

# Do-It-Yourself Mobility Management

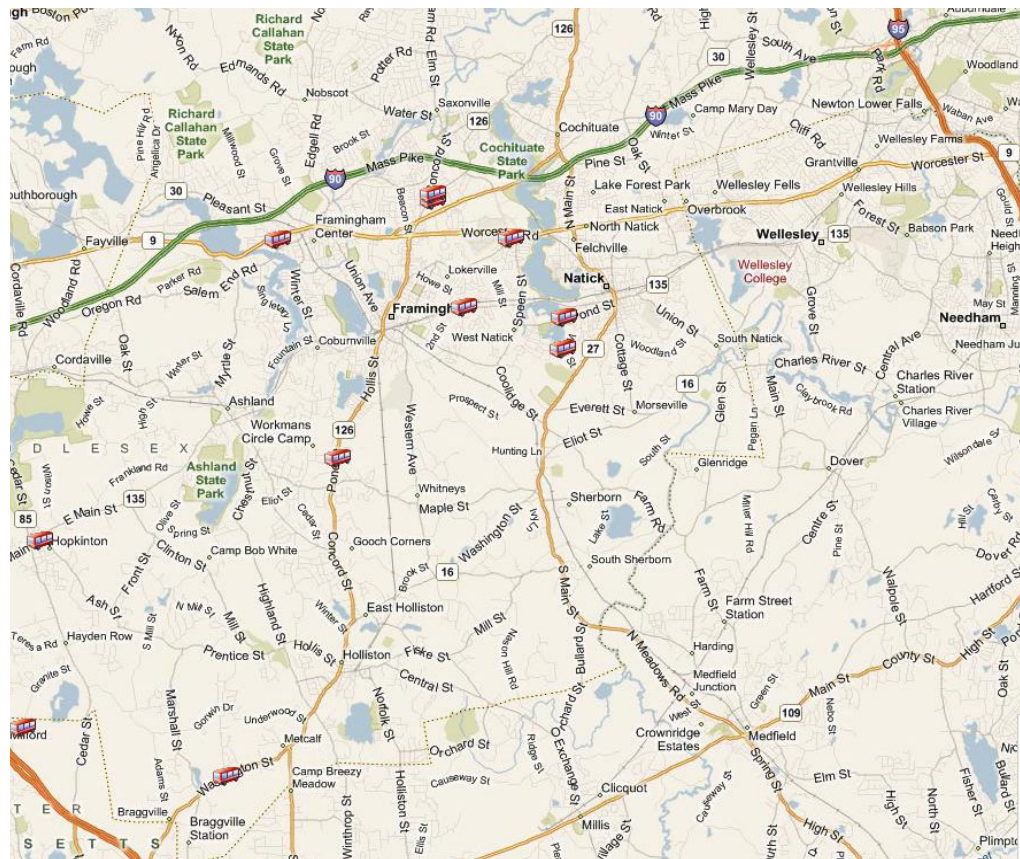
**THRILLING  
WONDER  
STORIES**

by Lawrence Harman and Edward Carr

*In the Boston suburbs, real-time technological innovations help transportation providers offer better service to their customers.*

Since the inception of the Mobility Manager concept in the eighties, community transportation professionals have looked to technology to help provide the efficiencies that would make passenger transportation faster, cheaper, and better. Unfortunately, the technology was not cheap, deployment was slow, and, often, the resulting transportation didn't seem to be measurably improved by the installation of the technology. Now, with several generations of wireless communication behind us, vastly improved mobile data hardware and software and Internet mapping applications of real power and low cost to publish real-time vehicle location for unprecedented customer information – a fundamental change in approach to transit technology is at hand. We call it do it yourself (DIY) Mobility Manager. The Home Depots of this brave new world are Google and Microsoft. The change agents are your children – or at least students at your nearest tech school or community college.

What's new about the technology?



The new wrinkles are: A GPS, web-mapping/tera-byte and petra-byte databases and smart phones. Assisted-global positioning systems (A-GPS) integrated into cheap and tough cell phones and cheap data plans from cellular carriers will get you started. The assisted part of the GPS term describes the concept of the cellular carrier devoting their wireless network to perform the location computations for the consumer on a very inexpensive phone at very high speed.

