

## NEW VOICE-RECOGNITION SYSTEM HELPS OFFICERS RUN A PATROL CAR

Story & photos by Dale Stockton

THERE'S NO DOUBT that one of the most challenging aspects of today's police environment remains the amount of technology and officer must control. Considering that a single human must operate all that equipment while driving—sometimes under emergency conditions—it's a miracle cops perform as well as they do. Even so, we probably crash a few cars due to all the distractions.

A promising voice-recognition system called Project 54 can improve this situation. Developed by the University of New Hampshire (UNH) in conjunction with the New Hampshire Department of Public Safety, the system get in name from the old television show, "Car 54, Where Are You?" Although the show was funny, this technology is serious, and it works. Before you label this vaporware, you should know more than 300 marked police cars are using this technology, and it's getting positive reviews from officers. The majority of installations are currently in New Hampshire, but Project 54 is spreading to other states.

I was intrigued when I heard about Project 54 and contacted Bill Lenharth, PhD, director of the UNH Research Computing Center. During the start-up phase of Project 54, Lenharth spent time with the state police and took note of the complexity of the patrol-car environment. "I was amazed at how difficult it was to operate all that equipment while driving at high speed," Lenharth said. "The amount of driver distractions in generate was amazing to say the least."

The original guinea pig for Project 54 was Lt. Mark Liebl, who was a patrol sergeant at the time the project began. He says Lenharth's willingness to listen contributed significantly to the project's success. While riding with Liebl and other officers, I watched them put Project 54 through its paces, and it was impressive. The most amazing thing is the program's simplicity and intuitiveness.

### AN OVERVIEW

An officer driving a Project 54-equipped car can fully use in-car equipment via voice commands, on-screen touch commands or manual controls. This redundancy is key because officers may use any of the switching systems in any combination. (Officers who prefer to use traditional switches may continue to do so). Unlike speech-to-text voice-recognition software that requires a learning period and often misunderstands the user, Project 54 software requires no learning phase and boasts a high cognition rate. User gender and access don't matter; the system, based on Microsoft Windows' Sappy 5 voice-recognition engine, works well due to categorized commands with unique sounds.

The benefit is tremendous: Rather than divert attention from the road and remove a hand from the steering wheel to perform a task, officers using Project 54 can control virtually any electronic component by voice. A computer voice confirms the receipt of the spoken command, and a display screen gives a visual



indication when a command activates or terminates power to on-board equipment.

Project 54 knows when to listen thanks to one modification so simple its almost brilliant. Most patrol cars these days feature cruise control as part of the equipment package. Because this feature doesn't really lend itself to patrol work, the cruise-control switches go unused. By using the cruise-control button on the steering wheel as the Project 54 system-activation switch, engineers have installed an on/off button right on the steering wheel, eliminating a potentially expensive and labor-intensive effort to run wiring through the steering column.

To issue a command through the Project 54 system, officers push the switch to tell the system to "listen up." The design overcomes one of the greatest obstacles of the development of voice-recognition systems—knowing when and when not to listen for a command. If a car doesn't feature cruise control, any type of switch, including a foot-activated button, will work.

## IN THE FIELD

New Hampshire State Police (NHSP) Trooper Tom Lencki (seen on the cover) has operated a car equipped with Project 54 for two years. Watching him control his car's equipment and run inquiries is like watching a skilled video-game player. Deftly switching between voice command and manual controls, Lencki actually enhances the efficiency and safety of his car's operation. While merging into a busy line of high-speed traffic, Lencki can look over his shoulder for oncoming cars while telling the computer to activate the car's rear flashers to warn approaching traffic of his intentions. As the patrol vehicle moves quickly into the flow of cars, Lencki commands the lights to turn off—all without removing his hands from the wheel or his eyes from the road.

"The thing I like best about Project 54 is I can run plates and people on stops or while moving," said Lencki. "I don't have to take my hands off the wheel or take my eyes off the suspect. I don't have to look down at the screen to type something in; my eyes are on whatever I'm running for officer safety."

