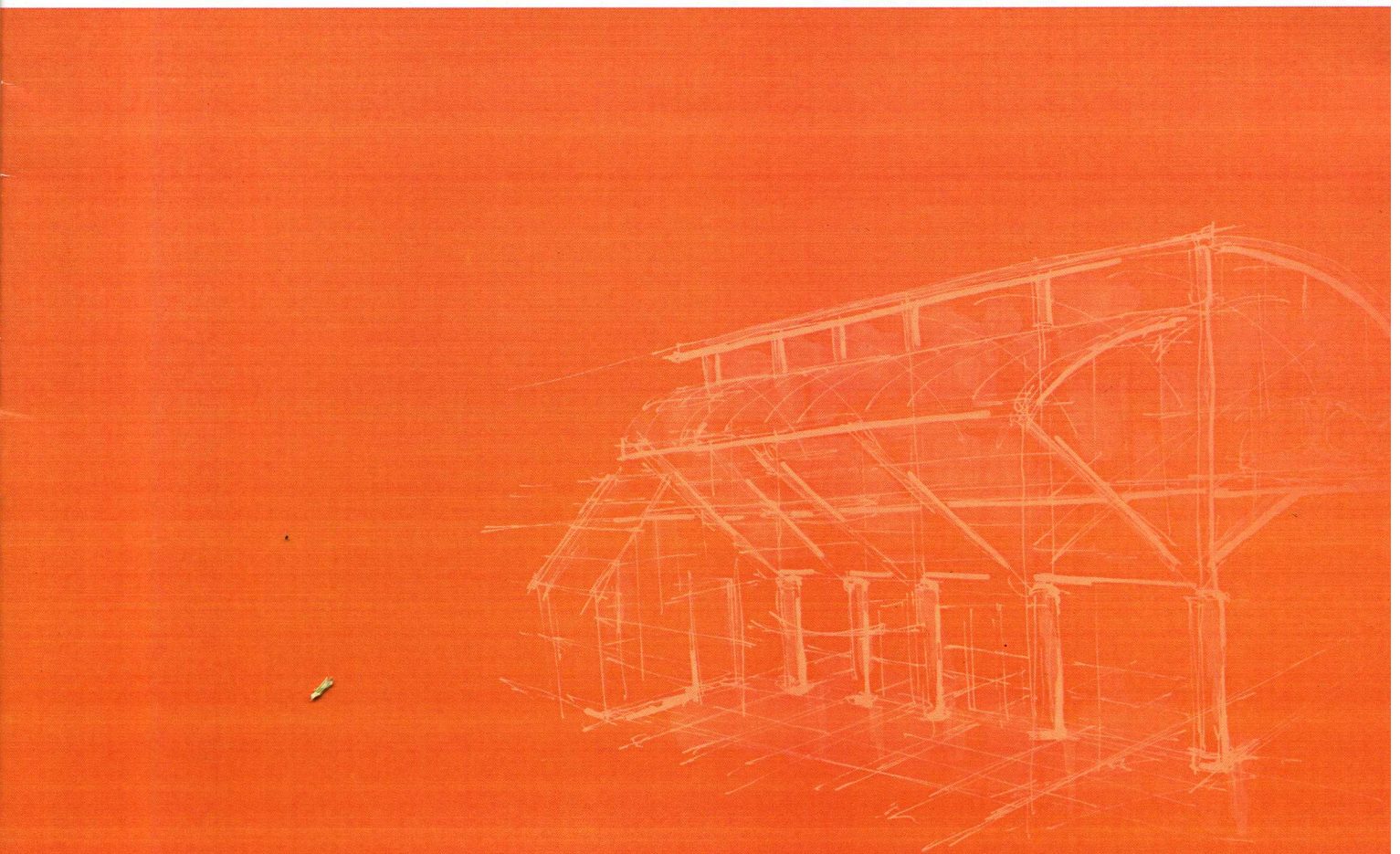
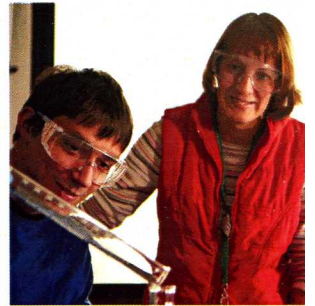


# PERSONAL RAPID TRANSIT WINONA IS READY



THE FUTURE OF PRT IS HERE.

