Mobility Allowance and the corridor services and rail programs. In the past, local governments have not actively coordinated with the MTA, since they have not believed their input would result in service changes by the MTA and they did not want their local service decisions questioned by MTA staff. A more joint decision-making process should lead to significant service coordination improvements.

Finally, as indicated previously, there would be innovative planning opportunities to match supply and demand, ranging from flexible destination service using smaller vehicles to more traditional fixed-route service. Providers could include contracting with the MTA at a lower contract rate using existing local and municipal operators, or contracting with private companies using any combination of buses, shuttles, and taxis.

The MTA staff will be bringing forward a report to the MTA Board in October more fully defining the concept and requesting proposals from local jurisdictions for demonstration services. These services would be determined by a thorough analysis of the MTA system by line segment, day of week, and time of day. This is another example of a concept that should both stretch existing resources and improve mobility. The Mayor of Los Angeles has also recommended that the service savings that should occur be reinvested to improve service for the transit dependent.

Smart Shuttle

Another concept that the Mayor has strongly endorsed is Smart Shuttle. The Smart Shuttle idea was proposed to our metropolitan planning organization as a third tier in the regional transportation system, which would improve transit use by making available a significant number of smaller vehicles operating on an expansive network of arterial and freeway high-occupancy vehicle lanes, with service efficiency and user access maximized through state-of-the-art "smart" technology. Although it appeared that a full rollout would only pencil out favorably assuming some hefty pricing fees on auto users, the potential to test the idea of multiple uses of smaller vehicles linked by existing technology seemed to have merit.

For example, multiple use could mean peak-period connections to rail services or relieving overcrowding on bus lines, midday use for nutrition or medical trips, and fixed-route service replacement for night and owl operation. If the Smart Shuttle public transit operation could generate additional revenue during the peak and operate more efficiently at night, then the cost would be minimized. Similarly, if the Smart Shuttle cost for providing Medicaid trips was less than existing costs, that portion of Smart Shuttle operation would also be an improvement. The goal would be to find as many revenue generating uses as possible to bring down the paratransit cost, which has typically substantially exceeded fixed-route cost. Smart Shuttle demonstration programs will likely be managed initially by firms with either contract transportation or taxi experience. However, it appears that these ersatz franchises have the potential for community based or owner/operator management in the longer term.

Summary

These three nontraditional transit service ideas — co-venturing with Health and Human Services programs, providing fixed-route subsidies for alternative service delivery options, and using more flexible services for a variety of trip purposes — indicate that there are opportunities to use new partnerships to improve mobility. There is a definite need for public transit to get "out of the box." We cannot afford, either literally or figuratively, to do business as usual. Let us recognize that our focus should be in using our skills as mobility managers, not necessarily as service providers, to improve mobility and efficiency.

TECHNOLOGY APPLICATIONS

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This presentation discusses transit vehicles, communication and technology. This is a hefty subject, because of both the many needs of transit and the many opportunities modern technology affords. This sounds like a perfect match, and it should be. But transit management's applications of technology to date have lagged woefully behind its potential.

This is not entirely unique to transit. When I lived and worked in Ann Arbor, Michigan, I chaired the education committee of the local Chamber of Commerce. I found myself in a very interesting situation. Within a community, which is home to a university, there were people that wanted to get down to basics. Their concept of basics was a 1950s factory

style education system because that is what they had grown up with and were comfortable with. They failed to recognize that the world fundamentally changed in 1973. Why 1973? Because 1973 was the introduction of the personal computer, which put a tremendous amount of knowledge in the hands of the common person.

I'll Take "Buses, Fareboxes And Electronics" For $1 Million

It is important, of course, to give credit to and highlight those agencies that have done some interesting things. Let us start with vehicles. Los Angeles, for example, is taking the lead in designing buses of the future — advanced transit, ATTB, and the like. These will be lightweight, low-floored, potentially alternatively fueled vehicles. Of course, they are spending millions of dollars to develop what already exists in Europe. Unfortunately, they are not permitted to go out and purchase this existing, but foreign, technology, so they are going to spend millions to develop an "American" bus of the future.

