"Developing Effective Mass Transit Systems"

Proceedings of the 5th International Workshop on Public Transportation

Moscow,

Russian Federation

May 28-29, 2007

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13. ABSTRACT

The Federal Transit Administration (FTA), in conjunction with the U.S. Embassy, the Russian Ministry of Transportation, the City of Moscow, and the Ministry of Transport of the Moscow Oblast (Regional) Government, hosted a bilateral conference to discuss the effective implementation of public transit systems. The conference was convened in Moscow from May 28-29, 2007 to provide a forum through which the relevant government officials of Russia and the United States, as well as representatives of the public and private sectors of the public transit industry, could hold in-depth discussions on the four identified conference themes:

- Transit Planning and Congestion Management
- Ensuring Safety and Security on Public Transit Systems
- Providing Accessible Public Transit to the Mobility Impaired
- Training Public Transit Professionals

This report has been produced to document the material presented at the conference, to provide a synthesis of the conference findings, and to define the action items to be pursued in further collaborative efforts between the Russian Federation and the United States.

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May 28 and 29, 2007

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METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in)	=	2.5 centimeters (cm)
1 foot (ft)	=	30 centimeters (cm)
1 yard (yd)	=	0.9 meter (m)
1 mile (mi)	=	1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in^2)	=	6.5 square centimeters (cm^2)
1 square foot (sq ft, ft^2)	=	0.09 square meter (m^2)
1 square yard (sq yd, yd^2)	=	0.8 square meter (m^2)
1 square mile (sq mi, mi^2)	=	2.6 square kilometers (km^2)
1 acre = 0.4 hectare (he)	=	4,000 square meters (m^2)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz)	=	28 grams (gm)
1 pound (lb)	=	0.45 kilogram (kg)
1 short ton = 2,000 pounds (lb)	=	0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp)	=	5 milliliters (ml)
1 tablespoon (tbsp)	=	15 milliliters (ml)
1 fluid ounce (fl oz)	=	30 milliliters (ml)
1 cup (c)	=	0.24 liter (l)
1 pint (pt)	=	0.47 liter (l)
1 quart (qt)	=	0.96 liter (l)
1 gallon (gal)	=	3.8 liters (l)
1 cubic foot (cu ft, ft^3)	=	0.03 cubic meter (m^3)
1 cubic yard (cu yd, yd^3)	=	0.76 cubic meter (m^3)

TEMPERATURE (EXACT)

[(x-32)(5/9)] °F	=	y °C

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm)	=	0.04 inch (in)
1 centimeter (cm)	=	0.4 inch (in)
1 meter (m)	=	3.3 feet (ft)
1 meter (m)	=	1.1 yards (yd)
1 kilometer (km)	=	0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm^2)	=	0.16 square inch (sq in, in^2)
1 square meter (m^2)	=	1.2 square yards (sq yd, yd^2)
1 square kilometer (km^2)	=	0.4 square mile (sq mi, mi^2)
10,000 square meters (m^2)	=	1 hectare (ha) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gm)	=	0.036 ounce (oz)
1 kilogram (kg)	=	2.2 pounds (lb)
1 tonne (t)	=	1,000 kilograms (kg)
	=	1.1 short tons

VOLUME (APPROXIMATE)

1 milliliter (ml)	=	0.03 fluid ounce (fl oz)
1 liter (l)	=	2.1 pints (pt)
1 liter (l)	=	1.06 quarts (qt)
1 liter (l)	=	0.26 gallon (gal)
1 cubic meter (m^3)	=	36 cubic feet (cu ft, ft^3)
1 cubic meter (m^3)	=	1.3 cubic yards (cu yd, yd^3)

TEMPERATURE (EXACT)

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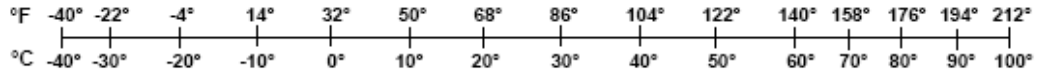
QUICK INCH - CENTIMETER LENGTH CONVERSION

QUICK FAHRENHEIT - CELSIUS TEMPERATURE CONVERSION



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Foreword

This report has been produced to document the proceedings of the 5th International Workshop on Public Transportation, which convened in Moscow in May 2007. This technical conference was organized to provide a forum for transportation officials from Russia and the United States to share knowledge and experience in relation to four identified transportation themes. In addition to providing a synthesis of the material presented at the conference, this report also defines the action items to be pursued in further collaborative efforts between the Russian Federation and the United States.

