Active Confocal Imaging System for Visual Prostheses

Principal Investigator: PELI, ELIEZER
Institution Receiving Award: SCHEPENS EYE RESEARCH INSTITUTE
Program: PH-TBI
Proposal Number: MR141249
Award Number: W81XWH-16-1-0033
Funding Mechanism: Neurosensory and Rehabilitation Research Award - Clinical Trial Option
Partnering Awards:
Award Amount: $299,953.00

View Technical Abstract

PUBLIC ABSTRACT

Objectives and Rationale: Blindness is devastating, significantly affecting one’s quality of life and adding a support burden for caregivers and family members. In recent years, there have been great advances in prosthetic vision. Among the most exciting is the recently Food and Drug Administration-approved Argus II retina implant. In addition to retinal implants, there are numerous efforts to create devices that will substitute other senses for vision. These devices, called "sensory substitution devices" (SSDs), use various combinations of audio, tactile, or electrical (tongue) stimulation. However, these all suffer from low resolution, low dynamic range, and limited visual field. Even with the most optimistic projections, these limitations are likely to remain. Low resolution results in an "image" that is in the form of dots, as if looking at a picture in a "connect-the-dots" children's book. Low dynamic range results in a picture that is in only a few shades of gray -- sometimes even just black and white. Limited visual field means that only a small fraction of a scene is visible at one time. These limitations currently make these devices only slightly better than useless. For example, reading using the Argus I requires tens of seconds for single letters and minutes for short words. At these rates, interpreting an image or a scene while walking is almost impossible. In addition, these rates were measured only in "clean" lab settings.