Because the electronics in an ANR headset are inside the ear cup, they typically reduce the acoustic volume inside the cup and, hence, its passive noise reduction. However, the active noise reduction and the remaining passive reduction from the ear cup are additive, providing superior noise reduction overall. And there are multiple other benefits to ANR:

- **Since ANR headsets reduce the loudest levels of the dominant engine and propeller noises, the pilot is able to distinguish unusual noises from the aircraft.**
- **The low-frequency noises in a cockpit can significantly interfere with a pilot’s ability to accurately hear audio communications. By cancelling those low frequencies, ANR will improve your ability to understand ATC.**
- **Because ANR headsets don’t depend on just the size, mass, and seal of the ear cups for noise-cancelling, they typically are lighter, less bulky, and more comfortable to wear.**
- **Since these headsets are powered (via batteries or a panel connection), ANR headsets offer additional integrated features such as Bluetooth connection, music amplification, and automatic muting of music for incoming comms, etc.**

Rating PNR vs. ANR

Calculating NRR ratings for PNR headsets is fairly straightforward. In a nutshell, the sounds are measured at the various frequencies by microphones outside of and inside the ear “cup,” and the decibel levels are compared to calculate the NRR rating. A good PNR headset could get a rating of 22-24 NRR, plenty enough protection for a GA aircraft cockpit.

Measuring the noise reduction of ANR headsets is much more complex. First, we know that passive attenuation (NRR) will be reduced simply because the electronics reduce the acoustic cup volume inside the ear cup.

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However, ANR headset makers don't tell us their passive NRR because it's misleading. If you measure passive noise reduction alone, ANR will come in below PNR, BUT that NRR number doesn't come close to reflecting the quiet that the pilot will actually experience with an ANR headset. The effects of ANR are VERY noticeable.

Asking the Right Questions

The bottom line here is that choosing a headset shouldn't start with NRR ratings. The first question you have to ask yourself is whether you want PNR or ANR. PNR headsets generally cost less, but the quiet, hearing accuracy, comfort, and features won't be comparable to ANR. If PNR is what fits your needs and budget, then NRR ratings will be helpful in choosing a product.

If you want an ANR headset, NRR ratings likely won't be available, and they wouldn't help you if they were. Instead, you'll need to consider other factors, starting with the effectiveness of the ANR. We'll talk about that in the next chapter in this ebook.





Zoan Herclerode, CFI and AOPA National Best Flight Instructor Winner

CHAPTER 2

Dispelling the Myth: ANR Blocks Engine Noise

Every experienced pilot is tuned to the sounds of their aircraft, what's normal and what's not. An unusual sound can be the first warning that something is wrong, sometimes even before engine or flight instruments show a problem. So, you don't want anything to interfere with your ability to hear what's happening with your craft.

Experts we talked to said that by filtering out the constant background engine noise, their headsets actually make it easier to hear unusual noises that could indicate trouble

We're often asked whether Active Noise Reduction (ANR) in headsets can interfere with a pilot's ability to hear the aircraft when they should. The answer from veteran pilots is, "No." In fact, experts we talked to said that by filtering out the constant background engine noise, their headsets actually make it easier to hear unusual noises that could indicate trouble.

Zoan Herclerode has been in love with flying since she was 16 years old. After seeing her husband through grad school, she set out to become a career flight instructor. She was AOPA's National Best Flight Instructor in 2017. She flies out of Colorado Springs and is also an assistant chief instructor for a military aero club there. Zoan appreciates how her Zulu 3 ANR headset cancels the low frequencies of her Piper Lance's engine and other aircraft she flies. "It takes out that big drone, that deep, dark hum that's really fatiguing and annoying. In the Excel, when I turn on the bleed air section in the APU, it's just obnoxiously loud. It's

really nice just to tone that out.” But she says she can still hear if there are problems. “I can absolutely still hear the engine. When you first start the piston airplanes, you can hear the starter Bendix engaged until it gets to 500–700 RPM. I can also distinguish between engine noise and air frame noise. Is it a thumping of a strap on the frame or the clump of a tire? One time, I heard a clunk and it turned out I had dinged part of the prop ring. I actually heard that when I had the headset on and going. Another time I heard a high-pitched squeal. I landed after about 30 miles and shut it down, and it wouldn’t start again. The electric fuel pump had failed, and the sound was the pump just spinning itself out.”