Utah Transit Authority often operates "outside the box." UTA had need for an upgraded radio system, but did not want to spend a great deal of money in acquiring one. By doing some research, they discovered something quite interesting: There are basic rules on communications that are covered in some rule book written by some scientists over the years relating to radio. They discovered that a radio is a radio is a radio. So instead of paying hundreds of thousands of dollars for a radio system, they built their own. Through a normal procurement process an agency could expect to pay $5,000 to $10,000 per unit. UTA's cost was much less.

In Phoenix, transit managers think outside the box occasionally, too. They were looking for a fare collection system. They did not want to spend a great deal of money either. So they purchased their own magnetic card reader and their own cards and sold the cards themselves. It was so successful that now they are working on being able to take Visa or Mastercard. They can take it through the same farebox system because they found somebody to act as their clearinghouse.

Speaking of fareboxes, buses tend to have huge fareboxes. They are so big that passengers using wheelchairs have great difficulty in negotiating around them. The transit system I run in Austin does not take in a lot of money; only 14 percent of our money comes through the farebox. But we have got these huge, old, expensive fareboxes, which only collect about a $100 per day. Why? Because everybody has always done it this way.

Incidentally, why did transit start using fareboxes in the first place? When I was a bus driver, we still made change. Somewhere, someone came up with the idea that we could no longer trust the driver to make change. So we developed a system that does not make change. (The other reason was that they were being robbed.) Now transit agencies expect people to come to the bus stop, if they can find it, with the exact fare in change or a pass of some sort. And we wonder why our users are less than thrilled with this. There has to be a different way. We should find other ways to collect fares.

Regarding vehicles and planning, technology can provide all sorts of valuable information. About 10 years ago Flint, Michigan, and Syracuse, New York, rewired the buses and were able to analyze performance. This is similar to the old Volkswagen that could be taken in for a simple plug-in diagnostic check. When this concept was applied to transit buses in New York City, it was a terrible disaster. But Flint and Syracuse tried it, and it worked. Flint now has a tremendously effective maintenance program that gets to things before they fail. Yet that system is still not a part of most transit fleets today.

An interesting application relates to road call diagnostics. Electrical failures are one of the most frequent causes of road calls. Transit is finally using "multiplexing," by which we can diagnose electrical failures. This was developed by someone else for another purpose and finally brought to the transit market — about a decade later.

Communications — Smart Cards And Self-Actualized Buses

Toronto Transit Commission (TTC) has been a leader in communications with an outstanding integrated system. And Kansas City has an excellent passenger counting system, using data to plan their routes. What a radical concept. They use data for something other than a report to their Board of Directors!

ROI is a strange term in public transit. For those of you not familiar with ROI, it stands for Return on

Investment. In transit we always think of cost and expense. Never about investment.

Abraham Lincoln said, "The dogmas of the quiet past are inadequate for the stormy present and future. As our circumstances are new, we must think anew and act anew." So let me suggest what is real and what is new.

Smart Cards. I have a four-year old Smart Card, which is, in fact, already relatively dumb. This particular card only has 64K on it. About 300,000 of them will be issued by Visa for the Atlanta Olympics. The most interesting thing about this is that Visa is not doing this as a pure marketing ploy to showcase cutting-edge technology. Rather, it is a sensible business move, because the people in Europe and the Far East are already using this technology and want to be able to use it when they visit the Olympics.

Moreover, Visa has found that Smart Card technology is fairly secure. This is especially important to a company that loses $1 billion each year through theft and fraud of current magnetic strip technology. How secure is it? The best and brightest students at the University of Michigan have been trying to break Smart Cards for over three-and-a-half years, without success. If they have not found a way, it must be a pretty safe technology.

The cards to be issued at Atlanta will still have the magnetic strip on them, because the current ATM machines are not fully capable of using all the capabilities of the Smart Card. This too will come.

In transit, Smart Cards are being used in Dayton. Houston is using them, too, for food stamps of all things. This "high-tech" item is saving a large amount of money. The federal government currently spends $250 million annually to batch and burn food stamps that are used once. The biggest opponent to greater Smart Card use is the sole producer of paper food stamps.

Washington, D.C., Metro is doing Smart Card testing on its Cubic Western proximity reader cards. This system will allow transit patrons to go through the turnstile with a Smart Card in their wallet or purse. It can be read without actually taking it out.

As people start to understand new technologies, they become systems thinkers. They no longer think just about products, but rather about systems.

