



Headset How-To

Today, aviation headsets sport more features than ever before. Use this guide to navigate your way through the headset jungle.

By Marc C. Lee

Ask any two pilots what the best headset is and you'll get two distinct answers, each with solid claims to back it up. There are scores of headsets on the market, and the different features of each model make choosing the correct headset a quagmire of myth, hearsay and fact.

The humble headset is the first piece of flying gear a student will be exposed to. It might also be the first piece of professional gear a pilot will purchase. The price of a good headset assures that it's not a trivial purchase, made on a whim. Purchasing a headset, though, can be confusing and complicated. We've done some research into the factors that might influence your purchase, and present this buyer's guide to aviation headsets.

Passive Vs. Active

Pilot headsets come in two basic flavors: active noise reduction (ANR) and passive noise reduction (PNR). In an ANR headset, a tiny microphone inside the ear cup picks up the noise around it. The noise sample is passed to electronics that produce an exact opposite "mirror image" of the sound. Tiny speakers generate the new sound back out to the ear cups. Because the generated sound is an "anti-sound" to the original noise, they meet and cancel each other out. The result is silence.



Beyerdynamic HS 300

ANR only affects certain low frequencies, so normal speech, changes in engine sound and airflow over the fuselage are all easily detected. Because ANR headsets rely on electronics to block damaging noise, they don't need to clamp tightly to your head and can be lighter and smaller than other headsets.

PNR is more like soundproofing your garage when you're in a band: it blocks damaging noise by stopping it with barriers. These headsets rely on clamping mechanisms to keep the ear cups sealed against the wearer's head. The cups completely cover the ears, and dense foam inside the ear cups absorbs sound while gel ear seals conform around the ear to stop sound waves.



Lightspeed Zulu

Noise Attenuation

The headset's basic job is to reduce (i.e., attenuate) harmful noise, and that ability is measured in both frequency range and number of decibels (dB). A headset rated at minus-24 dB at 100 Hz means it cuts noise in only that frequency by 24 decibels. Cockpit noise that's most damaging to human hearing is in the low-frequency band of around 40 to 250 Hz, while human speech is up around 400 to 4,000 Hz.

ANR headsets attenuate mostly in the low-frequency range, but aren't always effective in the speech range. Consumers might see noise reduction advertised as 26 dB, but that's only in those low frequencies. Reduction elsewhere might only be 5 dB. Though ANR is an amazing technology, it doesn't always beat out passive reduction.

Passive headsets block frequencies across a broader range and may offer higher noise reduction than ANR headsets, especially in speech frequencies. PNR does come at price because PNR headsets clamp tighter than their ANR counterparts and are usually heavier and seal tighter around the ears, which can become uncomfortable over long periods of time.

Companies like JH Audio, Clarity Aloft and Quiet Technologies are making the drawbacks of passive headsets obsolete with new lines of featherweight headsets. They use custom-molded ear inserts to provide up to 45 dB of noise reduction using passive technology. In all cases, pilots should consult the attenuation curves available from each headset manufacturer.

“A headset that feels okay for a few seconds in a pilot shop might feel a lot different after two hours in a hot cockpit.



JH Audio Aerous VX3

Microphone Quality

Besides protecting hearing, a headset's job is to make communication inside and outside the cockpit clearer. The microphone accomplishes that task. The quality of a headset's microphone influences price and can make a huge difference in transmission quality and clarity. While most midpriced aviation headsets use dynamic microphones, the king of the hill is the electret microphone.

Noise-canceling electrets are typically found in the upper-end models from various manufacturers. Some headset companies offer upgrades that let an owner swap out cheaper dynamic mics for noise-canceling electret microphones. The sound quality of electret mics is excellent, and the ability to block noise makes them the perfect solution for open cockpits and other loud environments. Some pilots say electret mics also



Telex Stratus 50

Advances in different technologies have yielded aviation headsets that rival music-production units, yet are small and lightweight. Microphone and speaker innovations provide unparalleled sound quality and intelligibility, increasing situational awareness.

No matter how good a headset sounds, it has to be comfortable. A headset that feels okay for a few seconds in a pilot shop might feel a lot different after two hours in a hot cockpit. Several factors affect a headset's overall comfort.



The amount of attenuation listed for any headset isn't enough to determine its ability to block noise. Pilots must also consider the frequency range that a headset attenuates. Individual cockpit environments vary and will determine whether ANR or PNR is best.

Clamping strength refers to how tight a headset mashes your head. To seal out noise, a headset has to be tight, although ANR allows for less clamping pressure than PNR. Any headset is going to put some pressure on your head, so when trying on headsets, leave them on for at least 5 or 10 full minutes to get a better idea of how they'll feel in your cockpit.

Heavy headsets will feel even heavier after a few hours of flying. Unfortunately, the cheaper the headset, the heavier it will be. Consider the mission and the purpose: A featherweight headset might not work in an open cockpit, and vice versa. Feel the ear seals. Silicone gel is comfortable and won't create hot spots. It also seals out noise better than foam, but it's a little heavier. Headbands can create pressure spots on your scalp. Materials like sheepskin feel better than vinyl, and wide headbands distribute weight more evenly than narrow ones. Again, try before you buy.

In today's consumer-driven world, accessories can make or break a headset. Besides obvious goodies like a nice carrying bag, most high-end headsets will allow you to plug in MP3 players, cell phones and other devices like digital recorders into dedicated mini-jacks.

A new headset innovation is multi-channel Bluetooth connection technology. These headsets allow wireless connections to various devices at once. For example, a pilot can use a cell phone and, say, an iPod with a dongle—both wireless. Controls in a small unit plugged into the headset allow for volume adjustments, channel changing and other functions, all ergonomically positioned. Though Bluetooth compatibility isn't new, the ability to use multiple wireless devices simultaneously is an interesting development.



Bose



ASA AirClassics
HS-1

[illegible]

Click on the image above to view in a larger scale.

Other headset nice-to-haves include individual volume controls, stereo/mono selector, different windscreens and—for ANR headsets—the ability to become a passive set if the batteries die. Pilots should also consider the way the boom mic is attached and adjusted. Some people love the single flex-boom instead of the metal adjustment hardware that makes you look like a refugee from the 1970s, with braces and headgear.

There's one truth about price that takes a while to learn: Don't go with a cheapo first headset, because you'll end up buying something better later, and it will cost you the price of both headsets. Those \$80 eBay "deals" are fine for the student who hasn't figured out if flying is for him or her or for the intermittent and casual flier. But if you intend on making flying a serious pursuit, do yourself a favor and buy the best you can afford: PNR or ANR.

Ultimately, your purchase will be a personal one and will be based on your own preferences and research. The worst thing to do is to be bullied into a purchase by a well-meaning pilot friend or, worse yet, a salesperson. Just slow down, do your research and take your time. Aviation trade shows are great places to try before you buy. Eventually, you'll decide on the headset that's right for you.

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