“One time, I heard a clunk and it turned out I had dinged part of the prop ring. I actually heard that when I had the headset on and going.”

Zoan also finds that an ANR headset is an important training tool for her students. “For the student pilots, when they’re first taking off and the nose wheel shimmy, they can’t tell the difference between what they’re feeling and hearing. Then I have them try an ANR headset, and they’re able to distinguish that sound of the nose wheel centering itself as the strut extends.”

Trent Palm is a second-generation pilot who lives in Minnesota. Both his uncles fly, and Trent started flying before he learned to drive. Trent has ANR headsets for his whole family when they take trips in their Piper Cherokee 6. Trent says his Zulu 3 headset saves on hearing and fatigue.

“A couple of months ago, while flying with a friend who has a [Cessna] 182, I had to borrow a (passive) headset. It’s amazing to me, when you don’t have ANR, how much your ears are ringing at the end of the flight. When doing a 3- or 4-hour leg, the noise does definitely wear on a person, and with the amount of cross-country that we do, ANR helps prevent that.” But Trent says ANR doesn’t compromise safety: “The big thing as a pilot is that we all listen for changes. The airplane will talk to you. I can still hear the engine well enough



“The airplane will talk to you. I can still hear the engine well enough to hear pitch changes and understand what’s going on, and that’s huge.”

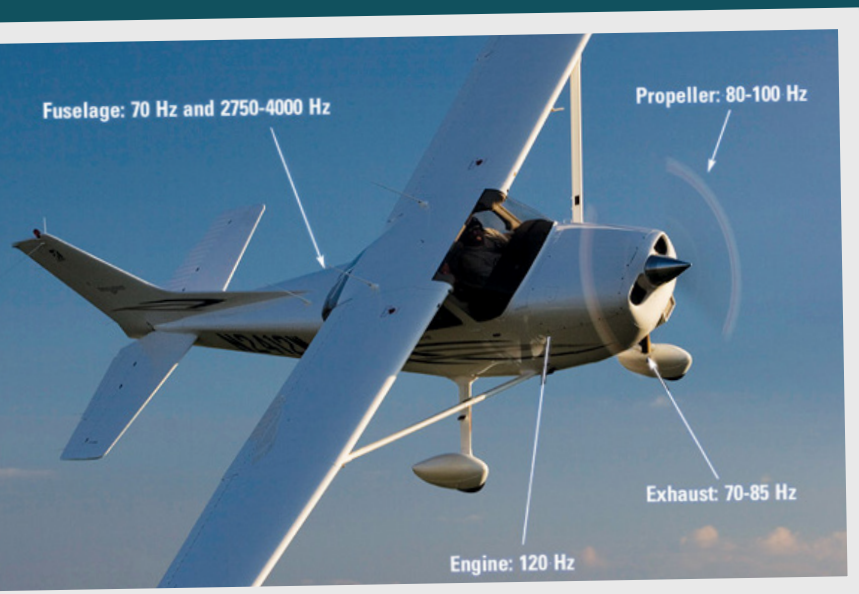
– Trent Palm, Private Pilot

“My husband is an aviation medical examiner, and he checks my hearing regularly to be sure I’m safe”

to hear pitch changes and understand what’s going on, and that’s huge. I tried an in-ear headset in a friend’s plane, but it sealed off some of that rumbling that you want to hear. I had the sensation that my ears were plugged. I don’t like not hearing the engine that much.” On Palm family trips, everyone wears ANR headsets for hearing protection and for a more pleasant flight. “My wife sits in back and is connected to front panel audio, and we have five other ANR headsets so each kid can listen to their own device with Bluetooth.”

