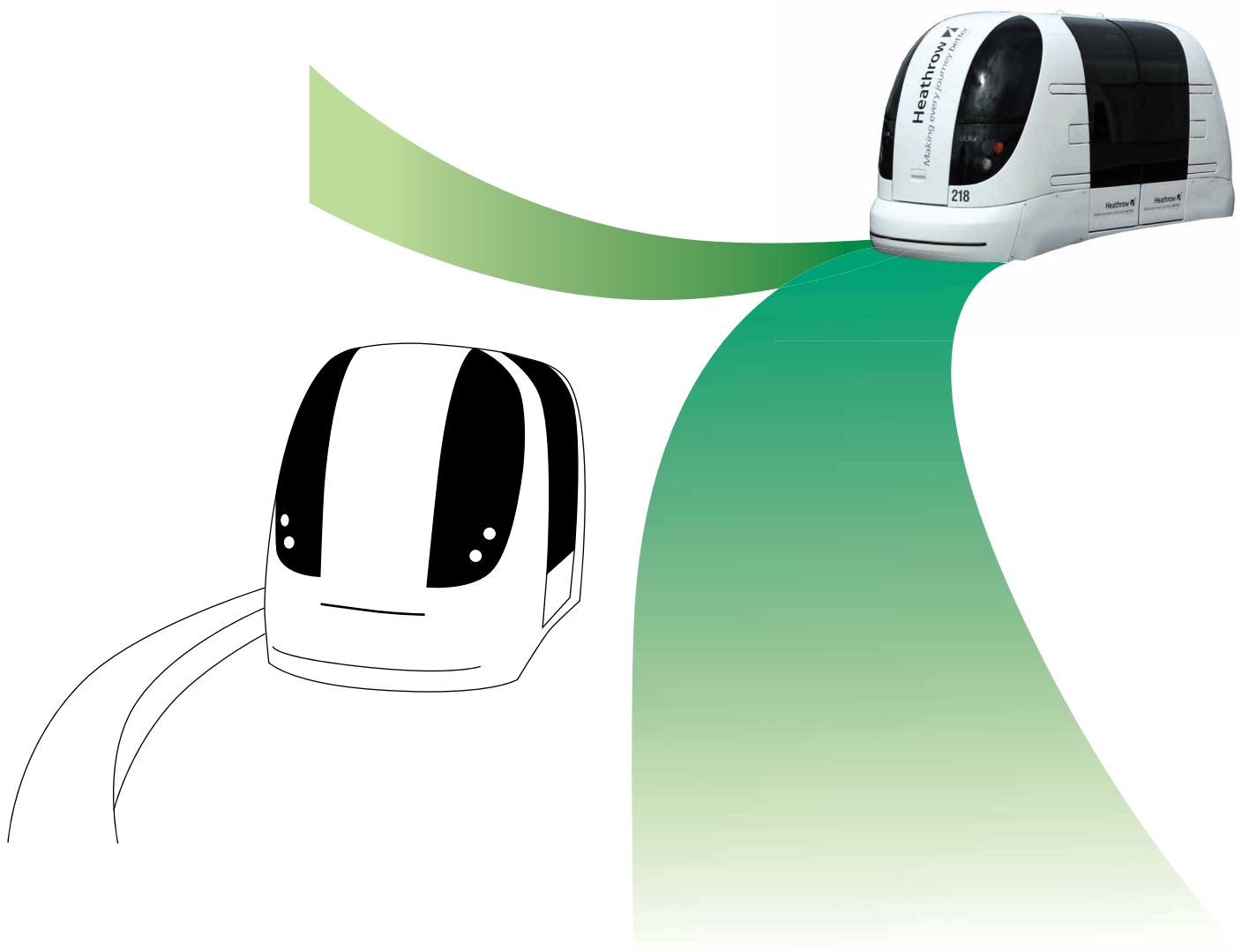


Personal Rapid Transit Workshop

Minneapolis, Minnesota
August 18, 2010

A Summary Report



Sponsored by:
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Hosted by:
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University of Minnesota

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CENTER FOR TRANSPORTATION STUDIES, 200 Transportation and Safety Building
511 Washington Avenue S.E., Minneapolis, MN 55455-0375
Phone: 612-626-1077 E-mail: cts@umn.edu Web: www.cts.umn.edu

WRITER: Trisha Collopy EDITOR: Pamela Snopl DESIGNER: Adam Babel PHOTOGRAPHER: Matt Miranda
Cover Photo: Steve Raney, ULTra PRT

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Workshop Purpose and Background

The purpose of the PRT Workshop, held August 18, 2010, in Minneapolis, was to share responses to a request for PRT information issued by the Minnesota Department of Transportation and to allow participants to understand PRT benefits and barriers to its implementation. Workshop participants also discussed next steps in exploring the viability of PRT in Minnesota, including principles to guide PRT service implementation, financing options, and organizational and governance approaches.

The workshop was a follow-up event to the PRT International Forum held by Mn/DOT on November 17, 2009, in Rochester, Minnesota. The forum brought together PRT companies and policymakers to discuss the potential of PRT in Minnesota and beyond.