One of the features officers appreciate most about Project 54 is its ability to change radio channels. The NHSP operate in a variety of areas, and troopers must change frequencies (more than 250) as they travel into different jurisdictions or enter another troop's district. It's a daunting task when using the standard radio controls, especially when driving.

With Project 54, each frequency is named; when an officer speaks the name, the radio switches frequencies without further ado, which helps when an officer requires a seldom-needed frequency and doesn't know how to switch over. For instance, to switch from the primary patrol frequency to the Coast Guard's frequency, a trooper in given area would have to know where in the 256-channel system that frequency was located. However, with Project 54, the officer says, "Coast Guard," and the radio makes the change.

"Finding your channel out of 256 while trying to maneuver through traffic is a little stressful," Liebl says. It may sound minor, but for the officers it's become one of the most popular features of Project 54.

## THE KEY TO SUCCESS

So, what makes this system successful when many other voice-recognition efforts have failed? In addition to the engineering expertise of UNH personnel, the answer lies in simple, non-proprietary interfaces and compatibility with the widest possible range of equipment. Manufacturers have approached UNH to propose a deal that would make the Project 54 technology proprietary; the university has met those inquiries with strong rejection. UNH is an educational institution for which the greatest indicator of success is proliferation of the technology, not profit. The cost of the Project 54 software reflects this philosophy: \$500 for a site license will cover an agency regardless of the number of vehicles, which is an incredible bargain. The university doesn't feature glitzy advertisements or salespeople, but they do offer a product that works.

The overall system is composed of parts—computer, microphone, interface boxes, Project 54 software and the equipment it controls. These days, most cars already feature in-car computers, so you need to add only

the Project 54 software, the microphone, and the interface boxes. The software resides in the car's computer and recognized the spoken word as a specific command and sends a data signal to the appropriate interface box.

Each piece of controlled equipment has its own interface box that recognizes the signal and sends that signal on to the equipment interface. Inside each interface box is a series of dipswitches similar to what you find inside a garage door controller. Setting these allows each box to operate independently from the others, even though they are all linked. The number of interface boxes needed depends on the amount of equipment the system must control. For instance, controlling a light/siren control head, a radar unit, a radio and data inquiry would take four separate interface boxes plus one for the system activation through the cruise-control switch and one for the car's computer.

Also essential to Project 54's effectiveness is the specialized microphone used to send the officer's voice command to the computer. The inside of a police car can be noisy; when it came to voice recognition, microphone selection was critical to Project 54's development. Other voice-recognition systems experienced ambient noise overload or were unreliable in cutting through the varied noise of a police car. Some even required officers to "wire-up," which led to delays getting in and out of the car. After extensive study and testing, Brett Vinciguerra, Project 54 lead research engineer, determined the Andrea digital array microphone fit the bill. This unit features an array of four microphones spread horizontally across the face of the unit. "It is amazing how much noise the Andrea microphone cancels," said Vinciguerra. "There were times during testing on the highway when the person sitting in the passenger seat could not hear what voice commands the officer was giving over the siren, road and wind noise, but the microphone picked out the voice command cleanly."

The total cost for Project 54 modification in a car depends on the type of equipment already installed in the car. A vehicle already equipped with a computer running either Windows 2000 or XP can support Project 54 software. The processor must be at least a 500MHz Pentium II to handle voice support. If a car already features this capability, the price for the various components and installation runs approximately \$1,000 - \$1,500, depending on the number of devices controlled.

In many departments, preventing one accident could cover the cost of outfitting an entire fleet. The increased effectiveness, productivity and enhanced officer safety make Project 54 a bargain.

## THE FUTURE

Meanwhile, in New Hampshire, the Project 54 team continues to work on its product. On any given day, you can find a group of UNH engineering students working with faculty to refine the system. Upgrades to Project 54 continue, including a system for handheld computers. Info-Cop, a popular interface for handheld inquiries, is now compatible with Project 54; other manufacturers are working with UNH personnel to integrate the software into their products. Additional efforts include a Project 54 for motorcycles and controlling video cameras.

Project 54 offers a proven technology option to help officers deal with the complex environment of today's police cars. For more information, check out the university's Project 54 Web site at [www.project54.unh.edu](http://www.project54.unh.edu).