There are several audio factors that affect flight safety: being able to hear the aircraft well enough to spot problems, reducing pilot fatigue, and managing the long-term risk of hearing loss. A recent article in *Plane and Pilot* cited findings by the FAA and U.S. Military that 30% of aviators have permanent hearing loss, and this loss is especially evident in pilots who started flying before the advent of headsets. The situation is serious enough that the Flight Safety Foundation is studying pilots with impaired hearing as a risk in aviation accidents.

Zoan Herclerode takes that risk seriously, for herself and her students. “My husband is an aviation medical examiner, and he checks my hearing regularly to be sure I’m safe. And I tell my students to invest in a good headset now. It’s cheap hearing protection. When you’re young, you’re under warranty, but time can take its toll. So, start caring for your hearing now.”



Source: planeandpilotmag.com

CHAPTER 3

Safety Check: Intelligibility in the Cockpit

If you've ever had a routine hearing test, you probably wore a headset and were told to raise your hand whenever you heard sounds. The hearing exam for pilots is very different: it tests their ability to hear the spoken word, because the ability to hear language accurately—directions from ATC and information from flight crew—is critical to flying safely. In fact, in a review of the NASA Aviation Safety Reporting System (ASRS), U.S. researchers found that more than 70 percent of incident reports involved problems with information transfer, primarily related to voice communications. Many factors can play into communication issues, such as ambiguous messages and language differences, but the ability to hear speech accurately is the foundation for successful communication.

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The ability to understand speech in given conditions is called "intelligibility." Intelligibility depends on several factors: sound level of the speech (it must be loud enough and not too loud), quality of the speech signal, and background noise. There is interplay between these factors: for example, if there's interference affecting the comms signal from ATC, it's even more important to keep background noise from further degrading the pilot's ability to hear accurately. We want to control these factors to improve the "signal-to-noise ratio."

In a small plane, the most consistent and controllable factor in intelligibility is background noise in the 50–300 Hz frequency range, which comes from the aircraft engine, propeller(s), and other equipment and from air interacting with the plane. Cockpit noise can range from 50 to 120 decibels (dBAs). The ability to





accurately recognize words drops rapidly at noise levels above 85 dBA. (The U.S. Occupation Health and Safety Administration (OSHA) also requires employers to protect workers from noise exposure at or above 85 decibels averaged over eight working hours.)

In an inherently noisy environment, there are two ways to improve the signal-to-noise ratio: crank up the signal or reduce the noise. Cranking up comms is not a good option for several reasons. First, setting them loud enough to overcome cockpit noise can actually reduce intelligibility. (It fails the “loud enough but not too loud” test.) Second, more loud noise adds to pilot fatigue, which can reduce pilot performance and, hence, safety. Third, adding to the noise increases risk of hearing loss over time.

Research has shown that ANR headphones can improve intelligibility between 5 and 12 percent in an aircraft environment.

Reducing noise through headphones is a better way to improve intelligibility in the cockpit, and numerous studies have shown that Active Noise Reduction (ANR) headphones are best. ANR headsets cancel out background noise, effectively eliminating selected frequencies of noise within the ear cup of the headset. They are extremely effective at cancelling constant, low frequency noises such as the engine rumble in an aircraft.

Research has shown that ANR headphones can improve intelligibility between 5 and 12 percent in an aircraft environment. By cancelling low-frequency noise, ANR headsets allow pilots to hear comms more clearly without raising the volume, reducing pilot fatigue, and protecting hearing. Another benefit of this improved intelligibility is that pilots have less need for ATC to read back instructions, lowering ATC workload and freeing the pilot to focus on other aspects of safe flying. And with additional integrated features such as Bluetooth connection and automatic muting of music for incoming comms, ANR headsets can also allow pilots to enjoy music at a safe volume and without compromising vital communication.