Following the forum, Mn/DOT launched a PRT initiative in December 2009 to study, research, and explore PRT's potential, and Mukhtar Thakur was appointed director of the Office of Multimodal Innovation. Mn/DOT issued the request for PRT information shortly thereafter.

Introduction and Welcoming Remarks

Moderator: *Laurie McGinnis*, Director, Center for Transportation Studies, University of Minnesota

Speakers:

Tom Sorel, Commissioner, Minnesota Department of Transportation (Mn/DOT)

Derrell Turner, Division Administrator, Federal Highway Administration

Jeff Hamiel, Executive Director, Metropolitan Airports Commission

Arlene McCarthy, Director of Transportation Services, Metropolitan Council



Tom Sorel

The second event on personal rapid transit in Minnesota in less than a year drew more than 90 engineers, public officials, private sector representatives, and community leaders to Minneapolis on August 18.

Laurie McGinnis, director of the Center for Transportation Studies, kicked off the workshop by discussing the progress made on personal rapid transit since the November 2009 forum in Rochester. As a result of that forum, the Minnesota Department of Transportation issued a request for information to gauge PRT interest in Minnesota. The agency received 21 responses.

Mn/DOT commissioner Tom Sorel said the agency issued the RFI to see if personal rapid transit is a viable transportation solution in Minnesota. A key goal of Mn/DOT is to be on the leading edge of new transportation technologies, he said. "That's what's driving us, that's why we're here today to discuss PRT," he said. Sorel called on those gathered to have an "open and honest discussion" on PRT that allowed for all points of view.

Panelists who followed Sorel had a range of responses to the potential for personal rapid transit in Minnesota. Derrell Turner, division administrator with the Federal Highway Administration, said the technology is still in its infancy and planners need to sort through a lot of misinformation to find where PRT is the best fit as a transportation solution.



Laurie McGinnis



Derrell Turner

“This technology fits well with Secretary of Transportation Ray LaHood’s livability and sustainability initiatives,” he said. “I think as we progress, we’re going to find niches where it’s the best fit ... We have to recognize a give-and-take for each transportation solution we put out there. And I think this is a good way to start that dialogue,” he said.

Jeff Hamiel, executive director of the Metropolitan Airports Commission, said PRT could serve as one piece of the transportation network for the already multimodal Minneapolis–St. Paul International Airport. A PRT system has been completed at London’s Heathrow Airport. That system, built by ULTra PRT, will serve as a circulator from a terminal to a remote parking lot.

Hamiel said PRT could serve as a circulator to MSP parking areas or as a shuttle to and from nearby hotels. As the airport grows from serving 32 million passengers a year to 50 million or more in the future, “we’ve got to continue to seek and search for new transportation modes,” he said. But in order for a PRT system to be successful, “it’s going to need strong public support and a lot of ridership to pay for it,” Hamiel said.



Jeff Hamiel

Arlene McCarthy, Metropolitan Council director of transportation services, also brought up the question of PRT’s role as part of a multimodal transportation network. McCarthy said she has questions about how PRT would fit into the region’s transit system. “To be honest, one of the concerns from the Met Council is, will PRT be a drain on federal and state funds when there is a shortage already?” Because of those concerns and concerns about ADA compliance, she said the council does not support PRT right now.

McCarthy said she was looking to see where PRT is a good solution and where it promotes good land use, and was willing to continue the conversation about PRT as an option. The workshop “is a great next step, and we along with other stakeholders look forward to the results,” she said.



Arlene McCarthy

Workshop Goals and Context and Summary of RFI Responses

Speaker: *Mukhtar Thakur*, Director, Mn/DOT Office of Multimodal Innovation



Mukhtar Thakur

Personal rapid transit has a history in Minnesota going back almost five decades to the pioneering work of Dr. Ed Anderson at the University of Minnesota. But what is the current interest, and what is PRT's viability as a transit solution? A recent request for information by Mn/DOT drew more than 21 responses, including PRT companies, cities considering the technology, and engineering firms willing to build the systems.

Mukhtar Thakur, director of Mn/DOT's Office of Multimodal Innovation, said the goal of the RFI was to seek information about the viability and benefits of PRT in Minnesota. The strong response was a key reason for a follow-up event. "If we only had two responses, it would be a very different picture than we are having today," he said.

Mn/DOT has explored PRT as a transit option in the past, most notably in the 1970s and 1980s, related to Anderson's work. The agency's current view is that PRT is not a replacement for buses or light-rail service, Thakur said.

"It may be competitive with feeder/shuttle buses in niche applications," he said. "We don't see PRT as being implemented as a network around the city, as of today." But it

can complement traditional modes of travel, particularly as a last-mile and midday trip option, he said.

Some key questions to answer about the feasibility of PRT include how it fits into current land uses, how it is going to be funded, and operations and maintenance costs. "The public is asking, what is it going to cost me and how is it going to help me?" Thakur said.

In response to Arlene McCarthy's question in the opening session about ADA compliance, Thakur said PRT systems can be ADA compliant. He recently visited the ULTra PRT system at London's Heathrow airport and found it complied with British accessibility regulations. The Hiawatha light-rail system in Minneapolis was also able to resolve those issues, he said.

"On the Hiawatha line, there was a lot of discussion on that issue. The question of level boarding, allowing wheelchair passengers to board from the platform ... It wasn't easy to get that to work," Thakur said. "But ADA regulations are going to serve most of us. There are a huge number of us who will be needing this mode of transportation," he said.