# WINONA IS READY.



## CONTENTS

Why PRT? .....	3
What is PRT?.....	4
Why Winona? .....	5
The PRT Lab .....	6
PRT Systems .....	7
Acknowledgments & Citations .....	10

# Minnesota's OPPORTUNITY



Embracing technology and innovation has long been the catalyst for economic growth in Minnesota. As the state explores ways to improve employment rates, build an advanced transportation system for the next generation, and meet the growing demand for green infrastructure, now is the time for Minnesota to once again be the leader—not the laggard—in engineering ingenuity. Now is the time for Minnesota to back Personal Rapid Transit.

Efficient, sophisticated, and green, Personal Rapid Transit (PRT) is the future of public transportation, and it is only a matter of finding model communities in which to study PRT's operations before it can be successfully launched nationwide and worldwide. The City of Winona, with an appropriate population and geographic size, university resources, and local manufacturers, offers the perfect research and development conditions for bringing this project to the market. Winona is small enough to experiment, yet large enough to produce meaningful results.

With widespread support from elected officials, business and community leaders, and other stakeholders, Winona is prepared to host and be the research center for a fully functional PRT system. In the following pages, we invite you to learn more about the future of PRT, Winona's unique advantages in hosting a live PRT lab, and how Minnesota stands to benefit from the project.

A handwritten signature in black ink that reads "Jerry Miller". The signature is written in a cursive, flowing style.

Jerry Miller  
Mayor of Winona

# Why PRT?

Many Americans are concerned about sky-rocketing fuel prices, environmental degradation, rising traffic congestion, and the ballooning costs to maintain conventional transportation systems. PRT provides a sustainable solution to these long-term issues through the following features:

**A** Personal Rapid Transit test lab in Winona would complement and strengthen the community, the educational programs, and the composites industry of Southeastern Minnesota as well as establish the state of Minnesota as a leader in the use of innovative technologies in future public transportation.

—Hugh Miller RTP  
Company President  
and CEO

## LOWER OPERATING COSTS

Sophisticated technology operates the PRT passenger vehicles and provides close monitoring of the system, keeping operational costs down. In fact, most operating costs can be recovered by fare box collections.

## LOWER CAPITAL COSTS

PRT's lightweight guideway systems are less expensive than road and rail and have smaller land footprints.

## GREEN

PRT is one of the most promising environmentally-friendly public transportation systems. Studies estimate that PRT systems will consume "50 to over 300 percent less energy than conventional public transportation systems and could achieve an automotive equivalent energy use of 70 to 90 miles per gallon" (Booz Allen Hamilton, Pg. 11). One major urban system could alone result in a reduction of over 542 million gallons of gasoline per year and a reduction of over 10 billion pounds of CO<sub>2</sub> emissions each year (Environmental Protection Agency). Additionally, PRT systems produce no pollution at the point of use.

## REDUCES CONGESTION

PRT is in part able to be more energy efficient than conventional public transportation systems because it both takes drivers off the road and does not interfere with other modes of transportation. Because PRT passenger vehicles have the ability to be closely spaced to one another, one PRT track at full capacity can accommodate the equivalent of roughly three lanes of freeway traffic (U.S. Department of Transportation).

## CREATE NEW CLEAN TECH JOBS

In order to be the leaders in the green economy, Minnesota needs to support industries that employ green practices. Constructing and managing a PRT system will not only create new clean tech jobs, but will attract like-minded industries to Minnesota that value green innovation.

## PRIVATE & CONVENIENT

PRT safely carries travelers from point A to point B in clean, individual passenger vehicles. Passenger vehicles are immediately available and do not follow a set route like buses, trains, and light rail do. Instead, the automated network tailors the passenger's route to his or her destination.

*Winona State University offers its support for the Personal Rapid Transit project lab in the City of Winona, Minnesota. With its history as a transportation center, its access to the resources of three institutions of higher education, and its highly skilled and adaptable workforce, Winona is uniquely positioned to lead the development of innovative transportation solutions. Winona State University would be proud to support the city on this project.*

