Electronic Enhancements to Hearing Protection

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For pilots and aircraft passengers, ear protection is crucial to reduce the possibility of permanent hearing loss. Repeated exposure to aircraft noise levels can have devastating effects over a range of sound frequencies. To lessen the chances of hearing loss, all aircraft occupants should consider ear protection when traveling by air.

Though a variety of ear protection options exist, perhaps none provides greater protection than electronic noise cancelling (ENC) headphones. Also known as active noise reduction (ANR) technology, aviation ANR headsets provide more than just passive, clamp-over-the-ears sound muffling. ENC technology employs electronic circuitry to supplement the noise-reducing effects of passive ear cups.

ENC technology works by counteracting the effects of aircraft engine sound frequencies. All sounds travel in waves, each frequency possessing its own amplitude and phase. ENC devices emit sound waves of the same amplitude, but inverted phase of the original sound. This results in interference, with the ENC-produced sound wave essentially cancelling out the original sound. ENC headphones are most effective at cancelling lower-frequency sounds, which include the frequency spectrum most commonly produced my aircraft engines and propellers.

Considerations for ENC Headphones

When choosing ENC hearing protection, aviators should consider the variety of options on the market. Unlike passive ear protection, ENC devices require a power source to supply their noise-cancelling sound waves. This power can be supplied either by a portable battery pack or the aircraft's electrical system. For aircraft power, headsets come with a unit that connects to the electrical system through the instrument panel. Battery-powered models have a compact battery module for ENC power.

Panel power is a great choice for pilots who usually fly just one plane. The availability of the aircraft's electrical system negates the need to purchase batteries for ENC power. In addition, aircraft power saves pilots the hassle of replacing batteries that might die midflight. Though great for aircraft owners, panel power is less user-friendly for pilots who typically fly a variety of airplanes.

For flight instructors, professional pilots, and aircraft renters, battery-powered ENC headphones offer the ultimate in electronic portability. Unlike panel-powered models, which sometimes require direct wiring of components to the aircraft's electrical system, battery-powered ENC headphones require no wiring to the aircraft's electrical system. Just plug in the microphone and earpiece cables, turn on the battery unit, and enjoy the benefits of ENC protection. The only drawback of battery-powered models is the need to maintain a supply of backup batteries. However, most modern ENC units can provide at least 25 hours of protection on a single nine-volt battery or a pair or AA batteries. In addition, the majority of modern ENC units include an auto shutoff feature in case users forget to turn off the battery pack.

Passive Qualities of ENC Units

In addition to the electronic noise reduction provided by ENC models, pilots should also consider the passive protection offered by these units. Passive hearing protection is the noise reduction quality provided without electronic enhancement. Passive protection simply prevents sound from reaching the ears by covering or blocking the ear canals. Occasionally batteries die, electrical systems act

up, and ENC modules experience problems. Be prepared for these instances by choosing a headset with adequate passive noise protection.

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