

Mitsubishi Electric Information Technology Center America (ITA)

# ITA Annual Report

July 1998 through June 1999

Welcome to ITA – Mitsubishi Electric Information Technology Center America, the North American corporate R&D arm of Mitsubishi Electric Corporation (MELCO). In this report you will find descriptions of ITA as a whole, and of our three laboratories, MERL – Mitsubishi Electric Research Laboratory, HSL – Horizon Systems Laboratory, and ATL – Advanced TV Laboratory. We also describe VGO – Volume Graphics Organization, which is in the process of moving into a separate business unit.

This work may not be copied or reproduced in whole or in part for any commercial purpose. Permission to copy in whole or in part without payment of fee is granted for nonprofit educational and research purposes provided that all such whole or partial copies include the following: a notice that such copying is by permission of Mitsubishi Electric Information Technology Center America; an acknowledgment of the authors and individual contributions to the work; and all applicable portions of the copyright notice. Copying, reproduction, or republishing for another purpose shall require a license with payment of fee to Mitsubishi Electric Information Technology Center America. All rights reserved.

Copyright © Mitsubishi Electric Information Technology Center, 1999  
201 Broadway, Cambridge, Massachusetts 02139  
617.621.7500

## Personal Eyewitness CarCam – Vehicle Accident Video Recorder



The Personal EyeWitness Vehicle Accident Video Recorder provides a robust and tamper-resistant recording of vehicle accidents. The PEW continuously records video into semiconductor memory, overwriting old video every thirty seconds, and stopping only after an accident triggers the vehicle airbags or other crash sensor.

The PEW uses Mitsubishi's AR chip as an inexpensive image sensor, and Mitsubishi's M32R integrated CPU plus DRAM chip to provide data compression and storage. The entire device will be able to sell for approximately US\$100 retail.

The intended initial market of the CarCam is truck, bus, and taxi fleet owners, and their respective insurance companies. Current fraudulent insurance claims in the US are estimated at 10% of the US \$10 billion/year insurance business.

*PEW – Personal Eye Witness, AR: Mitsubishi's CMOS-based Artificial Retina imaging sensor.*

**Background and objectives:** The Personal EyeWitness project goal is to produce a working prototype of a self-contained solid-state video recorder for vehicle accident data capture. The justification for this work is the large market in the US for any system that decreases liability or insurance costs for automobiles, taxicabs, trucks, and buses.

**Technical discussion:** A CarCam PEW unit is designed to be mounted in a car, truck, or bus, facing forward, and with a clear view of the road ahead. The CarCam contains an image sensor such as the Mitsubishi M64283FP image sensor (AR LSI) a CPU with low-power DRAM (such as an M32R), a ROM, a battery, a set of control switches, a small display, a serial or infrared interface, a power-input jack, an accelerometer, and a tamper- and impact-resistant case.

The ROM contains a small control program that repeatedly commands the image sensor to acquire an image, then compresses the image using asymmetrical compression, and stores the image in the low-power DRAM. Successive frames are written until the DRAM is full, then the oldest frames are overwritten. Approximately thirty seconds of video at 5 frames per second are stored; every second or two the PEW indicates on the display that it is active and recording. When a vehicle impact or other accident occurs (as detected by the accelerometer) the CPU continues to store approximately ten seconds of video into DRAM and then either goes into low-power memory-retention mode, or if flash memory is fitted, copies the digital image data into nonvolatile flash memory. The CarCam PEW can retain memory in low-power mode for one week on the internal 9-volt alkaline battery, or indefinitely if using the flash memory.

**Collaboration:** This work was done with the assistance of the department of Neural and Parallel Processing Technology of the Advanced Technology R&D center, with the Network Computing Department, and with the Electronic Devices Group of Mitsubishi Electronics America in Sunnyvale, California.

**Future Directions:** The current development for CarCam is producing a dozen operable prototypes and demonstrating them to General Motors and Daimler-Chrysler invited technology expositions in the next three months. Our goal is to achieve a high-level business connection with the design and management of these major automobile makers.

**Authors:** William Yerazunis

June 11, 1999