Acknowledgements

The United States Department of Transportation, Federal Transit Administration, wishes to acknowledge the support of our Russian partners in the organization of the conference event and the associated trade mission. This includes the Russian Ministry of Transportation, the City of Moscow, and the Ministry of Transport of the Moscow Oblast. The assistance of the U.S Embassy in Moscow and London, the U.S Consulate in St Petersburg, and the Center for Urban Transportation Research in Tampa, Florida, is also greatly appreciated.

Executive Summary

Background

In 2006, Secretary Peters, Mr. Simpson, and other U.S. Department of Transportation officials met with Mr. Igor Levitin, Minister of Transportation of the Russian Federation in Washington, D.C. They discussed several issues of interest to both countries, stemming from the common goal of providing better mobility and quality of life for their citizens through improving public transportation and mitigating traffic congestion. Four themes were identified for further investigation;

- Transit Planning and Congestion Management
- Ensuring Safety and Security on Public Transit Systems
- Providing Accessible Public Transit to the Mobility Impaired
- Training Public Transit Professionals

The Federal Transit Administration (FTA), in conjunction with the U.S. Embassy in Russia, the Russian Ministry of Transportation, the City of Moscow, and the Ministry of Transport of the Moscow Oblast (Regional) Government, hosted a bilateral conference to discuss the effective implementation of public transit systems. Titled "The 5th International Workshop on Public Transportation", the conference was convened in Moscow from May 28-29, 2007. This technical conference was organized to provide a forum through which the relevant government officials of Russia and the United States, as well as representatives of the public and private sectors of the public transit industry, could hold in-depth discussions on the four identified themes. The conference also provided an excellent opportunity to share Russian and U.S. experiences and gain insights into both countries' transit operations. This report has been produced to document the material presented at the conference, to provide a synthesis of the conference findings, and to define the action items to be pursued in further collaborative efforts between the Russian Federation and the United States.

Panel Session 1 – Transit Planning and Congestion Management

Both the Russian and US presentations highlighted the fact that similar problems are currently being experienced in both countries. Dramatic economic expansion in the closing years 20th century has resulted in exponential increases in levels of private vehicle ownership. This has placed great pressure to increase the capacity of existing transportation infrastructure, typically through increasing existing highway capacity, and building new highways, and providing enhanced public transit service. However, there are extremely high costs associated with this type of large scale infrastructure provision, both in financial terms, as well as in terms of social costs and environment impacts. The governments of both countries are aware that the funds required to provide such infrastructure is becoming increasingly difficult to obtain through traditional sources.

Both countries also acknowledge the important role that public transit has to play in addressing future transportation system challenges. In both countries, transit services

depend heavily on the federal government, both for planning and building new services, and for funding existing ones. The process leading to provision of new services is time-consuming and often hindered by lack if co-ordination between local and federal government. A more streamlined evaluation and implementation process is required so that projects may be completed within reasonable timescales. This will require closer collaboration between local and federal government through the identification of common goals. Funding constraints have also led the U.S federal government to investigate the implementation of Bus Rapid Transit (BRT) as a low-cost rapid transit alternative to Light Rail. One of the most successful BRT projects in the U.S is the Metro Orange Line in Los Angeles, which, since its opening in 2005 has already exceeded 2020 ridership projections and has resulted in a marked reduction in traffic congestion on parallel highways.

The issues outlined above have stimulated increased interest in Public Private Partnerships (also known as PPP or P^3), as a way of leveraging private sector technical, management, and financial resources. Mr Ford of SFMTA discussed the multitude of different PPP models that are available, and explained which ones had been successfully employed in the US to provide transportation infrastructure and to develop real-estate through joint development arrangements. Mr Ford's discussion showed how PPP arrangements compare favorably to more traditional approaches in terms of delivering projects within challenging time and budget constraints, while reducing the financial and legal risk to the responsible public sector agency.

While the PPP approach to providing public transit infrastructure is in its infancy in the Russian Federation, this country has extensive experience in involving the private sector in transit service provision, with a multitude of private companies responsible for the provision of bus, tram, and trolleybus services in Moscow and other Russian cities. One innovative aspect of this approach is the separation of transit services into Commercial Routes and Social Routes. Demand is high enough on the Commercial Routes to allow the private companies to set their own fare levels and concession structures, and to yield a profit without any government subsidy. Social Routes are provided where demand is not high enough to allow a profitable service to be operated. In this case the government provides a subsidy to the private company to operate the service, specifying the fare level and concession structure. In this way, areas of lower passenger demand are still provided with sufficient access to the transit system.