RFI Responses

Four cities and public agencies, five consultants, one PRT advocacy group, and eleven PRT vendors responded to Mn/DOT's request for information.

The cities were Bloomington, Maple Grove, Edina, and Winona. "The primary reasons these cities are here are because they are centers of activity and people want to see if there's enough interest for establishing PRT there," Thakur said.

While many PRT vendors are seeking a public-private funding model, a big question for most cities is the fare model and the long-term operations cost of the system. "Continuing operations from the public purse need to be very well defined," Thakur said.

The private vendors that responded to the RFI were:

- Unimodal Systems, based in California. It has a prototype on a 42-foot maglev guideway at the NASA Ames Research Center.
- Vectus, based in Sweden. It has a test track in Sweden and an MOU for a public-private partnership in Suncheon City, South Korea.
- PRT Minnesota. It has proposed a 3.5-mile circulator for Maple Grove with 13 stations.
- PRT International, based in Minnesota.
- ULTra PRT, based in the U.K. and California. It has completed construction

on a system at London's Heathrow airport and has proposed concepts for Edina, St. Mary's Hospital in Rochester, Minn., and the St. Paul Ford Plant. The London system was not yet in fare service operation as of August 2010.

- Automated Transportation, based in Wisconsin.
- Composite Solutions BEEMCAR, based in the U.K.
- Alden Dave Systems (ADS), based in Massachusetts.
- Mister PRT, based in Poland. It has proposed a system to the city of Ithaca, N.Y.
- 2getthere, based in the Netherlands. It has begun work on a 1.2-kilometer PRT demo system in Masdar City, Abu Dhabi.

The design and technology used by the vendors includes hanging pods, pods on a guideway, magnetically levitated pods, and motor-driven pods. Speeds range from 25 to 60 mph. The cost of the systems ranges from \$8 million to \$21 million per mile. Financing ideas include government funding, public-private partnerships, and community interest corporations, Thakur said. "People are talking about three to five passengers, an automated system on some part of guideway, pavement, or rail. That's what we are beginning to synthesize here," he said.

Several engineering consulting companies, including Honeywell, HDR Engineering, SRF/Krech Ojard, Mathews Industrial Management, Aerospace Corp., and PRT Consulting, also responded to the RFI. Most wanted to offer their expertise in developing a system or helping the public process, Thakur said. One, Aerospace Corp., is currently advising the city of San Jose on the feasibility of using personal rapid transit to connect its airport to a distant transit terminal.

Several cities and public entities in Minnesota responded to the RFI and have discussed PRT as an option, Thakur said. They are:

- Maple Grove, which is looking at PRT to help it develop an area near the Gravel Pit and Interstate 694.
- Bloomington, home of the Mall of

America, which has had discussions and presentations by three PRT groups.

- The Metropolitan Airports Commission, which is looking at future growth at the Minneapolis-St. Paul International Airport.
- Winona, which has submitted a grant to the Federal Transit Administration for a PRT lab and partnership center.

In addition, Thakur said, Mn/DOT has seen sketches or proposals for Edina, Richfield, and Bloomington, and a system that would connect the Ford Plant site in St. Paul to the Hiawatha light-rail line across the river. The agency issued a letter of support for Winona's federal grant application.

Nationally, several cities and states are exploring PRT as an option, including San Jose, Calif., New Jersey, and Virginia, which completed a legislative study in 2008.

Reports in those two states concluded that interest in PRT was growing globally, but the technology was not yet commercially viable and a fully operational system was needed to demonstrate the benefits of PRT and establish commercial readiness. In other words, "PRT was approaching but not ready for full deployment," Thakur said.

Only two systems are currently headed for public operation: the Ultra System at Heathrow Airport and the pilot 2getthere track in Masdar City, Thakur said.

Mn/DOT has several questions about PRT, including whether the systems can be built without disrupting existing environments and if construction is faster due to the smaller scale of the projects, Thakur said. "It's a smaller, lightweight system and quite a lot of construction can be done off-site, brought to the site, and put together quickly. That's a key element of what I saw at Heathrow," he said.

Other key issues are scalability, PRT's ability to extend other transit systems, low emissions, and whether it would visually complement the environment where it was added, Thakur said.

More information about the RFI proposals is available on Mn/DOT's Web site at: <http://www.dot.state.mn.us/transit/>.

RFI Responders' Comments

Following Thakur's presentation, several of the vendors who responded to the RFI said more about their proposals.

Carlos Espinosa, assistant city manager of the city of Winona, had an update on the city's Federal Transit Administration grant. The city did not receive the urban circulator grant it applied for, but learned in review comments that it should have applied for research funding instead. He said Winona's plan was to integrate a test track into current city infrastructure. "We're proposing PRT R&D in the state, specifically centered in Winona," he said. The city's long-term goal is to spur development of nearby manufacturing businesses, which could make some of the components of PRT systems.

Representatives from several PRT vendors, including Vectus, AldenDave Systems, and Composite Solutions, discussed the benefits of their PRT designs.

