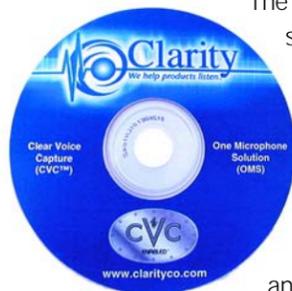




**A**utomobile manufacturers are giving voice to vehicle controls. But noise from other vehicles, the wind, the radio, and even the windshield wipers can degrade the quality of voice signals and the equipment's ability to process commands. Here is a product that could improve speech recognition in noisy automobiles.

## Clear Voice Capture™

**How It Helps:** Clear Voice Capture (CVC) software extracts voice signals of interest from noisy environments, improving the accuracy and performance of advanced voice interface systems.



The software emulates the 95 percent voice-recognition accuracy demonstrated in controlled laboratory experiments. Current technology can boast only a 65 percent voice recognition accuracy in a noisy vehicle. CVC software also improves voice quality, especially in noisy environments. For communications networks, it optimizes bandwidth by eliminating noise before transmission. It also improves battery life by as much as 20 percent in voice-recognition-based mobile devices such as personal digital assistants, cell phones, and Internet appliances. Implementation costs are low.

**How It Works:** CVC software reverses current noise-canceling solutions, which eliminate the low and high frequencies, leaving a mid-level frequency that includes voices and other noise clutter. CVC instead captures and isolates the voice sound using two microphones and mathematical algorithms. The software compares the voice data from each microphone, filters out sounds that do not match, enhances the voice signals, and sends them to a receiver. Voice then can be clearly transmitted to a voice-controlled instrument panel in a car so the driver's command can be understood.

**How Much It Will Cost:** The price of the commercial software license ranges from \$0.50 to \$5, based on quantity. A development/evaluation kit costs \$149.



**When It Will Be Ready:** The software is available now. It is being used in hands-free car kits, cell phones, microphones, wearable personal communications systems, hearing aids, and motor homes to improve the quality and accuracy of voice-based interfaces in demanding, noise-filled environments. Companies using CVC in their products include GE, Peiker, Texas Instruments, RTI, Hitachi, THB, and OnStar RiverPark. Many of these companies also co-market CVC technology to their customers. An audio-visual enhancement that could further increase speech recognition accuracy also is being developed.

**Who Is Working On It:** Clarity, LLC, has licensed and is commercializing the CVC technology. Founded in 1993, Clarity specializes in developing proprietary software products that improve the quality and performance of voice-based products. The company currently employs 21 people and is headquartered in Troy, Michigan, with offices in Campbell, California. Clarity is a spinoff of IC Tech, Inc., the developer and licensor of the technology. For more information, contact Dr. Gail Erten of IC Tech at (517) 349-9000 or erten@ic-tech.com. IC Tech and Clarity's Web sites are www.ic-tech.com and www.clarityco.com, respectively.



**MDA Origins**  
IC Tech developed the mathematical algorithms for CVC under BMDO SBIR Phase I and II contracts in 1997. This technology originally was designed to increase the robustness and sophistication of microphones used in battle management, command, control, and communications systems. For example, it could be used to eliminate digitized noise before transmission, thereby optimizing bandwidth in communications networks.