Overall it is clear that both countries share similar problems in terms of transit service planning and congestion mitigation. In both cases it seems that the federal government needs to develop a closer relationship with the local governments and that increased private sector involvement may be part of the solution. In this respect, the Russian delegates benefited from hearing how the PPP approach may be applied to transit infrastructure provision and joint development, while the U.S delegates were able to learn the innovative ways in which private companies are utilized in transit operations in Russian cities.

Panel Session 2 – Ensuring Safety and Security on Public Transit Systems

Public transit is part of every nation's critical infrastructure. As such, safety and security are of paramount importance in both the Russian Federation and the United States. In both countries, activities focus on mitigating criminal and terrorist activity in transit vehicles and stations, and ensuring passenger safety at all times. Security measures have become an even higher priority since the 9/11 terrorists attacks in New York in 2001. The Moscow Metro employs a sophisticated range of measures to ensure safety and security, centered around the Metro Police Agency that operates an armed police presence 24 hours a day, seven days a week. The transit police are supported by teams of security guards, transit staff, and members of the public using the system. Moscow has also been the target of a total of six significant terrorist attacks since its opening in 1935. Each country now employs a range of similar counter-terrorism measures, which include regular inspections of transit facilities and extensive networks of security cameras in transit vehicles, stations, and platforms. Canine units, bomb containment units, and chemical sensing equipment are also employed. The Moscow Metro also employs motion sensors in ventilation shafts, and explosive handling rooms in each station.

In the U.S, the Department of Homeland Security and the Department of Transportation work in collaboration to address security risks on U.S transit systems. The American Public Transportation Association has also played an important role by developing a series of draft security standards for three primary areas of concern; (i) Fixed Infrastructure, (ii) Security Risk Management, and (iii) Emergency Management. These standards may be viewed at www.apta.com.

The presentations provided in this session illustrate the major commitment already being made by both countries in this post 9/11 environment to ensure safety and security on their transit systems. Of significant interest to delegates were the range of new security technologies capable of enhancing traditional measures. These technologies include new static and mobile Ion Mobility Spectrometry Detection Equipment, capable of real-time detection of explosives, chemical agents and toxic chemicals. Another emerging technology with significant potential is Advanced Video Analytics Software, which is capable of providing real-time image recognition of moving objects. Though the application of this technology to the security field is still in the developmental phase, it has great potential for addressing the deficiencies and expense of human-based surveillance.

Panel Session 3 - Providing Accessible Public Transit to the Mobility Impaired

This session provided an overview of the measures provided in both countries to ensure transit service access to the mobility impaired. Provisions in the U.S are governed largely by the Americans with Disabilities Act (ADA), which was passed in 1991. This landmark legislation contained a raft of regulations designed to prevent discrimination based on any physical or cognitive disability. Of significance to the public transit industry was the stipulation that transit services should provide the same level of access to disabled people as is provided to other able bodied passengers, and that transit agencies must provide

paratransit service wherever a fixed-route service is in operation. Due to financial constraints, such accessibility requirements are often only applied to new facilities and vehicles. The regulations have had a huge positive impact on disabled passenger accessibility, and over 90 percent of the nations buses are now wheelchair accessible.

Roughly 11 to 12 percent of Moscow's population suffers from some form of mobility impairment, and all new buses and trolleybuses in the city are low-floor and fully wheelchair accessible. While the majority of buses and trolleybuses are wheelchair accessible, the city's trams are not accessible to disabled people, largely due to the design of the vehicles. Accessibility regulations have been administered to the vehicle manufacturers though it will take time for the existing vehicles to be replaced by new ones. Approximately 10 percent of the rolling stock is being replaced each year and it is anticipated that by 2015 all buses and trolleybuses will be disabled person accessible. Barriers to more widespread disabled access in Russia are the fact that there is a lack of formal legislation and the fact that there are a multitude of organizations that have jurisdiction over different aspects of transit accessibility. Thus, high levels of inter-agency coordination are required.