Thakur said PRT technology has developed dramatically since the 1970s. "There is a night-and-day difference between the capacities of the systems. These sorts of capacities of PRT, GRT, today are much more feasible than they were 30 to 35 years ago," he said.

Henkel noted there was a substantial difference in cost estimates of different vendors and asked if anyone could explain why.

Bill James, president of JPods, said startup costs are much different than recurring costs for PRT. Others said comparing the capacity and speed of the systems might be more of an apples to apples comparison between them.

Steve Raney of ULTra PRT said his company's most recent estimate was that a seven-mile system with 20 stations in North America came in at \$13 million per mile or \$40 million for the whole system. "If you do a one-mile system, you still have station and maintenance costs," he said. "The range of costs is different everywhere; it depends on whether you want the fancy or utilitarian model."

Raney said average costs across all vendors were \$8 million to \$13 million. "My

view is all PRT vendors are going to go on a cost curve," he said, because costs to manufacture vehicles will differ at 200 versus lower quantities.

Henkel noted that the RFI proposals included a mix of financing and asked Raney about their public-private financing model.

Raney said it varies from location to location. Heathrow is a privatized airport, but the land is owned by the British Airport Authority, "so it makes sense for them to finance it and capture the benefits." In a place like Edina, however, PRT could connect several privately owned parcels, like the Southdale Mall and a nearby hospital, and each of those land uses has a different value. In situations like that, it is more complicated to put together a funding and revenue model.

"Systems with fewer landowners and stakeholders involved are going to bubble up first. Eventually you're going to have a way to capture value from the private landowners and stakeholders," Raney said.

Mike Lester of Taxi 2000 said that public dollars help draw private financing. "The entities we're looking at want to know that halfway through, the brakes won't be put on the project."

Policy Issues Panel Discussion

Moderator: *Tim Henkel*, Division Director, Modal Planning and Program Management, Mn/DOT

Speakers:

Rep. Frank Hornstein, Minnesota House of Representatives

Sen. David Senjem, Minnesota Senate

Barb Thoman, Executive Director, Transit for Livable Communities

Steve Elkins, Bloomington City Council Member

Dennis Sweet, Treasurer, Citizens for PRT



Barb Thoman, Dennis Sweet, David Senjem, Frank Hornstein, and Steve Elkins

Does government support exist for PRT, and what are the opportunities for public-private funding? Those are two of the key questions that have arisen as Mn/DOT began collecting responses to its RFI on personal rapid transit. In this question-and-answer session, state legislators and PRT advocates and skeptics had a wide range of responses to personal rapid transit, from keen interest to concerns about PRT competing for dollars with other transit modes.

Bloomington Council member Steve Elkins said PRT could be a viable option along the Interstate 494 corridor, which has the largest concentration of jobs outside downtown Minneapolis but is currently not well served by bus service because jobs are spread out in corporate campuses along the freeway. “The fundamental problem we have with bus service: it runs along streets, has to stop at all the lights, and cannot be a faster option for suburban commuters,” he said. “Travel times have to be competitive.”

Buses circulating between corporate campuses have low ridership and slow times to destinations. But a PRT circulator could operate as an on-demand system between job sites. Although PRT vendors have ap-

proached Bloomington, Elkins said Bloomington doesn’t want to be the guinea pig for the technology. “From my perspective, we need to build one of these, prove that it works, demonstrate the economic benefits, and then it will happen.”

Two transit advocates—Dennis Sweet of Citizens for PRT, and Barb Thoman of Transit for Livable Communities—sketched out opposite views on personal rapid transit. Sweet said inexpensive on-demand PRT systems can play a key role in connecting commuters to mass transit options like light rail. That could help boost the number of commuters overall who use mass transit and boost support for public funding of transit, he said. “If we can get more people on public transit, they will see it as something they use instead of something for someone else,” Sweet said.

Thoman said Transit for Livable Communities has long been skeptical of PRT when it was competing with light rail and buses for public dollars. However, she said she is now thinking about PRT as an option in some areas, such as office towers along freeway corridors—“a place that’s too hostile and dangerous for people to get from one place to another.”



Tim Henkel



Sen. David Senjem and Rep. Frank Hornstein

“We have to look at all the menu of options now that are available to figure out what is the right investment for our very limited public dollars and what offers multiple benefits,” she said. In that menu, she said, “We’ll figure out where PRT fits in the mix.”

Minnesota State Sen. David Senjem and Rep. Frank Hornstein also sketched out opposing views of PRT.

Senjem, a state senator from Rochester, is excited about the new technology but has questions about where it will work well. He said there are some discussions about installing a PRT system in Rochester to move staff and patients from the Mayo Clinic to St. Mary’s Hospital a mile away. Currently buses provide continuous service during the day. But, Senjem said, PRT has to compete with the state’s car culture and win over voters who are leery of more public debt.

Questions

Question (from Bill James, president of *JPods*): Is Minnesota policy aligned toward PRT, and what are the implications of future jobs in PRT?

Hornstein: I did a simple bill to promote infrastructure for electric vehicles. That was controversial because people didn’t want mandates or public resources going into this. ... I’m excited about plug-ins for electric vehicles because we have significant needs to increase ridership, and we will, but we also

“PRT is exciting. I hope it can move forward. It definitely has its applications,” he said. But key questions need to be answered, such as “Can this work? How does it work? What does it cost? Will the public accept it?”

