In-Ear Auditory Research Platform



Auditory Research Dosimetric HPD



- Ensure adequate protection levels
- Monitor noise dose under HPD and provide feedback
- Maximize communication and perception of warning signals

Motivation

• Lack of appropriate data collection methods and tools for individual measurement of several known NIHL causes (exposure levels, HPD attenuation, susceptibility to NIHL, ...) and early symptoms (hearing threshold shift, OAE, ...) O Demand for versatile auditory research platform providing individuals with a controlled acoustic environment and live digital signal processing capabilities • Need for further refinement in the understanding of variability in inter-individual factors related to NIHL (auditory fatigue, recovery rate, effective silence values) Goals • Develop a measurement device for individual auditory data collection

O Design a versatile programmable audio framework for live signal processing

O Enable further fundamental research on NIHL and its prevention Methodology

O Review literature on NIHL, dosimetry,³ in-ear SPL measurements,⁴ HPD attenuation • Select transducers and electronics based on pre-defined criteria O Embed electro-acoustical components inside Sonomax instant custom earpiece Validate functionality of pre-production units in lab environment (ATF, test subjects) OPerform group studies by taking advantage of rapid deployment of custom earpieces



In-Ear Platform



Embedded, Low-Power, Versatile, Field Programmable

References:

[1] Drawing: Baker Morrant W. and Vincent Dormer Harris, Hand-Book of Physiology (P. Blakiston, Son & Co., 1892) p. 694 [2] Berger E. H., Royster J., Driscoll D. and Layne M. The Noise Manual,

strial Hygiene Association (AIHA) Press (2000 [3] ANSI (1991). "Specification for Personal Noise Dosimeters," S1.25-1991 (R1997), Acoustical Society of America, New York, NY

[4] ANSI (1997). "Specification for Integrating-Averaging Sound Level Meters, S1.43-1997, Acoustical Society of America, New York, NY