Bus Rapid Transit is an emerging transit mode that aims to replicate the high levels of service speed, comfort, and accessibility normally associated with rail systems at a much lower capital cost. The concept of universal design, where products are designed for maximum usability to all users, including the mobility impaired, is particularly applicable to Bus Rapid Transit. A wide range of station, vehicle and runningway design features aim to maximize ease and speed of access to and from the transit vehicle, in order to raise commercial service speeds and levels of reliability. Such design features can be grouped into station access, vehicle access, and vehicle interior. Station access depends heavily on runningway type, with many BRT systems operating in exclusive lanes either in the median or on the edge of the highway. While median operation maximizes service efficiency, getting to and from the station can be challenging – high quality pedestrian crossings or overhead walkways may be provided. Vehicle access may be optimized by providing level boarding to all passengers (a classic example of universal design). Precision docking technology may be employed to ensure that vertical and horizontal gap widths are minimized to the extent that ramps are not required, greatly reducing dwell time. The interior of the BRT vehicle should be designed to be open and spacious, allowing unrestricted access to wheelchair passengers. Wheelchair docking facilities need to be quick, easy and safe to use to ensure that commercial service speeds are maintained.

As with other areas of transit service, new technology has an important role to play in raising accessibility levels for the mobility impaired. The goal of the Mobility Services for All Americans (MSAA) Initiative is to improve accessibility levels using advanced technologies. This federal program is designed to work in collaboration with local and state agencies to provide coordinated technology-based solutions to transit industry partners. Potenial applications include; Geographic Information Systems (GIS), Automatic Vehicle Location (AVL), and Advanced Traveler Information Systems (ATIS).

Panel Session 4 - Training Public Transit Professionals

The long-term ability of the transit industry to provide high quality mobility to the people of the world depends on the maintenance of a well-trained workforce. Successfully addressing transportation workforce issues requires a collective effort involving the agencies, the federal government, the private sector, and a wide range of academic institutions. The need to fully understand the issues governing professional transit training prompted a major study in the U.S titled "*The Workforce Challenge: Recruiting, Training, and Retaining Qualified Workers for Transportation and Transit*". The report examined what is needed for transportation agencies to strategically alter key human resource activities—recruiting, training, retaining, and succession management—and made recommendations designed to enable these agencies to continue to meet emerging workforce challenges and adjust to labor market realities. The report also addressed the role of the federal government in this effort, and made a series of recommendations:

- Training must be a key priority for all involved.
- The agencies must invest more in training than they are now.
- The U.S Department of Transportation should partner with transit agencies.
- Transportation agencies should partner with educational institutions;

All these recommendations focused on improving the performance of transportation agencies and, ultimately, the nation's transportation system. They reflect the goals and benchmarks of successful public-and private-sector organizations and the primary goal of President Bush's 2002 Management Agenda, improving human capital.

The National Transit Institute plays a major role in transit professional training in the U.S, providing training, education, and clearinghouse services and delivering high quality training programs and educational resources to meet the needs of the industry. NTI offers a variety of courses in different program areas. Courses are typically free to public transit agency employees and government employees involved in public transportation. Tuition fees apply to all other participants. Transit organizations can receive a guaranteed number of seats in a course and reduce employee travel costs by volunteering to host a session. Training course are divided into General Program Training and Workplace Safety and Security Training. NTI also produces a variety of educational resources including written materials such as handbooks, reports, fact sheets, and pocket guides; videos; interactive CD-ROM training; and audio teleconferences. A complete listing of resources is available at www.ntionline.com.

The Russian Federation also recognizes that preparing highly-educated transportation specialists is vital. Within the City of Moscow, great emphasis is placed on involving (and encouraging) MADI professors in research activities. Practical training of students receives special attention. The companies where the training takes place are chosen through a thorough review process. There are currently nine research centers at MADI. These centers are financed through a combination of federal (40%) and self-earned (60%) funds. The newest courses prioritize the flexibility to participate in professional training while working full-time. For example, starting in the freshman year, students work during the day and take night classes after work.

Future Action Items

Following the completion of the panel sessions, Rita Daguillard, Director of FTA's Office of Research Management, provided some closing remarks. On behalf of the U.S delegation, she congratulated the speakers for the quality of their presentations and thanked her Russian co-sponsors, the Russian Ministry of Transport, the Moscow Oblast, the City of Moscow, and MADI, for organizing the event and being such exceptional hosts.