Calling himself a “PRT skeptic,” Rep. Frank Hornstein of Minneapolis said he is concerned PRT has been under discussion since the 1970s, but most plans have been shelved. Meanwhile, there are other transit systems that work, he said. “I concur with Barb that we have to focus our very limited investment and very limited political capital on systems that work,” he said. “Like the HOURCAR, like streetcars.”

Hornstein said he has been frustrated by some PRT advocates in the past who have opposed more government investment in transit and in public transportation in general—the very sources PRT advocates are looking for now to fund their projects. But two factors have changed since earlier debates about PRT, he said. One is the rising awareness of the cost of the nation’s dependence on oil and the need to seek out better land use and transportation solutions. The other is the Minnesota Legislature’s 2008 passage of a transportation-funding bill that included a quarter-cent tax dedicated to transit.

“What that reflected, was a legislative change, a public change ... We now do have an important political constituency and public acceptance for transit that we haven’t had,” Hornstein said.

have to be realistic that people are going to drive. So let’s make it efficient and less energy intensive. You can go down to the 46th Street Hiawatha light-rail station and see what I think is the future, which is a charging station powered by solar energy.

Elkins: Even though we’re making changes in our land-use policies to make public transportation of all forms more viable, it doesn’t change the fact that streetcars or LRT or express buses in the American Boulevard



Steve Elkins

corridor [aren't] going to cut it. ... If what you're trying to do is to provide a means of connecting people from Burnsville to Lake Normandale, having them get off a bus at American Boulevard and get on a streetcar, or any mode that runs at the surface and has to stop at lights, it's never going to be cost-effective, it's never going to be time-competitive, and PRT, once we've proven that it works, is a mode that can do that. It can run within the existing right of way, it doesn't have to stop for lights, it has lines that can run on demand; it can be time-competitive and cost-effective.



Barb Thoman

Former Minneapolis city council member Dean Zimmerman: People love their cars for three reasons: 1) It's sitting there waiting for you when you're ready to go; 2) It goes where you're going; 3) It gets you out of the weather. Everything else about cars we love to hate ... PRT satisfies those three elements and totally erases every other single reason you love to hate the automobile ... So, if you build a transit system that mimics the reason why we take the automobile and takes out the things you don't like, people will switch from the automobile to that system.

In terms of cost, the legislature is willing to spend all kinds of costs to subsidize all these kinds of transportation. No one is differentiating between capital cost and operating cost ... Every single vendor in here will tell you if we build this system, it will pay back its cost with revenue. Light rail takes \$10 million a year of public subsidy. The bus system, 25 percent paid for by users, and let's not even go into the automobile, the most heavily subsidized transportation system. PRT is the only system mentioned that will pay for itself in terms of operating cost.

Elkins: Dean makes a good point about traditional forms of transit. If you go back to the early part of the 20th century, transit was profitable. In the middle of the century, it couldn't be profitable any more, so it became a public enterprise. The fundamental reason [is that] a bus took one driver to operate a 40-passenger vehicle in 1930 and it still takes

that one bus driver to operate a vehicle in 2010. ... PRT doesn't suffer from that infirmity; there is no operator. As we go forward in time, vehicles that require paid operators are going to become less and less competitive with those that don't need an operator. ... In the long run, that's almost as big a consideration as the fuel considerations.

Hornstein: I just wanted to respond briefly to Dean's comments. The one he made at the end, about subsidies for automobile, which dwarf, absolutely dwarf any of these kinds of subsidies for public transportation. ... When people start to complain about subsidies for public transportation, it's such a drop in the bucket compared to our other modes.

Thoman: According to a CTS study in 2008 ... governments spend more money in this region subsidizing parking than they do subsidizing public transit. And then when you look at all that's spent by private industry, it dwarfs other costs. So it's by no means a free and unsubsidized thing. You know parking is free everywhere you go, and most of local road costs are paid for with property taxes ... So if people were truly paying the cost of driving, you wouldn't have to have as great a subsidy for public transit as you have today because the market might provide the correct signals for people to make different choices.

Jeff Brown, St. Paul resident: I'd like to offer a citizen's perspective. I've used nothing but public transportation for eight years. I'm now buying a car. I think public transportation's dynamite. But when you actually depend on it to get around, you will learn more about it than you can in a Ph.D. program ... There's a reason people aren't using transit. It's not that they've forgotten about it; it's that it doesn't work for most people.

We need to look at PRT as a complementary system to get people from my neighborhood to other transit modes. It doesn't matter what transit corridors are popular. If I can't get from point a to point b, you've got to buy a car.



Dennis Sweet

Sweet: There's a feeling among a lot of us that there's untapped demand for public transit. There is demand for transit, but it doesn't deliver what the consumer wants.

Hornstein: I'd like to respond to criticism of the bus system. We've had a drip, drip, drip of cuts to the bus system. When you have lower fares and more frequent buses, people will come.

Question (from *Carlos Espinosa, assistant city planner, city of Winona*): What is necessary to begin growing support for PRT?

