



Sensors

Visual Instrument Sensor Organ Replacement (VISOR)

Device that converts visual signals to audibly perceptible signals

Humans rely heavily on vision to sense their environment. The Visual Instrument Sensor Organ Replacement (VISOR) device translates visual and other passive or active sensory instruments into sounds. The sensing super-position device increases the image resolution perception and is obtained via auditory and visual representation. The VISOR device provides a mapping or association between signals representing a selected region of a received visual image and audibly perceptible signals that are mapped one-to-one onto a selected set of distinguishable audible signal parameters. External multi-spectral sensors are translated into audible signals targeting the same human vision field. VISOR provides the ability to sense beyond the human visible light range, to increase human sensing resolution, to use wider angle visual perception, and to improve the ability to sense distances. It also allows compensation for movement by the human or changes in the scene being viewed. The system operates in real-time, using limited capabilities of the human user.

BENEFITS

- Enables user to simultaneously focus attention on multiple aspects of a visual field
- Extends the vision system of human beings
- Increases human sensing resolution
- Enriches image detail
- Operates in real time
- Wide variety of tasks that are difficult or cumbersome to accomplish can be met

technology solution

THE TECHNOLOGY

The Visual Instrument Sensory Organ Replacement (VISOR) is a system to augment the human visual system by exploiting the improved capabilities of the human auditory system. In order to increase the visual image resolution obtainable via an auditory representation, a mapping is performed to distribute an image in time. Three-dimensional spatial brightness and multi-spectral maps of a sensed image are processed using real-time image processing techniques and are transformed into one or more two dimensional maps of an audio signal as a function of frequency and of time. VISOR converts visual signals with at-least one associated wavelength, the visible and or the infrared, to one or more audibly perceptible signals with associated audio parameters that can be recognized and distinguished by the human ear. These signals include an audible indication of change, or change rate with time of one or more visual parameters. The radio signals provide monaural and /or binaural signaling that is analogous to depth clues provided by visually perceptible images. The audible signal parameters have an intuitive connection with the visual signal parameters to which the audible signal parameters corresponds. A visual image region that is likely to experience interference, signal distortion, signal attenuation can be converted and presented as a sequence of audio signal attributes that are more easily and accurately perceived or interpreted. The VISOR device was developed to augment the current state-of-the-art head-mounted (helmet) display systems.



VISOR Image

APPLICATIONS

The technology has several potential applications:

- Hazardous environment (where fluids are opaque)
- Unfavorable atmospheric conditions (rain, snow, hail, sleet, fog)
- Noisy or life threatening environments (chemical spills, battlefields)
- Aviation and other vehicle cockpits
- Control room monitoring (process plants, transportation or utilities)
- Detecting micro-fractures in materials

PUBLICATIONS

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