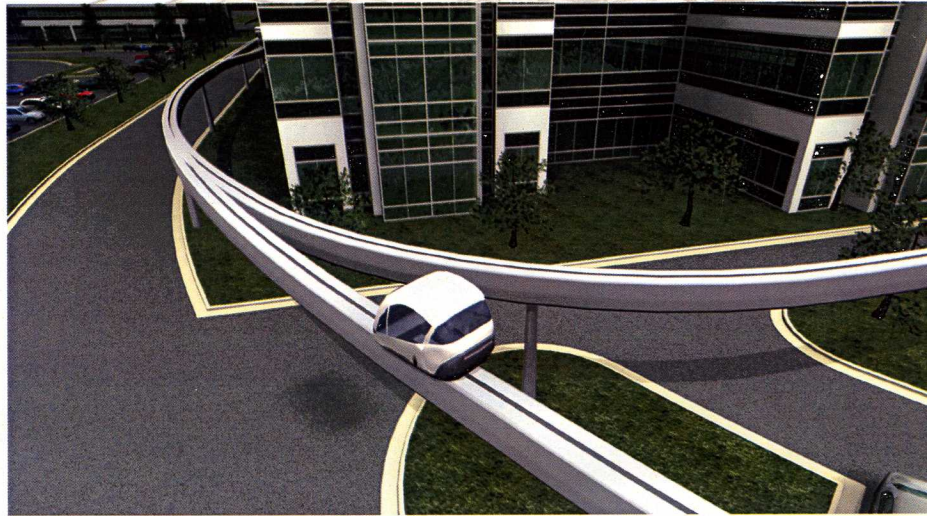
—Judith Ramaley, President, Winona State University

#### **FASTER SERVICE**

PRT provides point-to-point travel, meaning individual vehicles do not stop during their route. Conceptually, this could allow PRT to achieve “between 14 and 65 percent faster average travel speeds and between 14 and 125 percent faster overall trip times compared to bus, light rail and heavy rail transit” (Booz Allen Hamilton, Pg. 10).

#### **INCREASED SAFETY & SECURITY**

PRT’s quick electric ticketing and mapping, combined with a private ride, minimize security risks often experienced in conventional public transportation stations.



⌵  
PRT passenger vehicles travel an individualized route on elevated guideways, thus leaving other modes of transportation undisturbed

# What IS PRT?

Innovative, point-to-point travel for the 21<sup>st</sup> century, PRT involves small and lightweight 2- to 5-passenger vehicles that run on elevated guideways, taking passengers directly to their destination with no stops in between. PRT is powered by internal electric rails, battery power, or on-board generators. Due to the demand for more economically and environmentally efficient modes of transportation, PRT is expected to be a \$44 billion industry by 2020. (Frost and Sullivan, Executive Summary, Pg. 13)

# Why WINONA?

The City of Winona represents an attractive and sensible model community for a Minnesota PRT lab. The combination of Winona's demographics, traffic patterns, public/private partnerships, and unique university resources create the ideal testing environment for PRT. Once fully operational, the City of Winona would own the PRT system and be responsible for managing its operation in conjunction with the selected PRT provider.

## COMPOSITE MANUFACTURING

Headquartered in Winona, RTP Company is an international leader in compounding a wide range of thermoplastics. RTP Company employs approximately 700 workers, 335 of which are located in Winona.

Winona's Product Development Center employs 20 composite development engineers that can work directly with the PRT lab to develop the proper composites needed for the PRT system, including materials for the interior and exterior of the PRT vehicle cab and for ticketing stations. These composites can be tested for performance at RTP Company's quality assurance test facility and then, once developed, these composites can be directly manufactured in Winona. In addition to RTP Company, there are numerous companies in the Winona area that do unique and complementary processing of composite materials that will be beneficial to the PRT program. If PRT proves successful in Winona, RTP and affiliated companies stand to create an unlimited number of jobs as the system takes off worldwide.

« Composite materials can be manufactured locally at RTP Company.



Area universities and colleges »  
offer unique research and  
development capabilities.



## UNIVERSITIES

Winona's universities offer a built-in network of programs, faculty, students, and research staff poised to provide technical support and training for planning, design, operation and maintenance of PRT systems. In addition to their research and study capabilities, Winona's universities and colleges have the second highest traffic impact ratios in the state and will provide an excellent location to test the effects of PRT on different traffic patterns of a college campus. (*Center for Transportation Studies, Pg. 41*).

## MINIMAL IMPACT OF LAB ON WINONA TRAFFIC PATTERNS

Unlike other major metropolitan areas, Winona's size, population, and traffic patterns permit testing and experimentation of an operational PRT system without significantly disrupting local travel and commerce.

## WEATHER CONDITIONS

Unlike many urban areas, Winona offers a full range of weather conditions to allow proper testing of the system in hot summer conditions to cold winter conditions.

## AMTRAK STATION CONNECTION

A Winona PRT system could potentially connect to a new Amtrak station in Winona and serve as a regional transportation hub. Both Winona's city transit system and buses to Rochester could meet at the hub.