Ms Daguillard stated that she views this conference as the catalyst for the establishment of an ongoing relationship between the two countries. She defined three primary steps that needed to be taken to ensure that this occurs:

1. *Publish the conference proceedings and disseminate to all delegates and participating organizations*

2. *Develop an Action Plan for joint projects and activities to be undertaken through collaboration between the two countries in each of the four defined research areas*

3. *Define points of contact for each of the four research areas*

In closing, Ms Daguillard extended an invitation to the Russian Delegation to visit the United States, so that the U.S participants may have the opportunity to reciprocate the exceptional Russian hospitality experienced on this trip

1. Introduction

1.1 Background

In 2006, Secretary Peters, Mr. Simpson, and other U.S. Department of Transportation officials met with Mr. Igor Levitin, Minister of Transportation of the Russian Federation in Washington, D.C. They discussed several issues of interest to both countries, stemming from the common goal of providing better mobility and quality of life for their citizens through improving public transportation and mitigating traffic congestion. Four themes were identified for further investigation;

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The conference acted as the centerpoint to a U.S Trade Mission to Russia that took place from May 24 to 30, 2007. The Trade Mission comprised 18 delegates representing the U.S transit industry (for more details, see Appendix I). The delegation spent May 24 to 27 in St Petersburg, meeting with local officials and visiting the city's various transit facilities, and May 27 to 30 in Moscow. The full conference agenda is provided in Appendix II.

1.2 Proceedings Report Structure

This report has been produced to document the material presented at the conference and to provide a synthesis of the conference findings. The next four sections are structured around each of the four key conference themes. The final section defines the action items to be pursued in future collaborative efforts between the United States and the Russian Federation.

2. An Overview of Public Transportation in Russia[1]

2.1 Summary

Russian cities rely heavily on their urban mass transit systems. Though these systems are aging and in need of modernization, they remain effective and are expansive. Three fourths of Russia's population of 144 million lives in urban areas and Russia's mass transit systems carries in excess of 120 million passengers each day. The Russian market for mass transit rolling stock is one of the world's largest and holds significant potential for foreign suppliers in the medium and long term. As Russia's economy expands, demand for modern high quality components for rolling stock and vehicles meeting international technical and ecological requirements is also growing, giving a boost to the industry and creating opportunities for U.S. exporters. There are also increasing opportunities for suppliers of modern traffic management systems and for U.S. suppliers of transport equipment and engineering and consulting services.

Overview of Russia's Mass Transit System

Although private car ownership continues to grow (now exceeding 9% growth annually in Moscow), undeveloped urban traffic infrastructure will ensure a prominent place for urban mass transit systems for the foreseeable future. Subways are now operating in 6 cities: Moscow, Saint Petersburg, Novosibirsk, Nizhni Novgorod, Ekaterinburg and Samara. In addition, new subway lines are also under construction in Kazan, Omsk, Chelyabinsk and Volgograd. Construction plans are already in development for new metro systems in Perm and Rostov-on-Don. All these metro systems are constantly expanding with construction of new lines and stations being announced regularly. These systems operate essentially as autonomous units with the rest of public mass transport system delivering passengers to them.

City Passenger Transport (Gorodskoe Passazherski Transport or GPT) is provided by a bewildering array of systems including heavy and light rails, monorails, trams, trolley buses, over-the-road coaches, buses and more. While such fleets are generally obsolete and in need of constant repair and replacement, local manufacturers are able to satisfy the demand for rolling stock and vehicles in required volumes and at attractive prices. Bus transport service is provided in 1,231 urban communities and to 81,101 rural settlements. Buses operate on 9,576 urban and 16,115 suburban routes and 6,482 intercity routes. Taxis operate in 81 Russian cities and electric public transport functions in 177 towns, including tram service in 67 cities and trolley bus service in 90 cities. Length of tramway track is 6.3 thousand km and length of trolley bus lines around 10 thousand km.

Like most market economies, Russia operates both social, government subsidized public transportation and the constantly expanding number of private mass transit operators. The traditional public sector, which provides the majority of services, carries people at regulated tariffs and operates with significant losses. These services are subsidized from local budgets. Private sector (primarily buses and mini-buses) are self-financing and do not receive government assistance, and their fare structure is typically not fixed. Most private transport companies operate bus services, particularly using small capacity buses and mini-buses. However, several

[1] The material presented in this section has been extracted from "*Russia's Mass Transit - 2005 Update"*, produced for the Federal Transit Administration by the U.S Commercial Service in Moscow. The material has been reformatted where necessary for consistency.

contract operators are now operating commercial trolley bus transportation. Also some city administrations have begun to contract the complete provision of municipal mass transportation services to private operators. These operators transport passengers in large capacity buses as well as in trolley buses and receive subsidies from the local budgets.