A ten or twelve percent improvement in intelligibility may not seem like a lot but hearing A single word can make the difference between a crash and a safe landing. Consider the case of a Boeing 747 on an approach into Nairobi, Kenya, in the 1970s. ATC cleared the plane to “descend seven five zero zero feet”

Luckily, the plane broke out of the clouds in time for the crew to see what was happening and pull up into a climb. But they still came within 70 feet of hitting the ground.

(7,500 ft), but both pilots heard “five zero zero zero feet” (5,000 ft), an altitude 327 ft below the altitude of the airport. Luckily, the plane broke out of the clouds in time for the crew to see what was happening and pull up into a climb. But they still came within 70 feet of hitting the ground. This incident had a happy ending, but there are others that didn't.

Another thing to consider: A military study found that pilots with pre-existing high-frequency hearing losses show substantial impairments in speech intelligibility, which in turn can affect flying safety. They concluded that, by improving intelligibility, ANR could help compensate for these hearing losses. For most people, hearing will decline as we age, starting as early as our thirties or forties. So, by using ANR to help compensate for mild hearing loss and to protect our hearing, we can extend our safe flying years. And that's a happy ending for every added day in the air.

CHAPTER 4

Better Hearing is Music to This Pilot's Ears

Nick Hoffman is a man of many talents. Millions of Outdoor Channel viewers know him as an outdoorsman, pilot, and host of the series Nick's Wild Ride. To millions of country music fans, he's a professional musician who's spent decades performing with the greatest names in the business and is a top-selling recording artist with his band, The Farm. He seems to balance his passions for adventure, flying, and music effortlessly, with one exception. Twenty-five years in the music industry has taken a toll on his hearing. So, just as in his music career, he uses the sound technology to help deliver the best experience in the air.

Hoffman hails from a very musical Minnesota family and started playing the fiddle at age 4. He says there was a jam session every Saturday night at the Hoffman house, and one of his earliest memories is of falling asleep under his grandma's piano bench while the adults were still playing. He started playing in bands by age 13. When he was barely 17, he ran away from home to Branson, Missouri, sleeping on park benches for a few weeks and eventually finding a job in a show that Dolly Parton owns. From there he moved to Nashville, played in bars, then landed a 12-year gig with Kenny Chesney that lasted from Chesney's early years in small clubs to his superstardom, with the #1 selling show in the world. Since then, Hoffman has played as a side guy for many other country legends, including Tim McGraw, Keith Urban, Brookes & Dunn, Trace Adkins, Sarah Evans, Charlie Daniels, Willie Nelson, John Mellencamp, and more. In 2010, he was signed by Warner Bros with his band, The Farm. They've had two top 40 songs, and he has a new solo album coming out in early 2023.



While music is Hoffman's first and deepest passion, he acknowledges that it has taken a toll on his hearing. Of course, hearing protection was the last thing on the minds of his teen band mates. And he says, "Especially in the early days of my career, I played every night in smoky bars and clubs with no protection and the amplifiers cranked up. It's like being next to a jet engine for 4 hours straight. And my hearing paid for it." The outdoor side of his life added to the problem: years of shooting firearms for trap, skeet, and hunting. In early days, he didn't use any hearing protection for that either. He says, "Now I have constant tinnitus—my ears ring loudly 24/7—and I have probably 30–40% loss in my mid to high range hearing. That affects my daily life now, including my work as a pilot. So, any time I can do anything that helps protect my hearing now or to enhance my hearing with the loss that I have, I jump at those opportunities."

Hoffman says that having an ANR headset makes all the difference to his safety and comfort in the cockpit. "ANR has been a game-changer because background noise is the enemy. With that, especially on top of my hearing loss, everything gets muddy. When you can use ANR to eliminate background noise, it allows me to hear any kind of communication—with both passengers and ATC—more accurately and at a quieter level that doesn't damage my hearing. It's also just so much more pleasurable."

