

# Innovative Merger of Sweepers and Cameras

A camera mounted on the dashboard of city sweepers enables Palmdale, CA, to address public safety and target street infrastructure repair needs.

By Keith Chambers

**I**n 1997 Palmdale was hit with a financial crunch that required the city to resume many maintenance functions itself. Among the results of this action is a leading edge program whereby Palmdale Deputy Director of Public Works, Terry Connell, and Superintendent of Maintenance, George Upegui, mounted a video camera inside the city's sweeper cabs to record what their drivers see. A microphone is located near the operator, enabling him to record comments on tape.

Palmdale serves 127,000 people within its 10 sq mi boundary. Sweepers clean up 22,000 curb miles a year. Although the impetus for the system was a citizen complaint questioning whether their neighborhood had been swept, the program's primary intent is to identify problems within the city's infrastructure: potholes, hanging limbs, sidewalk repairs, etc.

Both Connell and Upegui were working for the city when California's Proposition 218 (Voter Approval for Local



Government Taxes) was passed, leaving Palmdale hard pressed for revenue to continue its street landscape maintenance district operations. The loss of funding caused by 218 would have required the city to significantly reduce its maintenance staff and possibly its ability to provide key services in the event of an emergency situation. Here's what happened.

Following the passage of 218, and to save the jobs of valued employees, the city decided to start handling street maintenance on its own, including street sweeping. Before that, Palmdale had contracted with Los Angeles County to do the job. Although Palmdale is a small city, its road systems are varied and intricate because it has both urban and rural street sections. The city's business core is swept weekly; residential areas are swept once a month. The city also does some complaint and emergency sweeping as needed. The first two sweepers Palmdale started with in 1997 were Schwarze (www.schwarze.com) A7000s, and they are still in use. Currently, the city has five sweepers, three air machines and two mechanical broom units.

According to Connell: "Our camera program was actually the result of talking to Ernesto Rodriguez, one of our sweeper operators. He was complaining because he had recently swept a street

when somebody called saying that the area hadn't been swept. Ernesto said something on the order of 'I wish I'd had a camera in my sweeper.' The more we thought about it, the better an idea it seemed to be."

Before incorporating cameras in their sweepers, Palmdale public works managers identified trouble spots by having a supervisor drive the streets twice a year looking for problems. "The camera program is a real manpower saver," said Upegui, adding that the camera system is innovative because it serves multiple purposes within the single video. Because sweepers repeat their routes throughout the city at least every month, and do so at a slow speed, the video log has proved to be an effective way to locate infrastructure needs in addition to providing proof of where the sweepers operate.

"Like everyone," Upegui continued, "we have residents who call in and tell us something like 'I've been living here for a year and have never seen a sweeper come by.' Our camera program, with its date-stamping, is the most effective response we can offer. It also has a day-to-day purpose for infrastructure inspection, revealing where attention is needed on trees, curb-and-gutter, low spots where water is collecting, sidewalks in disrepair, and all the other sorts of problems that can occur out there."

## Simple and Efficient

The sweeper-based camera system is simplistic, yet efficient. The city does not use anything fancy—just off-the-shelf video cameras. By purchasing them through a police equipment company they came with a mounting bracket on the camera, so they were mounted on



*A simple off-the-shelf, dash-mounted video camera sits on a mounting bracket, both of which were purchased from a police equipment company.*

the dash of the sweeper chassis. A standard microphone is used, located where the operators can make verbal notes of anything they spot that needs work. The manager review system allows scanning directly to the notes, so they are handled quickly. The system also provides evidence that a sweep was made should the city get a complaint. All tapes are archived onto date-stamped CDs and kept for seven years.

If the city gets a complaint that an area was missed, it can burn a copy of a date-coded CD and deliver it to the resident, or provide them with still photos of the street in front of their residence as it is being swept on that date. Palmdale does not have a “no parking” system for sweeping days, so another thing operators look for is areas where parked cars prevent them from keeping the streets cleaned, essentially putting a supervisor in the machine.

The sweeping videos are reviewed by the city’s street maintenance supervisor every day. Although this might sound like a time-consuming process, most of the time a supervisor can review the tape at a brisk pace. Initially, they determine if the operator made any audio notes as the result of any problems that were noticed. Any such information is forwarded to the office staff, which prepares a work order that identifies the problem and assigns corrective action to a specific maintenance crew. The city uses management software from CitiTech Systems Inc. ([www.cititech.com](http://www.cititech.com)) to monitor cost and productivity for all maintenance activities, including sweeping (See box).

This program generates around 150 work requests a year for services like tree problems, low spots, and street repair. It conserves quite a bit of time when compared to the city’s previous twice-a-year inspections. For most sweeping routes, the supervisor can quickly go through the tapes. With the push of a button, the tape will flash to the area where the audio comments were input by the operator, where the tape pauses so the information can be noted.

In addition to increasing the information base about street conditions, the program has had the added benefit of boosting the professionalism of the

## How Palmdale improved Service and Operations Using Integrated CMMS Software

When the Palmdale Public Works Department took responsibility for road maintenance from Los Angeles County in 1997, department managers needed to plan and track maintenance performance without using stubby pencils and file cabinets stuffed with important, but unmanageable, information. To resolve this dilemma, the department began using a DOS-based planning and budgeting software that was developed by Burke and Associates in the 1980s, but, by 2000, department managers needed a different product to integrate into the Windows environment. They also wanted software that would link maintenance operations to the value of infrastructure assets and share information with other software. The implementation and utilization of any maintenance management system takes staff support time and effort. The startup data entry required for assets such as pavement segments, storm sewers, utilities, lights, and other infrastructure is substantial. Palmdale was looking for a vendor that provided:

- A software product that would be a high quality maintenance management tool.
- A software product that would be a GASB-34 compliant asset management tool.
- High quality prompt technical support.
- Responsive willingness to listen to the needs/requests of the users of the software.