# An Academic Hub for RESEARCH & DEVELOPMENT

## SAINT MARY'S UNIVERSITY

Saint Mary's University's GeoSpatial Services—a nationally recognized environmental and geospatial service center—will apply mapping and assessment technology to document, understand, and graphically depict the benefits and considerations critical to understanding, planning, and assessing PRT deployment in a variety of landscapes, urban configurations, and demographic compositions.

GeoSpatial Services will utilize the research from the Winona pilot project to develop a suite of web-based mapping and assessment tools designed to facilitate point-to-point deployment assessment and modeling for urban planners in any situation around the country.

## WINONA STATE UNIVERSITY

Winona State offers the only undergraduate engineering program in the country devoted to education and research in composite materials engineering. Founded in collaboration with the region's composite industry, the School of Engineering provides space for education and research plus equipment for mechanical testing, thermal analysis, physical characterization, design, and prototype manufacturing. Additionally, the Science Laboratory Center is an 118,000 square foot building with labs and research and teaching space.

## MINNESOTA STATE COLLEGE-SOUTHEAST TECHNICAL

Southeast Technical's electronic, network administration, industrial maintenance, mechanical drafting, and transportation programs will help meet the technical and service requirements of a PRT testing lab. This includes the servicing and maintenance of PRT vehicles and track plus studies on the usage impacts on PRT vehicles. There is also significant potential for Southeast Technical to serve as a learning lab for a variety of regional students throughout the K-12 system.

# The PRT LAB

## PROJECT PHASES

(costs estimated)

### 1 \$25 MILLION

- » Build an operations and maintenance center affiliated with MnSCU schools (Winona State University and Southeast Technical College)
- » Provide a training system for operators
- » Build 1-mile guideway system with roughly 20 cars to demonstrate system and merger capabilities
- » 20 months to complete (estimate)
- » Baseline study

### 2 \$100-125 MILLION

- » Winona will decide what it wants to connect by PRT (schools, downtown, rail station, etc.)
- » Build 4 additional miles of guideway

### 3 \$50 MILLION

- » Final build-out of system
- » Guideway miles, number of cars TBD

The primary objective of the Winona PRT lab will be to confirm the safety of PRT technology for sustainable public transit service. Simultaneously, the lab environment will allow engineers to receive training during both the design and implementation stages. Researchers will also engage in social and behavioral experiments to study and assess the impact of PRT on local travel patterns and usage. Additionally, manufacturers and engineers will explore prototyping, component testing, system design, testing, and certification. The Winona PRT lab will ensure cost, safety, and production challenges are addressed early and on a smaller scale before large scale systems are rolled-out.

#### IMPACT ON LAND USE PLANNING & DEVELOPMENT

- » How will land use planning and development change if PRT was available?
- » What does a city do with the land used and freed up by PRT?

#### MOBILITY FOR SENIORS

- » How will the senior population use PRT?
- » How will travel patterns change?

#### VISUAL IMPACT

- » What does a PRT system look like when fully implemented?
- » What does a PRT block from view? What effect does this have on the population?
- » How can potential visibility concerns and challenges be addressed?

#### ENVIRONMENTAL IMPACTS

- » How many vehicles can be taken off the road?
- » How do traffic patterns and congestion change?
- » How does PRT help reduce greenhouse gas emissions and help the state reach its greenhouse gas emission reduction goals?
- » How does PRT reduce other pollutants by reducing the number of cars and buses on the road?

#### CONSTRUCTION DECISIONS

- » How do the stakeholders come together to make building and operating decisions?
- » Who makes the decisions? Who is involved?
- » What type of public/private partnerships work effectively? What doesn't work?

## TRAFFIC GENERATION

- » Evaluate alternative traffic management scenarios across an entire traffic network
  - What happens when the system is shut down during peak travel times? During non-peak travel times?
- » Test social reactions to different system adjustments
  - Raise/lower fares; provide discounts
  - Change appearance or location of stations, fare boxes, and maps
  - Change parking requirements adjacent to stations
  - Change hours of service
- » What effect does PRT have on other transportation modes?
  - Rail, bus, bike, auto, plane, walk/run
- » Input travel time data for PRT to measure travel reliability and accessibility
- » Estimate travel times on arterial links and study PRT's effect on these links
- » Study the characteristics of both captive and choice riders to determine what factors help increase ridership of choice riders (those who have other travel options besides PRT)

# PRT SYSTEMS

Conceptualized over 50 years ago, the market value of PRT has reached a tipping point, with several cities around the globe actively exploring and testing the benefits of a PRT system. With years of testing have come numerous technological advancements and a greater understanding of PRT's benefits to a community.