And he says ANR doesn't interfere with his ability to hear how the engine is doing. "Your ears are not designed to operate at high volume. So, when you can bring ambient levels down, you can hear more subtleties. You hear all the same things, but slightly differently and, in my opinion, actually better." And he especially loves the HearingEQity feature in the new Lightspeed Delta Zulu headset, which optimizes sound to the user's hearing profile. "This is big for a guy like me who has a lot of high-end hearing loss, because I can shape the sound to my needs." (As an artist, Hoffman



"Your ears are not designed to operate at high volume. So, when you can bring ambient levels down, you can hear more subtleties."



also appreciates the aesthetics of the Delta Zulu. He says with a smile, “It’s ridiculously sexy. It’s the Scarlet Johansson of headsets.”)

Hoffman thinks we all need to be protecting our hearing better. “We often think that hearing loss only happens to older people. At 20 you don’t think about going bald, and at 30 you’re bald. Every young kid thinks they’re indestructible. My early days in bands were the start of my hearing loss, and I’m sure that my early days in aviation didn’t help. My hearing loss showed up already in my early 30s.” He says an ANR headset can be a lifesaver in a lot of ways, and not just in the cockpit: in a pinch, he’s used his Delta Zulu headset for hearing protection while cutting wood out in the barn.

The bottom line, for Hoffman, is that his life and livelihood depend on the ability to hear. “Both of my passions need hearing, but both can also take away hearing if you’re not careful. And you can’t pass the medical and you can’t go flying if you can’t hear. A good ANR headset from day 1 of flying is one of the best investments you can make. They might be a little more expensive, but they protect your long-term ability to fly.”



CHAPTER 5

Flying with Hearing Aids: A Game Changer

Kiko Jeantette has wanted to be a pilot since he was a small child, but life took him in other directions: building his own IT company and raising a family. A year or so ago, when he booked a private flight as a treat for his aviation-loving 9-year-old son, it rekindled his own passion, and he decided that, at age 47, it was finally time to become a pilot. Unfortunately, flight training revealed a safety problem. With age had come hearing loss, and even with hearing aids and a popular brand of ANR headphones, Jeantette was missing more radio calls than the average student pilot. Fortunately, he found a solution.

Jeantette has worn hearing aids for about 4 years. On the flight with his son, he was wearing a pair of passive noise-canceling headsets, and he had a lot of trouble hearing. So, he did extensive research online. He says, “Everyone told me that the Bose A20 headset would be best, but no one addressed the question of pilots with hearing aids.” Still, he needed a headset, so Jeantette bought the Bose model and started flight training. It often takes him several minutes to adjust his hearing aids so that he doesn’t get feedback from the headset, but he says that “At least with a phone app and most modern hearing aids, you do have the control to make those adjustments.”

“I have six kids, so I want to land safe every time. I want to come home.”

But as his flight training progressed, Jeantette found he was hearing and understanding only 70 to 80 percent of radio calls. Because of his hearing loss, higher end frequencies drop off and he’s not able to hear consonants very well. So, for example, the word “kite” sounds like “ite” to him. That makes it easy to miss his call letters. Everyone misses some radio calls, but as he got closer to soloing, Jeantette and his instructor both worried that he was missing too many. And, as Jeantette says, “I have six kids, so I want to land safe every time. I want to come home.”



*Kiko Jeantette
and his son*

About that time, information about Lightspeed's new Delta Zulu headset popped up on one of Jeantette's aviation newsfeeds. He was excited to read that the Delta Zulu headset and app can test the wearer's hearing, create a hearing profile, and automatically adjust the headset performance to fit the user's hearing—something Jeantette understands well because he has multiple profiles for his hearing aids for use in restaurants, meetings, watching TV, having conversations, etc. He knew there was a 60-day return policy, so he ordered a pair to try out, then went through the Delta Zulu's hearing test and set up. He says the results were amazing.

"First of all, the noise cancelling was way better than the A20s. Even if I had normal hearing, I think they would be better." But the real proof was in the flying. "I was too high the first couple of landings after I got the Delta Zulus. What I suddenly realized was that I was used to flying by engine sound, and with the Delta Zulus, it sounded so quiet that at first, I was reluctant to pull the power back."

