



Innovative Technology and Product Development

Hearing Assessment System

A Case Study

Challenge

There are few readily accessible, low-cost hearing screening programs in the US. Government statistics indicate that approximately 17% of American adults report some degree of hearing loss and only one in five people who could benefit from a hearing aid gets one. Worldwide, hearing loss is one of the major contributors to the global burden of disease, yet only one in 40 people who need a hearing aid benefits from one. In particular, hearing healthcare surveys confirm that the scarcity of services is in large part due to the limited number of available hearing healthcare professionals globally. To address these issues, solutions are sought to improve hearing healthcare access and lower its cost.

Creare Solution

Creare has developed a Wireless Automated Hearing Test System to assess hearing without the need for a soundproof room or mobile trailer. The system consists of an audiometric headset and accompanying mobile device to administer the tests. The headset provides sufficient ambient noise attenuation to act as a "portable sound room". This device increases access to hearing health care by enabling quality hearing tests to take place at point-of-care locations, schools, senior centers, and at work sites.

The speakers in the Creare headset are mounted in ear cups that significantly attenuate the ambient noise over a wide range of frequencies. Electronics mounted in the headset control the stimulus levels and the automated hearing tests then transmit test results wirelessly to a smartphone, tablet, or laptop. With automated assessment algorithms, the test can be essentially self-administered. This feature enables hearing testing in low-resource locations where personnel with minimal training can easily administer the test.



Hearing assessment system developed by Creare



The Creare headset connects wirelessly to software on a smartphone, tablet, or laptop

Impact

Creare headsets have been successfully used to screen for HIV/AIDS-related hearing loss in Africa. In a study conducted as an industrial site, measurements compared favorably with automated hearing thresholds obtained in a conventional mobile trailer typically used in occupational health. The headsets have also been used to support the development of novel therapies for patients with acquired hearing loss from cancer and cystic fibrosis treatment. We expect to register the headsets with the FDA in the near future.

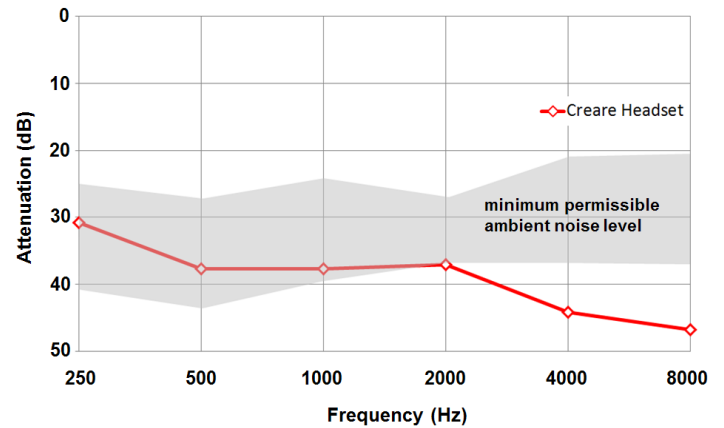
About Creare

Founded in 1961, Creare LLC is an innovative technology and product development company located in Hanover, New Hampshire. We serve government and industrial clients with engineering R&D services that include analysis, prototype design, fabrication, and testing. Our clients include large and small companies and government agencies in the aerospace, defense, medical, energy, and process industries. Creare means "to create" – we create value for our clients when we solve their most difficult problems. We also help integrate new technologies into their products, systems, and processes.

References

D. K. Meinke, J. A. Norris, B. P. Flynn, and O. H. Clavier, "Going Wireless and Booth-less for Hearing Testing in Industry," *International Journal of Audiology*, Vol. 56, 2017, pp. 41–51.

D. Brungart, J. Schurman, D. Konrad-Martin, K. Watts, J. Buckey, O. Clavier, P. Jacobs, S. Gordon, and M. Dille, "Using Tablet-based Technology to Deliver Time-efficient Ototoxicity Monitoring," *International Journal of Audiology*, Vol. 57 (sup4), 2017, pp. S78-S86.



Our headsets allows users to meet or exceed the standards for background noise attenuation outside of a sound booth.



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