Hornstein: I just haven't seen anything yet that works. ... We don't have a lot of time with global warming and peak oil to look at things that don't have a track record. That's why elected officials gravitate toward things that have a track record, and we still have a huge hill to climb just with transit, just with rail. ... But it does concern me that a lot of resources are being put in PRT when there hasn't been a lot of dialogue with the legislature. We're focused like a laser beam on what works.

Elkins: I don't think suburban communities feel as well served by existing options as central cities do. ... I don't think we should be taking the potential of PRT off the table if

it can be made to work and practice the way it does in theory; it would satisfy the needs of most suburban communities better than the other options.

Senjem: If I were in Rochester and if I wanted to implement PRT in that city, what I would do first of all is sell it locally. How much, in our case, in the sales tax dollars might we be able to bring to the state capitol and say we've got this much, do you have that much? I think a state-local partnership in terms of financial commitment would be enough certainly to start the discussion. Without it, if I say, "Give me PRT in Rochester," 200 of the 201 legislators would laugh at me.

Thoman: I think we've moved from a time when many of us drove everywhere for everything to having more options like taking the train to downtown, taking a bus out, transferring to the HOURCAR. ... I recognize that the challenges are greater in suburban communities. The further out you go, it's hard to get around on public transit. ... The challenges are really greatest in those suburban communities where public transit is going to be the most expensive to provide. So, we need to look at that menu of options and being really flexible about what works where.



Keynote Presentation

Speaker: *Curt Johnson*, Principal, Citistates Group



Curt Johnson

Although the idea of personal rapid transit has been around for decades, it has continued to hit roadblocks, both political and technological, which have left many cities wary of building a PRT system. In his keynote address, Curt Johnson sketched some of the promise as well as the trials that have kept personal rapid transit from broader acceptance.

PRT has promise as a transit solution, he said, but it is currently tangled up in chicken-and-egg questions about its viability. Arguments are often rabidly for or against personal rapid transit or too technical for lay people to understand. “PRT is hard to discuss because it generates strong sentiments,” he said. “I think we might agree that the modern conception of PRT is finally, if barely, emerging as a legitimate member of the transportation community.”

High-tech systems like the ULtra PRT at Heathrow Airport in London offer an elegant, custom ride to a destination determined by the user with no wait times. So why aren’t cities eager to “grab and go” with PRT?

Johnson said the explanations are multiple and “tend to compound each other.” Almost all new technologies emerge with some glitches, which tends to compound market skepticism, he said, citing the radio, television, and computer as examples. Breakthroughs can take decades—or longer—to find a market. And “any failure compounds stigma,” he said. “People remember flops.”

There are also a list of practical problems, such as finding land parcels where PRT is a good fit, right-of-way questions, challenges in getting multiple property owners to collaborate, visual concerns about having the tracks installed, and concerns about safety, Johnson said. But the biggest reason why PRT has been slow to emerge has to do with policy and politics, he said.

“Transportation policy largely operates to protect the modal status quo. Roads and transit. Advocates protecting the gate team up with legislators to protect the door. So

PRT is seen as a competitor for ever scarcer dollars,” he said. “In this kind of scene, any policymaker advocating a new technology is taking a big risk.”

So given the barriers, why spend time on PRT? When policymakers shift from talking about transit modes to asking commuters about service, PRT begins to make more sense, Johnson said. “Asking whether people are arriving at a destination they desire is a far better question than why Interstate 494 is backed up at 4 p.m.,” he said. “This shows how land use plays a critical role in determining how people get to destinations they desire.”

Through that lens, PRT can be a complement if it is built in key, activity-rich zones where people now make multiple car trips. In such zones, car trips would be reduced along with air and noise pollution by introducing PRT, he said.

One local activity-rich community is the suburb of Edina, which has discussed PRT to connect isolated job sites in the Southdale mall area. As an experiment, Johnson said he spent 45 minutes trying to walk from one corporate campus to another. “Three times in 45 minutes I was stopped by a motorist who would roll down the window and ask if I was in trouble, so foreign was the sight of anyone trying to behave like a pedestrian,” he said.

Where does PRT make the most sense in Minnesota? Some options include the Minneapolis–St. Paul International Airport, Rochester, with its Mayo Clinic campus, and areas like Southdale, Johnson said.

“We all have to admit that retrofitting PRT into an existing urban environment would be forbidding,” he said. “But you if take an area like Southdale, with unwalkable distances, PRT there could in fact enable and encourage people to park one time and ride often. You could even imagine it extending from France Avenue all the way up to the 50th and France zone,” he said. And a similar model might apply to American Boulevard in Bloomington.

PRT could grow as an industry in Minnesota, Johnson said, but only if officials buck the state's risk-adverse culture. And he said many hard questions remain for PRT, including whether the state's recent multimodal collaboration in the Interstate 35 corridor could be a model for using multiple modes in another corridor.

Johnson said in his own career as a transit advocate, he's moved from supporting mass transit to backing light rail, in part because it got people who wouldn't consider public transit to get out of their cars.

"I think the same is true for PRT," he said. "It can't happen until people try it. That's why I think it's critical to pick the right place to have the first one. After it opens, the politics will take care of itself."

Group Discussions

Facilitator: *Ferrol Robinson*, Research Fellow, Hubert H. Humphrey Institute of Public Affairs, University of Minnesota



Ferrol Robinson

In the final session of the day, Ferrol Robinson, a research fellow at the Humphrey Institute, led a discussion of PRT drawbacks, benefits, and some principles for adopting PRT in Minnesota. Following is his compilation of the comments.