And what about the safety issue and being able to hear calls? Jeantette's Delta Zulus passed that test with flying colors. "The Lightspeed headset allows you to automatically record the headset audio from a flight to your mobile device, so on my second flight with the headset, I turned on the recording

feature. When I listened to the recording later, it turned out I had only missed two radio calls. And, listening to the playback, I was able to determine that I missed them not because I couldn't hear them but because I wasn't paying attention. That was a huge confidence builder for me, and in flying, confidence is everything. It was a game-changer for me, and I think that feature could be a game-changer even for people without hearing issues. I told my instructor, 'I think you should have every student record every flight.'"

Needless to say, Jeantette will be keeping his Delta Zulus. "I love them so much that I made a YouTube video to tell other people who are in my position, because nobody talks about what works best for pilots with hearing aids. The hearing profile test was amazing. Also, the Delta Zulus wrap around the ear better, and that helps because my hearing aids fit right into the pocket, and the nice, big over-the-ear design also fits nicely over my glasses and hat. Now I want to see if I could fly without my hearing aids, just with the aid of the Delta Zulus. With my hearing, it might not be possible. But for long cross-country trips, being able to have the hearing aids out would be a huge benefit because it's more comfortable."

Jeantette recently had another reason to appreciate his Delta Zulus. He just bought his first plane, and he and two instructors went to Seattle to fly it



"I just smiled because the headset was doing everything it's supposed to do, and that's amazing."

back to his home airport in the Denver area. There was a snowstorm coming into Seattle, and they took off, literally minutes before the airport closed down. They flew to Tri-Cities, Washington, on to Boise, Idaho, and then to Ogden, Utah, staying just ahead of the storm. But moments after they touched down in Ogden, Utah, the carbon monoxide (CO) sensor in Jeantette's Delta Zulu headset went off. He says, "It was freezing so, of course, we had been running the heater the whole time. Luckily, there wasn't anything wrong with the plane. It's just that with the heater on and the plane sealed, the CO level rose while we were taxiing. But my instructors had no idea because they didn't have headsets with CO sensors." Warned by Jeantette's sensor, they opened the plane's windows and door, and the headset monitor showed the CO dropping to safe levels. Jeantette chuckles, "I just smiled because the headset was doing everything it's supposed to do, and that's amazing."

The Delta Zulu Headset, for Hearing, Safety, and Comfort

The Delta Zulu also introduces a built-in audio equalization system called HearingEQity™ that ensures crystal clear flight communication. Through an automated 12-frequency hearing test that can be taken through the Lightspeed app, HearingEQity sets the hearing level in each ear of your headset to create your individual hearing profile to compensate for any hearing variations between ears.

The legendary Zulu comfort and durability continues in the Delta Zulu. Performance ear seals, sturdy cables built around a Kevlar core, full Bluetooth integration, and an industry-best 7-year warranty, are still standard in our newest mode.

Delta Zulu is built for your mission with safety, control, and comfort in mind.



CONCLUSION

Protecting Your Hearing, In and Out of the Cockpit

For most of us, some hearing loss is inevitable with age. (So, we should all get our hearing checked as we reach “that certain age.”) That said, there’s plenty we can do to protect our hearing. The CDC recommends that everyone take these steps:

- **Turn the volume down on music, loudspeakers, and other devices.**
- **Avoid loud, noisy activities and places when you can.**
- **When possible, walk away from loud noise in the environment.**
- **Take breaks from the noise because volume, frequency, and exposure time all combine to cause hearing loss.**
- **When you can’t avoid noise, use hearing protection.**

The fact is, if you’re going to fly, you can’t avoid noise. What you can do is use effective hearing protection: a good aviation headset that not only reduces your exposure to hearing-damaging noise, but also optimizes your ability to hear the comms that are so critical to coming down safely, every time.



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