In September 2000, Palmdale purchased maintenance management software from CitiTech Systems ([www.cititech.com](http://www.cititech.com)). This software greatly expanded Palmdale’s maintenance management program. There were systems that partially addressed operational aspects maintenance and there were systems that addressed the asset management aspects of maintenance, but CitiTech Management Software (CMS) integrated work management, asset management, resource management, and activity-based accounting into a single maintenance management tool. It offered a simple way to capture data on maintenance activities that impact numerous sub-systems. One work entry reporting screen captures and updates cost and performance information associated with assets, labor, equipment, material usage, service requests, work assignment, and maintenance programs.

In short, the integrated software design allowed the department to effectively implement a management program with powerful data collection and reporting functions. It works behind-the-scenes to track work requirements that might otherwise “fall through the cracks.” The Alert Reminder screen surveys maintenance information and data to identify items demanding immediate attention. From work orders to employee certifications, CMS lets us manage operations pro-actively and provide better service to our customers—the citizens of Palmdale.

Today, the city’s maintenance/asset database consists of 425 miles of roadway, which consists of 2,400 individual pavement management sections that include individual entries for sidewalks, curbing, and gutter—about 12,000 individual assets that are tracked in just the street pavement inventory.

There are additional assets tracked in other management sections of the maintenance management program. They include:

- City drainage system (pipe, manholes, and catch basins).
- City sanitary sewer system (400 miles).
- 16 parks totaling 340 acres with pools, sports fields, etc.
- 210 Landscape maintenance districts.
- 35 Public Buildings (290,000 sq ft).
- 257 drainage basins.
- 6,800 traffic control signs.

sweeper operators. Originally, the plan was to put the camera on one of their supervisor's pickup trucks, but the city decided that the sweeper operators would have a more detailed picture because they sweep at about five mph. "Our city maintenance and maintenance support staff perform their jobs extremely well, with regard to sweeper operations, sweeper uptime, and unit maintenance. They want to do the best every time they sweep," Connell added. "The addition of the camera system, although simple, works for us and we're proud of it. I think our sweeper operators are our best eyes and ears out there. They see the roads all the time, so they can spot places where something has changed for the worse. The camera program provides another facet to their jobs, and it's an important one. Plus, it saves us a half-time position of having someone drive around inspecting for the same thing. That's a good savings and it

allows maintenance to focus more resources on services while maintaining a high level of public safety.

Although the program may sound costly, Palmdale's system, which includes six cameras and a VHS-to-CD converter, cost just under \$10,900.

"For that amount of money, we have an outstanding, ongoing program," Upegui said. "It's efficient and we're keeping the complaints down. We're taking a proactive approach to dealing with issues the city might not notice otherwise, but that are important to us to solve early on, and doing it before they escalate. We all believe that performance and service are the name of the game, and this program allows us to improve both." GE

*Mr. Chambers is a freelance writer who makes his home in the Northwest. This presentation is based on an article that originally appeared in American Sweeper<sup>SM</sup> ([www.AmericanSweeper.com](http://www.AmericanSweeper.com)) magazine, (Vol. 9, No. 1, 2004), published by Schwarze Industries, Inc.*



## Potential Solution for Slippery Streets

**T**o complement the traditional methods of clearing ice and snow, many local departments of transportations are investing in fixed, automated anti-icing spray systems on targeted areas, such as bridges and ramps. These systems have proven useful on all classes of roads, in both urban and rural areas.

The Federal Highway Administration (FHWA), in coordination with the Highway Innovative Technology Evaluation Center of the Civil Engineering Research Foundation (CERF) and the Snow and Ice Pooled Fund Cooperative Program of the American Association of State Highway and Transportation officials, is conducting a multiyear study to evaluate the performance of one type of fixed, automated anti-icing spray system called FreezeFree<sup>TM</sup> ([www.ssiweather.com](http://www.ssiweather.com)).

Transportation agencies can use the FreezeFree system to apply calibrated amounts of anti-icing liquids on targeted areas and high-incident locations. To trigger the spraying cycle, highway workers either can active the system manually or allow the system to use its pavement sensor to monitor ambient conditions and the road surface, and then automatically activate a pump and a series of high-pressure valves that spray anti-icing liquid over the targeted area. The system's computer makes a record of the conditions and other information, including the date and time of activation. To supervise and evaluate the system's performance, officials can retrieve data or monitor the system via telephone, fax, or computer.

With the study nearing completion, CERF recently hosted a meeting to review the draft final report from the project. Paul Pisano, leader of FHWA's Road Weather Management team, and Rick Nelson, assistant director of operations at the Nevada Department of Transportation, conducted the meeting to gather feedback from a technical panel. At the meeting, the panel discussed the findings from test sites in Maryland, Minnesota, North Dakota, Oregon, and Wisconsin. The panel concluded that the report provided strong evidence that fixed anti-icing systems show potential for future use on roadways. In addition, the panel decided that, with some revisions, the report could serve as a useful guide to local agencies evaluating the fixed, anti-icing option.

In addition to FreezeFree, other fixed automated systems currently on the market include the Boschung ([www.boschung.com](http://www.boschung.com)) Fixed Automated Spray Technology system—FAST and Micro-FAST—and the All Weather Inc. ([www.allweatherinc.com](http://www.allweatherinc.com)) Quality Manufactured Fully Automated Spray Technology—QM-FAST.

For further information contact Paul Pisano, at [paul.pisano@fhwa.dot.gov](mailto:paul.pisano@fhwa.dot.gov) or 202-366-1301.

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