Fare increases and plans to introduce distance-based fare structures for public systems continue to appear in the headlines around the country. On January 1st, 2005, the Russian Federation government eliminated the majority of transportation privileges for use of public transport. Prior to this, more than 60% of country's populous enjoyed special fare privileges, mainly in the form of free transportation. This new increases in revenues are helping operators to modernize and seek modern technologies to improve the operations of their fleets.

2.2 Infrastructure

In 2004, Russia's infrastructure included 1,976 thousand km of bus routes, 6,31 thousand km of tramways, 9,97 thousand km of trolley bus routes and 420.5 km of subway lines (double-track) with some 267 stations. Overall, the renewal and refurbishment of the mass transit infrastructure is one of the priority issues facing Russia's municipal authorities. While the mass transit system has adequate technical maintenance and production facilities (parks, depots and garages) for the size of the fleets, much of the equipment employed is obsolete, and it is estimated that around 60% of this equipment needs to be replaced.

Though in regular use, it is estimated that half of the track and power supply facilities for electric transport are in need of renewal. Real estate investments are now helping fund the modernization of some interchange stations, where service, trade, and information centers have begun to sprout up around bus and tram stops.

When discussing urban mass transit infrastructure, in Russia, it is necessary to consider country's capital on its own given the sheer magnitude of its mass transit network. The Moscow city metro system is generally regarded as the best in the world in terms of reliability and passenger volumes. In 2004, the metro alone carried over 4 billion passengers. Surface passenger transportation includes 5,589 km of bus routes, 938 trolleybus routes and 419 tram routes. Moscow's Metro is more than 250 km in length and consists of 9 lines and more than 150 stations. Moscow's major transport operator, state holding company Mosgortrans (an abbreviation of Moscow Government Transport) operates 30 state enterprises and serves more than 600 regular routes. There are more than 5,246 thousand units of a rolling stock, including 3,556 thousand buses, 1,159 thousand trolleybuses and 531 trams. In 2004, Mosgortrans procured 629 new buses, 134 trolley buses and 127 trams. The Moscow city government's 2004-2005 investment program calls for procurement of 300 trolleybuses and 700 buses equipped with automatic fare collection system and is emphasizing the use of alternative types of fuel including natural gas. Currently, the Moscow city is also implementing new monorail and a mini–metro projects. The first monorail line has been completed and is undergoing operational tests. The first mini-metro line of 2,780 meters long is scheduled for completion in September 2005.

2.3 Public Transit's Strategic Role

For the foreseeable future, mass transit will enjoy a continued heavy reliance in all of Russia's cities. Road infrastructure is in relatively poor condition, and the rapidly increasing number of cars is putting severe stain on urban road traffic management systems not designed for such

volumes of cars. Thus, mass transit system must continue to play a vital role in ensuring the population's transport mobility. In 2004, Russia's urban public transport systems carried over 37,4 billion passengers. Motorbus transportation accounts for 48% of all traffic, trolley buses and tramways for 42%, and subways for 10% of passenger traffic.

Table 2.1 – Russian Passenger Transport Volumes (million passengers).

Types of transport	1995	2001	2002	2003	2004
Buses	22,817	20,883	19,620	17,896	21,000
Trams	7,540	7,354	6,982	6,321	5,803
Trolley buses	8,475	8,604	8,181	7,291	7,160
Subway	4,150	4,205	4,200	4,205	4,211
Taxi	66	13	12	10	N/A
Sea	3,4	0.7	0.6	0.6	1,223
Internal water	25	27	27	22	22.8
Air	32	26	28	31	33.8
Railway	1,833	1,306	1,271	1,304	1,335
TOTAL:	44,941	42,419	40,322	37,083	40,789 (est)

Source: State Statistic Service and Ministry of Transport

The average Russian city has 3 public (municipal) passenger transport enterprises, two of them operating bus fleets and one operating urban electric transport, as well as 5-6 private enterprises and around 100 individual minibus entrepreneurs. The Russian mass transit market is therefore comprised of approximately 350 municipal and public operators, more than 1,500 medium-sized private operators and about 35,000 self-employed entrepreneurs. Overall, public sector enterprises account for 85% of mass transit passenger traffic in Russia, while the 15% carried by the private sector, concentrated in bus and minibus transport.

