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R&D

Reading For The R&D Community

DNA Purifier

Ceramic Composite

Rolling Circle Amplifier

Optical Voltmeter

RF Personal Monitor

Epoxy Electrocoat

Fluorescence Microscope

Thickness Mapper

Compact Communicator

Picoammeter

The **40th**
Annual

Lensed Optical Fiber

Sphygmomanometer

Crystallization Robot

CO₂ Washer

Simple Syringe

Globus

3D Interferometer

Tiltmeter

Propulsion Modeler

Soy Plasticizer

Leak Detector

Ophthalmic Analyzer

Brain Imager

Nano Analyzer

Facial Tracker

Dig Gene Test

Nerve Stimulator

Bionic Chip

Universal Sensor

Quiet Foam

Magnetism Analyzer

Hybrid Engine

DNA Analyzer



Awards

Landmine Detector

Photovoltaic Module

DNA Quantifier

Laser Diode Array

Fiber Optic DWDM

Honoring Today's

FT-Raman Spectrometer

Weatherometer

Technological

Super Enzyme

Cold Shipper

Innovations

Ultrasonic Spectrometer

NMR

Art Restorer

Indoor Air Tester

Nanoalumina Fiber

Holographic Memory

Self-Cleaning Glass

Fast X-Ray Sensor

SNP Genotyper

Car-Cam Watches Over You

With the development of **faceLAB**, manufacturers can focus on prevention of accidents, nearly half of which are related to driver fatigue and distraction.

With two dashboard-mounted video cameras, **faceLAB** from Seeing Machines Pty Ltd., Canberra, Australia, monitors the gaze of the driver. A team of researchers created an innovative, non-intrusive video system. **faceLAB** uses algorithms and image processing to estimate eye and head positions. Even when the face is partially occluded, **faceLAB** can track driver gaze. This capability sets **faceLAB** leagues ahead of its competitors. Another feature is its ability to track a person's gaze under a wide range of lighting conditions and even when the head is turned 90° to the side.

faceLAB consists of a stereo camera platform, image acquisition hardware, a processing PC, and software that performs real-time processing. The system provides 3-D tracking information at 60 Hz with high confidence levels. The system requires no headgear and does not restrict head movement, making **faceLAB** the most feasible existing technology.

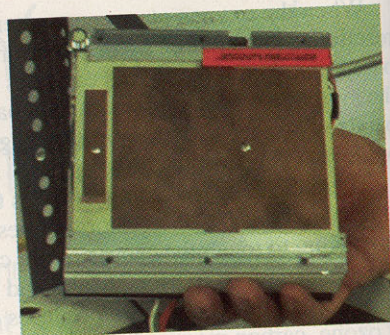
www.seeingmachines.com

Write In 2004



Sensor Boosts Mining Safety

Coal mining could be made safer for both miners and the environment with a new tool from **Stolar Horizon Inc.**, Raton, N.M. In mining, safety is challenged when the machines used to dig into the



roofs of mines cut too thinly, leaving weak roofs to collapse and resulting in injury or death. Larry Stolarczyk developed the **EDIT Horizon Sensor** for the mining industry. It's a sensing system that provides real-time analysis of the thickness of coal in the floors and roofs of mines and the locations of dangerous abandoned mines parallel to active ones.

The **EDIT Sensor**, or electromagnetic wave detection and imaging technology, detects changes in the thickness and the dielectric constant as the impedance of a resonant microstrip patch antenna (RMPA) is altered. The RMPA allows the **EDIT Sensor** to detect both the type of rock over or underlying it, as well as the thickness of the rock up to a point where the RMPA becomes insensitive. This point depends upon the frequency at which the RMPA is used; for example, at 500 MHz, its maximum detection depth is 81.3 cm, and at 1 GHz, its maximum depth is 30.5 cm.

www.stolarhorizon.com

Write In 2004

Lights Keep Patients On Time

The **Healthcare Electro-Optical Locator (HEAL)** is a locating and guidance network that may give people who are mentally impaired more autonomy. Those who have a traumatic brain injury or Alzheimer's disease, for example, can be reminded of and guided to appointments with **HEAL**.

Talking Lights LLC, Boston; Massachusetts Institute of Technology, Cambridge; and Spaulding Rehabilitation Hospital, Boston, made this autonomy a reality by seeing potential in existing environments. Led by Roderick Hinman, a team of researchers designed the locator network with lights already in buildings. The receiver is a palmtop computer and photocell that

patients can carry, wear, or attach to their wheelchairs.

The locator lights flicker at a rate imperceptible to the human eye. At modified rates, they encode messages such as "This is the patient's room," "This is the therapy desk," or "This is the gym."

Programmed in the receiver is the daily schedule of a patient and a map of the facility. When a patient has an appointment, the receiver reminds and guides the patient to the correct location. The receiving unit decodes the modulated light and knows the patient's location within 0.9 to 1.2 m, depending on the spacing of the lights. If the patient doesn't respond to the reminder, the receiver notifies the staff desk. A wrong turn generates new directions.

HEAL is the only system that automates the task of escorting patients from



one location to the next. Studies have shown that **HEAL** reduces staff intervention by 50% in patient trips from one part of a care facility to another. **HEAL** may also allow early Alzheimer's patients to remain in home care for a longer period of time.

www.talking-lights.com

Write In 2004



The 40th Anniversary



Awards

October 2002
R&D Magazine

Exclusive

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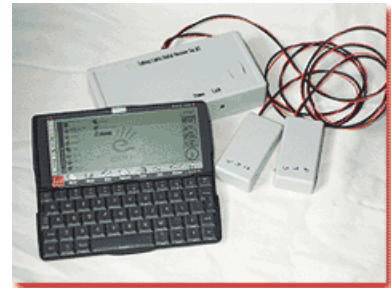
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www.talking-lights.com



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