Summary of Comments from PRT Workshop Participants

Participants were asked to address four specific topics:

- Perceived impediments to PRT implementation
- Anticipated benefits of PRT
- Principles for PRT implementation
- What happens next: potential steps

The extensive number of comments made in each of these topics has been grouped into logical sub-topics. This summary is not a verbatim record of comments received, but it does reflect their sense and spirit. It should be noted that while these comments form a good basis for understanding the topics reviewed, they are by no means exhaustive. Additional discussions and analyses are likely to yield additional relevant comments.

A. Perceived Impediments to PRT Implementation

1. Public and Policymakers' Perception About PRT

- Absence of PRT-related public education and outreach results in a lack of familiarity on the part of the public and policymakers.
- Perception of PRT as too futuristic leads to concerns about technology, safety, and viability.
- There are concerns that PRT will intrude on the built and natural environment and create a visual impact.



- Perception about “having to ride” with strangers.
- Perception that the small-vehicle capacity (four to six passengers) is not suitable to satisfy peak passenger demands.
- Lack of independent analysis and evaluation creates doubts on claims about benefits.

2. Institutional Issues and Barriers

- PRT has not been part of the political and public process.
- Current institutional infrastructure does not allow for consideration of PRT (for example, Comprehensive Plans don’t include PRT as a transportation option).
- A PRT community impact analysis (CIA) is needed to dispel PRT-related concerns.
- Public and policymakers too tied to mass transit and have low expectations for it.
- Policymakers are risk-averse: more inclined to continue to do what is “known and proven.”
- An assessment of PRT benefits versus risks has not been conducted.
- PRT requires dedicated right of way, which is often owned by public entities.
- False starts and missteps have created uncertainties.
- Uncertainties have resulted in decision-makers not ranking PRT high enough to get funding.
- Lack of public and/or private funding has precluded building a PRT demonstration project.

3. Lack of Clarity in Explaining PRT Applications

- Lack of uniform definition of PRT (often confused with Group Rapid Transit, for example).
- In the past, PRT was often presented as being in direct competition with buses and LRT. This led to unproductive clashes with traditional transit interests and may have contributed to slowing PRT progress.
- PRT is now seen as a niche application in locations not well served by traditional transit, and as a complement to traditional transit systems to make them more productive and successful.
- Central planning for transportation tends to ignore niche applications.
- Confusion about applicability of PRT has led to premature proposals for large network applications, absent a PRT demonstration project.
- Many benefits invoked by PRT proponents (e.g., substantially replacing autos and substantially reducing our dependence on petroleum-based fuels) are, at best, long term.

4. Cost and Financing Issues

- Need to differentiate PRT operating costs, which are likely not to require public subsidy, from capital costs for a PRT demonstration project, which may need public-private funding.
- Need to improve the accuracy of estimates of capital and operating costs: the wide range of estimates (from RFI responses) creates credibility problems.
- Whenever cost estimates are presented, assumptions associated with

these estimates need to be clearly stated.

- Past PRT proposals have lacked a credible business plan, which may have made it difficult to secure the necessary funding.

B. Anticipated Benefits of PRT

1. Environmental Sustainability

- PRT requires a small footprint: amount of land needed is small, typically located in or above existing road rights of way or other built space.
- Is energy efficient: powered by electricity—on-demand service, does not circulate empty; reduces over-reliance on scarce petroleum-based fuels.
- Produces minimal local emissions; is considered a green technology.
- Minimal noise: quiet and efficient.
- Exclusive, separated guideway operation offers a congestion-free trip.
- Multi-level stations allow for PRT station-oriented development.
- By making it easier to use traditional transit, may increase transit ridership and reduce number of car trips.
- By providing greater access to peripheral parking facilities, could reduce parking requirements in the core and result in more efficient land use.

2. Improvement in Levels of Service

- Exclusive guideway operation and off-line stations allow for efficient service and high service speeds.
- Since vehicles wait for passengers at off-line stations, wait time is minimized.
- Accessibility is improved by adding stations where demand requires it, without reducing system speeds.
- Ability to add interconnected guideway “loops” provides greater service coverage flexibility while maintaining non-stop service and speeds.
- Service connection to bus, LRT, and commuter rail stations expands the service coverage of these modes and addresses their first-mile/last-mile service gaps.
- Can operate over interconnected loops as well as along short-haul routes.

3. Financial Sustainability

- PRT is characterized by low operating costs: no drivers required and vehicles do not operate when empty.
- Analyses indicate that PRT will recover operating costs from fares, parking revenue-sharing, and advertising revenues, and operating revenues will not be required.
- Reducing or eliminating public operating subsidies will lead to more sustainable funding.
- If system is built in Minnesota, would result in ongoing, green technology job creation and enable the state to export this technology to other states and other countries.
- Could increase shared parking use and parking efficiency by improving access to parking facilities, which could be a source of parking revenues.
- Could possibly reduce car-ownership expenses as well as the need for a second car.
- Could be used to distribute small cargo and packages at night, which could secure additional revenues.

