Sennheiser S1 Headset Advances ANR Technology

Product review

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THE NEW SENNHEISER S1 digital headset offers an impressive combination of advanced digital electronic noise canceling and passive hearing protection all with excellent wearing comfort. The S1 is expensive, but you get a lot of performance and capability for the money.

Unlike some other high-end electronic noise canceling headsets, the S1 has large ear cups with soft cushions to rest against the head. A full-coverage ear cup made from dense material is the only way a headset can block noise without active electronic noise canceling, and the S1 is very effective in this passive mode. Batteries can quit, and electronics may fail, but the passive noise attenuation of a full ear cup is always available.

To enhance the comfort and fit of its ear cups Sennheiser made the S1 asymmetrical, a first for aviation headsets as far as I know. Because our ears are really mirror images of each other they have a front and a back. Sennheiser designed the S1 ear cups to fit comfortably over the right and the left ear. That means you cannot reverse the headset so the microphone boom is always on your left side. But the cup fit is ideal for each ear. Sennheiser was so focused on the fit and comfort that the cushion material in the front center of each ear cup is softer to fit better around the temple piece of the eyeglasses most of us wear while flying.

Sennheiser also did a total redesign of the automatic noise canceling electronic technology using digital instead of analog electronics. And the NoiseGard, as Sennheiser calls its system, tracks both noise inside and outside the ear cup, while traditional noise canceling headsets only deal with sound inside the cup.

As you probably know, automatic noise canceling headsets create an "anti-noise" sound that cancels the unwanted sound. The anti-noise sound wave is exactly 180 degrees out of phase with the noise. When the two waves collide the unwanted sound is eliminated and we hear nothing—actually close to nothing because the anti-noise can't be absolutely perfect.

Sennheiser calls noise detected inside the ear cup "feedback noise," and the S1 uses that input to cancel most noise in the lower frequency range. The new mics mounted on the outside of the ear cup detect what Sennheiser calls "feedforward" sound. The feedforward logic is most effective at canceling higher frequencies. Combining both technologies in a single headset offers a broad frequency range of automatic noise canceling that is not overwhelmed by the volume or frequency of the sound.

Because the S1 uses digital logic it maps the sound frequency and level and develops a strategy to cancel the noise. The traditional analog system simply measures the noise present and develops an anti-noise wave for the average sound in the ear cup. The digital circuit is especially good at eliminating repetitive noise of the same frequency and amplitude—such as noise created by the propeller rotating at a constant rpm, or the shriek of a door seal leak when the airplane is flying at a steady airspeed.

I flew with the S1 in my Baron for a little more than 20 hours with legs as long as three hours and 45 minutes and can say the comfort is very good. You can adjust the squeeze pressure, so if your head is bigger than average, the headset is still comfortable. And the microphone on the S1 is simply excellent, the best I have used yet. My wife, Stancie, who is a very harsh critic of headset comfort and performance, pronounced the mic the best she has heard coming through our intercom, and also approved of the S1 comfort, a rating she has awarded only one or two other headsets.

Because the digital algorithm that the S1 uses to create its anti-noise signal is optimized for one noise condition, Sennheiser includes a "recalculate" button on the left ear cup. Press the button and in a few seconds the headset measures the current sound level and develops a new digital strategy to defeat it. The noise level, for example, is different on climb with high prop rpm and low airspeed than at cruise with slower prop rpm and higher airspeed slipstream noise. So a touch of the button after leveling commands the headset to develop a new digital algorithm, and in a second or two the noise level you hear drops significantly.

Sennheiser could have made this feature automatic but in testing found that if the digital brain was always searching for a new algorithm, the noise canceling you hear wandered around and even shrieked or popped. By allowing us to select when to take a new noise sample, the noise canceling we hear is uniform and effective.

The S1 has full connectivity capability to personal electronics such as phones and tablets via Bluetooth or a connector to input audio. The headset is stereo or mono, and you can reset "dip" switches to enhance higher frequency performance to make up for the hearing loss most of us aging pilots have experienced.

The S1 digital headset is priced at $1,095 with an intro price of $995. For more information visit *www.Sennheiser-Aviation.com.*