Today, several companies worldwide are testing PRT systems, including Minnesota-based Skyweb Express, Taxi 2000.

## SKYWEB EXPRESS, TAXI 2000

Skyweb Express provides point-to-point transportation (P2P), meaning passengers travel non-stop from origin to destination on an electric, elevated guideway system.

Skyweb Express offers the echo™ Control System technology, which communicates with each individual vehicle more than 10 times per second, continuously updating vehicle data. This results in less congestion, faster trips, and shorter waiting times. Skyweb Express is a high capacity PRT system, capable of transporting 21,600 passengers per hour. (*Booz Allen Hamilton, Pg. A1-2*).

## ULTra, ADVANCED TRANSPORT SYSTEMS (ATS)

ATS is a funded corporation operating in Bristol, England and was selected by the British Airport Authority for pilot implementation project at Heathrow Airport. Vehicles are battery-powered with a maximum capacity of 7,200 passengers per hour.

## VECTUS, VECTUS PRT

Vectus is a subsidiary of POSCO, a steel producing company in Korea, and is focused on development and commercial interest in Asian and European markets. Vehicles are powered by linear induction motors in the track, with a maximum passenger capacity of 5,600 passenger per hour.

## 2GETTHERE

2getthere is a Dutch-based company, offering a ground-level PRT system with battery-powered vehicles. 2getthere is contracted to build a small test PRT system in United Arab Emirates as part of the "Masdar" carbon-neutral city.

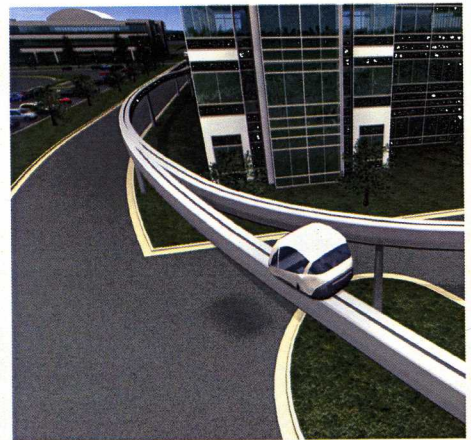
# PRT *an opportunity that can't be ignored*

**PRT implementation in the United States is no longer a matter of *if*, but of *when* and *where*.**

Cities worldwide have recognized the economic and environmental benefits of PRT and are anticipating PRT lab cities to establish functional systems to ignite research and development.

With a robust science and technology community, a strong university and college system, and appropriate population and geographic size, the City of Winona offers the ideal environment for hosting a PRT lab establishing a center of research and development for this important project. Minnesota, too, has set clear goals to meet the growing demand for green infrastructure. By supporting the Winona PRT project, the state will be sending a strong message that it understands the key to solving its future public transportation, green jobs, and environmental challenges rests in innovating its way to long-term solutions.

The time for PRT implementation is now, and the City of Winona is ready to bring this exciting opportunity to Minnesota.

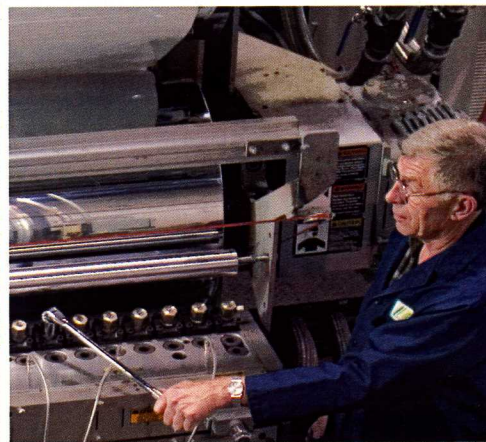


*Winona's proposed personal mass transport proposal offers Saint Mary's University an unparalleled opportunity to grow its geospatial capabilities, resulting in both a stronger and more diverse academic curriculum and increase in the university's ability to attract students to the Winona Area.*

—Barry Drazkowski, Executive Director, Geospatial Services Saint Mary's University of Minnesota

*Minnesota State College-Southeast Technical is excited about the potential of being part of the exciting Personal Rapid Transit project. We at Southeast Technical are looking for ways that we will be able to help develop sustainable communities and to lead others on this path. This project has significant potential to accomplish those goals... We are excited and supportive of this project.*

—Jim Johnson, President, Minnesota State College-Southeast Technical



#### ACKNOWLEDGMENTS

The City of Winona would like to thank RTP Company, Winona State University, Saint Mary's University and Minnesota State College-Southeast Technical for their critical support and assistance in preparing this document.

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