4. Livability

- Democratization of mobility: no age or other impediments to use; ADA accessible.
- Promotes and facilitates transit use and transfers from autos.
- Reduces reliance on autos for short- to medium-length trips.
- Uses existing right of way: does not cut through communities.
- Exclusive guideway operation improves safety by reducing conflicts with cars, bicycles, and pedestrians.

C. Principles for PRT Deployment

1. Interface With Transit Modes

- Where possible, PRT service should be designed to function as a feeder and distribution system for traditional transit modes.
- Fare collection technologies should be interoperable with current systems.
- Transfer to and from transit modes should be seamless, and include a common fare system.
- A purpose and need statement should be developed for each PRT project.

2. Cost and Funding

- Operating costs should not receive public subsidies.
- The initial demonstration project should rely primarily on private funds, but may also require some public funds.
- Subsequent implementations will rely on private funding, or be funded through public-private partnerships.
- PRT should avoid competing for traditional public transit funds, except in applications that are not well served by traditional public transit.

3. Performance-Based Requirements

- Must define PRT performance requirements then develop standards
- Make interoperability a system requirement.
- Set design standard for guideways early in process.
- Any demonstration project should meet system requirements and standards, and subsequent implementations should conform to the initial system requirements, unless these have been formally modified.
- Create a PRT Development Roadmap.

4. Regulatory Issues

- Vehicles and stations must be ADA compliant.
- Must ensure that statutes governing use of public ROW accommodate PRT applications.
- PRT construction should comply with governing codes for building, fire, safety, etc.
- PRT construction must meet all relevant environmental requirements.
- Set up a PRT certification process and body.

D. What Happens Next: Potential Steps

1. Organization

- Create a group of agencies and vendors to work together to develop

requirements and standards to ensure that PRT is implemented appropriately and effectively. Need to identify who should lead the effort.

- Define the role of the public sector in this group.
- What support can Mn/DOT provide? Does Mn/DOT have staff time to review plans/layouts and meet to discuss requirements?
- Explore the process for establishing a formal legal public-private partnership agreement (consortium) that clarifies roles, responsibilities, and sharing of risks, liabilities, and rewards.
- Create a PRT trade organization to conduct education and outreach efforts, seek political support, and explore funding options.
- Conduct a feasibility study with broad-based public and private sector support with the goal of creating political will and support.
- Reach agreement on the preferred site identified in the feasibility study and build the demonstration project at that site.
- System performance requirements and standards, and testing and evaluation plans, must be developed prior to implementation of a demonstration project. Testing must satisfy system requirements and obtain any certification needed, and should cover all system components.
- Begin to explore regulatory, permitting, and certification requirements.

2. Education and Related Steps

- Promote the creation of student chapters to study and conduct PRT research and investigations.
- Promote greater involvement in Citizens for PRT activities.
- Work with the League of Minnesota Cities to gain support for proposed PRT projects.
- Create PRT websites for all proposed and feasible sites.

3. Seeking Champions

- Political and community champions are needed to move plans forward and win the support of stakeholders, policymakers, and politicians.

Summary and Next Steps

Speakers: *Ferrol Robinson*, Research Fellow, Hubert H. Humphrey
Institute of Public Affairs, University of Minnesota
Mukhtar Thakur, Director, Mn/DOT Office of Multimodal Innovation

Robinson and Thakur wrapped up the discussion with a few final comments.

The biggest unresolved issue for PRT, Robinson said, is funding. Some have suggested approaching the legislature or state and regional agencies, while others suggested a grassroots model in which cities put up money to leverage funds.

“A number of cities are collecting funding for transportation, collecting a half-cent sales tax. That might be a model worth exploring,” Robinson said. He also mentioned Raney’s planning model of having an agency identify a site and develop guidelines for PRT.

The question of who would lead the next step—the public sector or private sector—was still not resolved, Robinson said. “I don’t know at this point that there would be another Mn/DOT workshop. I think we’re beyond that. What is the next forum? Who convenes it and how do we communicate upcoming efforts?”

Audience members as well as Robinson and Thakur agreed that PRT’s biggest challenge is finding political and community champions who could move PRT forward.

In a panel earlier in the day, state legislators mentioned the fight for public transit dollars in a time of lean government budgets. At the end of the brainstorming panel, Robinson reminded the audience of the resistance PRT faced getting public funding. “We know that if federal or state [officials] took the initiative it could be done, but there’s a huge ‘if’ in that,” he said.

Thakur said that Mn/DOT would prefer to be part of the conversation, in line with its strategy of pursuing and exploring innovation. After two workshops in under a year and an RFI that gathered 21 responses, much was learned about the mode, including impediments to its implementation and potential benefits, but the department also learned that while there are, at present, several PRT systems being tested, none are in actual operation (as of August 2010). Much remains to be learned about funding this mode: Public funding at a time of difficult economic conditions is clearly a challenge. In addition, he said, the public needs to be fully engaged and informed in discussions about this new mode and its potential implementation.



CENTER FOR TRANSPORTATION STUDIES

CENTER FOR TRANSPORTATION STUDIES, 200 Transportation and Safety Building
511 Washington Avenue S.E., Minneapolis, MN 55455-0375
Phone: 612-626-1077 E-mail: cts@umn.edu Web: www.cts.umn.edu