2.4 Overall Fleet Performance

At the beginning of 2004, Russia's public sector mass transit fleet comprised approximately 92,000 buses; 10,900 tramcars; 11,800 trolley buses, 5,900 subway cars. Vehicles of large and extra large capacity comprise 66% of the public sector bus fleet, and 100% of the tram and trolley bus fleet. According to the Ministry of transport, 58.8% of bus fleet is more than 8 years old, while only 26.2% of buses are less than 5 years old. More than 60% of tram and trolley bus fleet is 15 years old and 10 years old respectively. Thus, a major of investments will be for the renewal of the mass transit fleet. The current annual renewal rate for the bus fleet is 5%, while deterioration is at the level of 15%. The situation with tramway and trolley bus fleet renewal is similar with the deterioration of trams and trolley buses is 6% and 8% respectively, while renewal is 0.6% and 3%.

In addition, some 66,700 private sector buses are in operation for passenger transport (only 12% of the privately owned bus fleet of large and extra-large capacity and the average private owner/operator runs just two buses). Such private bus fleets are comprised of mainly small capacity buses and minivans (Russian-built PAZ, GAZ Gazelle models and Ford Transits). These buses are mostly used for commercial operations. Priced approximately at $6000, a new Gazelle

has a payback period of 1.5- 2 years making these buses the most popular among individual businessmen. Recently, some private operators began introducing larger capacity buses to their fleets. These are mostly second hand Western models (MAN, Scania, Mercedes, and Volvo) that typically have a remaining service life of 10-15. With a typical value of $15,000- 20,000, these buses are estimated to pay for themselves in 2 years. However, increases in import duties have caused private operators to significantly reduce the importation of second hand buses.

According to Ministry of Transport of Russia, the annual demand for vehicles to replace the existing fleets is estimated at 12,000-15,000 buses, more than 1,000 trolley buses, 600 trams and 270 subway cars. However, in 2002 state and municipal entities purchased only around 5,000 new buses, 480 trolley buses and only 82 trams. Including purchases of second hand vehicles total procurement is estimated at 12,712 vehicles. According to the Ministry of transport annual purchase of new buses stays at a level of 4.9 thousand buses, which is not enough even to replace obsolete vehicles.

2.5 Funding and Procurement

As Russia's economy expands, and income levels continue to rise rapidly, there is a trend towards raising fares, improving fare-collection procedures, and reducing the operational expenses of municipal transport operators. At the same time, many local authorities are encouraging commercial operators to assume a greater role in providing mass transit services. The market for vehicles remains a direct function of the purchasing power of regional and city governments. However, these entities are not able to renew the fleet without federal support. Government subsidies still remain the primary source of vehicle fleet replacement in the municipal enterprises. In 2002, 6 billion rubles were spent on bus purchases and 2.2 billion rubles on trams and trolley buses. All purchases of electric transport and most bus purchases were made from government budgets. Operators' own funds accounted for only 1.2 billion rubles spent on bus purchases.

Outright purchase is the usual method for procurement of vehicles by public and private sector operators. Municipal entities typically purchase by open public tender, while the private operators use many procurement schemes to pay for vehicles in cash and register them as private vehicles. The leasing sector is relatively undeveloped in Russia, and small bank loans are difficult, if not impossible to arrange. In addition, there are tax privileges granted when a vehicle is registered as individually owned. Both small and large operators use similar procurement and registration methods. Most of them operate vehicles rented from individuals. The practice is not without risk, as most contracts concluded in these cases lack legal basis and usually are not accepted by court.

The financial services sector is developing quite rapidly in Russia, and in the medium to long term a range of financing options should become available to fleet operators to make capital equipment acquisitions more efficient. Currently private operators have begun to utilize leasing schemes for fleet renewal. However, standard conditions of leasing in Russia usually require a down payment of 30% with the contract period no more than 3 years.