GPS & GIS. Global Positioning Satellite (GPS) technology can now locate objects within three meters. And geographic information systems (GIS) allow us to keep complex databases. The SMART bus system, when it was introduced in Denver, helped us discover something very interesting. The maintenance department had one way of recording for a bus stop, the operations department had another way of recording for a bus stop, and the planning department had still another way. The vendor tried to build a database, only to find that one of the fields was alphabetical, one was alpha-numeric, and the other was numeric. This echoes Churchill's line about the English people being divided by a common language. Transit is like that. We all gather our own pieces of data, but we seldom put it together. We need to learn how to bring data together into information systems.

Montgomery County, Maryland, is measuring things transit agencies have traditionally not considered. Transit always talks about ridership. The question is, ridership relative to what? It is important to identify what the other variables are, then find a way to measure them. GPS and GIS become fairly critical in this endeavor. To assist, the federal government has standardized the mapping protocols. The U.S. Geological Survey is doing a special database. Another effort has resulted in a special databases related to transit. This system is going to benefit all of us for many years to come.

SMART Bus. In talking about SMART buses, it is not only a question of "Do we know where the bus is?," but also, "Does the bus know where it is?" Putting data terminals on board buses is a big step toward better communications. Some leaders in the industry, like the Chicago Transit Authority, took a real hit when they bought existing European technology. They did not feel the need to reinvent the wheel.

With these systems up and running, CTA will be able to tell people the headways are 30 to 40 seconds going south on State Street, or Archer Avenue, or someplace else. They will also help control the banana effect during peak hours. The banana effect occurs when buses get so close together that they begin to come in bunches. In between, there are huge gaps in service. People stand there waiting a long time for the bus and getting upset. When the bus finally does come, it comes with one or two others right behind. Now the riders have their bus, but they are even more upset.

SMART buses can help spread out service and eliminate the banana effect.

In Austin, we are working on advanced signal timing. Our highest productivity route is the north Lamar route and yet it has only a 78 percent on-time rate. A major contributing factor is that it has the highest boarding of wheelchairs in the entire system. Almost every single trip has at least one, possibly two. We are looking at signal timing to help restore buses to schedule. We have a partner in 3M, using their Opticom system in order to be able to test it. They are learning some interesting things about it as well.

The Black Box For Buses. The black box for buses is like the flight data recorders common in the airline industry. We do have accidents in the transit industry, although looking at the national data one would never know we do. With black box data recorders, we can learn some things to apply to designing buses and teaching our drivers. I have a slightly different perspective on this, having once experienced a 180° turn on slick tires on a slick street while driving a bus near Midway Airport in Chicago.

Dispatch Radios. While presenting this paper, I received a message on my pager from my secretary in Austin, giving me the phone number of the General Manager at BC Transit in Victoria, British Columbia, Canada. At my fingertips, I had his home, cellular, and office phone numbers. With this, my notebook computer, and my cellular telephone, I have complete digital cellular communications. Now imagine that in a supervisor's car — even a radio system. In Austin we intend to close down our radio center in our building and shift all our radio dispatching to our supervisors' vehicles.

Fuel Cells. The Ballard Corporation in Victoria has developed fuel cells for bus operations. I have discussed retrofitting five of our vehicles from diesel engines to fuel cells. They originally came to us in Austin and asked if we wanted to buy a $1 million bus. Capital Metro does not need a whole new bus (it already has a hundred of them). We plan to spend $100,000 to replace engines, because we never took adequate care of the old ones. Perhaps we can test fuel cells.

We are interested in fuel cells, particularly, because we already have compressed natural gas (CNG). We have a mandate that required us to go to CNG. I have lots of buses running on CNG. Out of 30 CNG engines, we have lost 18 due to problems of constant burn within a cylinder. So, we are looking for a different technology. Why fuel cells? Because we can reformulate the hydrogen used in the fuel cell at a $2.5 million CNG fuel station we already have.

Summary

My primary message is that much of the technology transit can and should use is already here. We simply have to figure out a way to get out of our traditional way of thinking and do some basic thinking about other solutions and partnerships we can use. We need to think outside the box. I believe we have a lot of people who, once they are unfettered, really become creative. I think we can come up with a tremendous set of transportation solutions for our communities.