

Montreal RFID-enabled Bike Project Picks Up Speed

The city provides an update on its plan to roll out RFID-enabled bicycles that commuters can use for short trips from transit stations to an office or store.

By Claire Swedberg

July 17, 2008—The city of Montreal is making headway on its plans, announced last month, to deploy an RFID system for renting bicycles. The [Public Bike System](#), managed by the city's parking authority, the [Stationnement de Montreal](#), will share a software platform with the parking-meter solution the city has been using for cars since 2003.

Both the parking and bike-rental systems are being provided by wireless solutions company [8D Technologies](#), which also designed and built the systems' RFID hardware. The city has already replaced 16,000 single-space parking meters with 350 solar-powered parking terminals that transmit data regarding filled parking spaces via a GPRS cellular transmission to a third-party hosting system using 8D software.

Now, says Alain Ayotte, executive VP of Stationnement de Montreal, the city is building onto the existing parking system with bike rentals that will be tracked using RFID tags on the bicycles and interrogators on bike docks connected to solar powered bike stations. Beginning in September of this year, Montreal will provide 40 bicycles at four modular stations—each with 10 docks for bike storage—that can be installed at various locations throughout the city. After trialing the system with the public, the city intends to purchase 300 stations and 2,400 bikes for deployment in spring 2009.

Like the new parking terminals, the bike stations are solar-powered and employ a cellular GPRS connection to communicate with back-end software. Therefore, the stations can be placed wherever the city chooses—and because they are modular, they can be relocated as demand changes. "One of the advantages we have with our solution," says Isabelle Bettez, co-owner and CEO of 8D Technologies, "is that the station could be put on one corner one day, then taken down and put somewhere else overnight."

The project is part of a mandate from the city of Montreal for the parking authority to encourage an increase in bicycle and public transit use. For instance, additional commuters would be able to take public transportation if they had access to a bike that would transport them from the transit station to their offices. "The service we want to offer is short-term," says Ayotte, meaning a user would pick up a bicycle at one docking station, ride a short distance to an office or transit station, then return the bike to another docking station, all within 30 or 40 minutes.

Once the system is deployed, a user will be able to consult the city's bike-rental Web site to identify where the closest docking station is located, and how many bikes are available at that location. The system will enable the user to set up an account for repeated use—prepaying at a city office for a pass card with an embedded passive RFID tag designed by 8D Technologies. The pass card's unique ID number is then linked to that

individual's account in the server.

To rent a bike, the user waves the pass card in front of a dock's RFID interrogator, awakening it (to reduce power consumption, the readers go into sleep mode immediately after a transaction). The reader then captures the card's unique ID number and transmits that number back to the server, which—if the number is approved—sends instructions to unlock the bicycle. The bike also has a similar passive tag attached to it, which sends the data to a second interrogator at the dock, thereby alerting the system that the bicycle is being removed. That bike and the customer's ID number are then linked together in the server.

Alternatively, commuters could, at the time of the bike rental, pay as a "casual user" with a credit card at the station itself. Once the payment or pass card is accepted, the terminal generates a paper ticket with a three-digit number printed on it, that the user then punches into a keypad at the bike dock. The system unlocks the dock, and the reader awakens as the bike is removed, once more linking the user's identity (in this case, the three-digit number) and the specific bicycle.

Once finished, the user simply returns the bicycle to the most convenient station, and the interrogator at the dock again captures the bike tag's ID number, transmitting that data to the server to indicate that individual has returned a specific bike, and at which dock it is located.

Jean-Sébastien Bettez, who co-owns 8D with his sister and serves as the company's chief technical officer, describes the RFID hardware as proprietary. As such, he declines to reveal the frequency being used, or the ISO standard with which the system complies. It is, however, a passive system, he says, designed for a very short read range—about 1 to 3 centimeters (0.4 to 1.2 inches)—to avoid cross-reading the tags of other bikes parked in neighboring docks. Bicycles and docks are being provided by the city.

The 8D software not only allows parking authority employees to view the activities of each station, and to know who has which bicycle, it can also transmit alerts, such as when a bicycle has not been returned, or when a station will need more (or has too many) bicycles. If a bike is not returned or is brought back late, the user is subject to a late fee or replacement charge. The city has that user's identification, either through the three-digit number associated with a credit card number or the prepaid pass ID number, and can send a bill to that person's home address.

According to Ayotte, the initial phase in September will enable the public to sample the system, and to offer input. "We want to make sure the citizens can provide their input before we go into final production," he says. The spring 2009 deployment will take place in Montreal's city center, and the city hopes to expand to outlying neighborhoods later this year, with as many as 3,500 to 4,000 bicycles in use by the end of 2009.

The bicycle stations will have a dual purpose, Bettez says, because they can also be utilized for parking cars. While the existing 350 parking terminals are simply used for car-parking purposes, the bicycle stations will be able to transmit and receive bicycle data, as well as information about car parking. Parking spaces throughout the city have unique numbers.

RELATED_ARTICLES If an individual parks a vehicle in the vicinity of a modular bike station, that person can make use a credit card to pay for parking in that space, indicating the specific parking space number. That information, like the bicycle data, is transmitted via GPRS to the city's server. Car-parking payments can be made at any station; therefore, if a driver chooses to increase parking time at a space, he or she can do so from any station throughout Montreal.

Ayotte declines to specify the system's cost, but says it will be fully funded by user fees, as well as by corporate sponsorship. He says he foresees users purchasing annual memberships at a price yet to be determined, enabling them to ride an unlimited number of bicycles per year. "Everybody who is involved in

this project is excited," Ayotte says. "It's not a mercantile project—it's a social project." He adds that he has received calls from other cities around the world asking about the system.

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