As anyone who has tried to find travel directions on the web know, the corporate giants, Google and Microsoft, have found it in their interest to unlock access to massive database capabilities and high quality web mapping services to the consumer. The cost to the consumer for the use of Google and Microsoft databases and web maps is the cost of

Internet connectivity – an increasingly reasonable proposition. Lastly, while Apple's iPhone may be getting the media attention, the next generation of mass market mobile devices will have revolutionary transmission capabilities and computing power which can be tapped by persons with disabilities and the general public to acquire real-time mapping of transit and paratransit vehicles. In the future, these mobile devices can automatically communicate with a specific vehicle about estimated arrival time and individual intermodal transfers. The promise of mainstreaming transit and inter-city travel using individually programmed mobile devices with universal automatic vehicle location and Internet web mapping is close to reality.

How is it faster, cheaper, better?  
In a public partnership between

the Bridgewater State University's GeoGraphics Lab and the new MetroWest Regional Transit Authority, a prototype web-based automatic vehicle location system has been deployed that provides real-time AVL on a Microsoft Virtual Earth application with a refresh rate of less than five seconds. Less than five second refresh rate for AVL is world class speed. The mobile unit is a Motorola i355 military spec cell phone with A-GPS and a custom program to push the GPS data over the Internet using Nextel's iDEN network. The i355 is an \$80 phone with an unlimited data plan of \$10.00 per month. Web mapping is free if you can write the application from Google or Microsoft – a pretty cheap and very fast AVL system. What you get is a world-class real time AVL system hosted by Google or Microsoft, with all the expertise that entails, to keep the database up and running. Now you can design the customer information for your specific transit or paratransit service and individual clients using their free application software. Who can provide better mobility management than you – with Google and Microsoft backing you?

Getting yourself in a position to be a DIY Mobility Manager will be difficult for some and less difficult for others. We have tried to build a supportive relationship between public higher education – with their tech-savvy and transit-savvy students – and a new suburban transit agency with a lot of problems and modest resources. You will have to fashion your own approach. Be forewarned, DIY technology development will not be easy and it may change you. There are two features that make it worthwhile.

### **Situation Awareness**

The authors' military experience was in the 1960s, before the Department of Defense built the global positioning system and before the cell phone was ubiquitous. We did learn that real-time information on the location of assets and personnel saved lives. Moving passengers, some of them very fragile, requires very timely information on where the vehicles are and where the client is. Most people are aware of geo-coding – plotting a location on a web map by typing in an address. We are now able to accomplish reverse geo-coding – finding the address of the AVL vehicle from its latitude and longitude and placing it on the label for each vehicle on the web AVL map – in milliseconds. This means that if you know you are on 151 Main Street that the web AVL map can tell you that the bus is on 250 Main street and is moving eastbound at 18 miles per hours. This information can be conveyed to you on a flat screen TV at an intermodal terminal, on your desktop, or on your smart phone. You should be able to get that information in voice or text and it can be refreshed every five seconds on your Internet Browser. This is a new dimension of situational awareness for the consumer and for most operations managers in community transit.

### **Spatial Analysis**

Again, when these authors started out, acquiring aerial imagery with six-inch resolution was only achieved at great cost in US dollars and, in some parts of the world, human life. Now you can type in your address on Google Maps and Virtual Earth and you are looking at high-resolution imagery of your house that was unheard of a generation ago. When you combine this free

imagery and mapping capability with the very rich GPS data that you acquire from A-GPS cell phones there is a capability for geographic analysis of your data archives that will answer all the questions you were afraid to ask about historical transit and paratransit services. Is the bus route or paratransit service being operated as it was intended? Are the routes well designed? Are we going to the right places? Are the drivers performing as required? Are the buses on-time at key time points? The data collected from these systems each day require larger and larger databases –we have a 10-terabyte database server – and mapping programs of increasing capacity and ease of use. Fortunately, the cost of computer storage devices are plummeting and the cost of desktop geographic information systems (GIS) are low while they are increasing in power. The ability to use spatial analysis for strategic planning and evaluation should be worth the modest time and cost required.

### **Bottom Line: It's Customer Service.**

The A-GPS cell phones have been on the MetroWest (Massachusetts) buses for about a month and the AVL has been hosted by Microsoft Virtual Earth in real-time. In this period, customer complaints have been cut in half. When a customer calls to complain about a bus being late, a MetroWest employee can look at the web map and immediately resolve the problem with the bus operator while the customer is on the phone. That is real-time customer service at DIY cost.

*Mr. Harman is a professor at Bridgewater (Mass.) State University and Mr. Carr is the administrator of the MetroWest Regional Transit Authority in Natick, Mass.*