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▶ [Safety](#)

▶ [Pressroom](#) (web)

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▶ [CEO Forum](#)

▶ [Employee Recognition](#)

▶ [Employee Activities](#)

▶ [Metro Projects](#)

▶ [Facts at a Glance](#)
(web)

▶ [Archives](#)

▶ [Events Calendar](#)

▶ [Research Center/Library](#)

▶ [Metro Classifieds](#)

▶ [Bazaar](#)

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Photos by Gayle Anderson

Passenger Counting System Creating a Revolution in Bus Scheduling

'Smart bus' system helps planners
create more accurate schedules.

Optical device records '24 hours a
day, every line, every stop,' says
one planner

By BILL HEARD, Editor



The computer printout of service performance data from Metro Bus Line 4 runs the length of a hallway as Systems Manager Simon Guevrekian demonstrates. Compiled by the Service Performance Analysis Department, the data come from Automatic Passenger Counters installed on Metro buses.

(April 11, 2007) It would seem to be a simple optical device that counts the customers getting on and off a bus, but this little electric eye and the powerful computer system backing it up are responsible for a revolution in Metro's bus scheduling procedures.

Called Automatic Passenger Counting (APC), it feeds passenger data into the Automated Transportation Management System (ATMS) – a much larger "smart bus" system that can track the movement of each bus, and provides radio communication, computer-aided dispatching and other high-tech elements.

Metro's Automatic Passenger Counting installation, which includes devices at the front and back doors of every coach in the 2,500-bus fleet, is the nation's largest and is admired by service planners at transit agencies across the country. APC is even installed on Metro's three-door

articulated buses, although it is being upgraded for Metro Orange Line coaches which permit passenger entry at all three doors.

Since it went into full operation last June, APC has compiled more than 130 million data records from Metro's almost 200 routes and 18,500 bus stops, according to Simon Guevrekian, systems manager in the Service Performance Analysis Department.

APC provides some 60 different types of data, including line and trip number, bus location, time spent at each stop, the number of passengers boarding and exiting and the average number of boardings at a bus stop, among others.

Service Performance Analysis team members who work on the APC project are, front to rear, Systems Manager Simon Guevrekian, Scheduling Systems Supervisor Ruben Hernandez, Transportation Planning Manager Susan Phifer, and Scheduling Systems Project Leader Rodger Maxwell.



‘Important software development’

“This is probably the most important software development this agency has ever seen,” says Jake Satin-Jacobs, manager of Operations Performance Analysis – Consolidated Reporting. “We have the capacity now to look at how service is running – by the day, by line, by trip, by hour of the day, by operator, division and sector.”

That’s what makes this “data warehouse” so useful for planners like Mike Brewer, service development manager for the San Fernando Valley sector, who’s looking for ways to save some 19,000 bus service hours to help balance Metro’s FY 2008 budget.

“We have to find ways to schedule more efficiently and we’ve used the APC data exclusively to do that,” says Brewer. “We’ve also relied on it heavily to avoid canceling lines and, as a result, we’ve been able to save quite a few lines being considered for cancellation.”

In the San Gabriel Valley, Service Development Manager Jon Hillmer contrasts the real-time APC data he now receives with that once provided by schedule checkers who recorded bus ridership on hand-held devices and were able to provide end-to-end line checks only once a year.

"The data is now 24 hours a day, every line, every stop," he says. "Over time, we'll be able to get a very good picture of a bus line or trip, how much time is needed to complete a trip and how many passengers are boarding at each stop."

Just now, Hillmer and the sector planners and schedule makers are using APC data to develop a plan to link the El Monte Busway with a limited number of bus stops through downtown LA to the Harbor Transitway and on to the Artesia Transit Center or to LAX.



Systems Manager Simon Guevrekian checks a point on a computer printout of service performance data from Metro Bus Line 4. The data was compiled by the Service Performance Analysis Department.

A viable concept?

"This line could serve employment centers along Century Boulevard near the airport," he says. "We're using the APC data to see if the concept is viable."

While the APC data warehouse is useful in large-scale service planning, it also can be used by division transportation managers to look at individual trips and compare the actual daily performance of bus operators in driving their routes and meeting time points.

"It gives us the ability to accurately measure in-service, on-time performance at various levels for schedule and operations fine-tuning," says Guevrekian.

In addition, he says, "We have lots of data samples that allow us to determine seasonal changes or look at Wednesdays versus Mondays, for example. The data warehouse gives us the ability to define our own level of analysis – stop level, route segment level, line level or system level for various time periods."

Wheelchair boardings are an example of the stop-level data available through APC. The Service Performance Analysis department publishes a monthly report that shows the number of wheelchair boardings on each bus trip, by bus stop and operator.

"We can isolate operators who pick up substantially fewer numbers of people in wheelchairs," says Satin-Jacobs. "It's been very effective. The number of wheelchair passenger passups has been decreasing."

On a larger scale, data provided by the APC system helps Metro ensure that buses anywhere in the 1,400-square mile service area are operating according to schedules that are properly drawn up to accurately reflect

conditions on the street.

"Now, we can better balance the number of buses in a given location with the number of people demanding service there," says Satin-Jacobs. "Our passengers benefit totally from this – it's all for them."

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