Since 2002, the Russian federal government's program *"Modernization of Russia's Transport System"* has been under implementation. The program supports transport fleet renewals by partially subsidizing the interest rates of commercial loans provided to municipalities for such purchases. However, in 2003, only 7 million rubles were provided from the federal budget, which helped to attract credits worth 320 million rubles. This program is partially modeled after the World Bank's "City Transport" project (1995-2001). Under the project, 14 cities were selected to participate in an open competition: Velikie Luki, Vologda, Ekaterinburg, Kostroma, Nizhni Novgorod, Novgorod, Omsk, Pskov, Rostov, Samara, Saransk, Smolensk, Tver, and Cherepovets. During the course of that program, some 1,392 new city buses and 40 trolley buses were purchased, and more than 1,000 trams and buses were overhauled. Diagnostic and garage equipment, communication facilities and office equipment were also purchased and more than 5,000 Russian experts were trained in mass transit management. The most significant result of the project implementation was that revenues from travel fares payment increased by over 50% in the participating cities, which helped these cities to reduce budget subsidies. Moreover, the quality of mass transit services increased and waiting time and vehicle occupancy was reduced.

2.6 Local Production

While the production capacity of local industry for mass transit purposes is able to satisfy demand, the quality of equipment remains rather low. Vehicles' reliability and comfort is essentially lower and the level of operational costs higher than that of foreign competition. Although prices for domestic manufactured buses, trolley buses and trams are generally half that of similar foreign-made equipment, many mass transit operators still prefer secondhand imported vehicles, largely because of reliability.

Trolley bus manufacturing in Russia is concentrated in 3 firms: Trolza JSC (Saratov region), Trans-Alpha JSC (Vologda), and Bashkirski Trolley Bus Plant JSC. Around 500 trolley buses were manufactured in 2002. The state-owned Ust-Katava Plant (Chelyabinsk region), Uraltransmach (Ekaterinburg) and OAO Saint-Petersburg Tram-Mechanical Plant produce the trams in Russia. Finally, ZAO Metrovagonmash (Moscow region) and ZAO Vagonmash (Saint-Petersburg) produce essentially all Metro rail cars in Russia. Current production is around one quarter of the rate of 5 years ago, and currently output is fewer than 50 cars per year. While manufacturing capacity of these plants can satisfy demand for cars, including comfortable modern energy efficient cars, the depressed purchasing power of local authorities and a reduction of available federal financial support has kept sales on a low level.

Most Russian manufacturing facilities are privatized and are under control of large Russian financial and industrial groups. One example is "Russkiye Avtobusy", which includes largest Russian bus factories (LIAZ, PAZ, Golaz, KAVZ). The large financial and industrial group "Basic Element," which is, in turn, controlled by well-known Russian businessman Oleg Deripaska. In addition, international investment in bus manufacturing is also furthering demand for western components. In order to improve quality of vehicles and produce fuel-efficient equipment, local bus manufacturers are incorporating foreign components like engines, transmissions, and axels.

2.7 Imports

At present the development of Russia' mass transit vehicle imports depends to a great extend on the customs policy pursued by the Government of the Russian Federation. Russia imports mainly second-hand buses. However, in 2003 the market for imported second-hand buses collapsed when the Russian Government introduced new increased import duties for buses over 7 years old. Import tariff for these buses increased to 3 Euro per one cubic cm of engine displacement. As a result customs clearance for a bus with engine displacement of 12 liters will cost around 39,600 Euro. For the first ten months of 2003 Russian buyers imported little more than thousand buses over 8 tons compared to 6,300 in 2002.

Currently the demand for used buses of large and extra large capacity is increasing once again. In 2004, the market began to rebound with a total 2,823 imported vehicles brought into Russia. Regions, which purchase more than 100 imported vehicles include Kaliningrad oblast (443), Moscow (247), St. Petersburg (187), Khabarovsk krai (179), Irkutsk oblast (152) and Buryatia (115). The majority of these vehicles were manufactured between 1995-1999. Lastly, Russian operators have repeatedly mentioned the aggressive marketing strategies of Chinese bus manufacturers. While these efforts have yet to result in significant imports, it is an area that we will continue to monitor.

2.8 International Business Prospects

Despite low prices and trade barriers for imports, local industry still is unable to satisfy market demand for reliable, well-made vehicles. Domestic production does not answer modern requirements, and developing new models will likely take too long to meet the growing needs of the market. Solving the problems facing obsolete manufacturers will undoubtedly require strategic investments and access to new technologies to allow these companies to improve production and access international markets for their vehicles.

There are some important positive indications for the transit vehicle manufacturing sector in Russia. The Russian vehicle and component manufacturing industry is now in an active integration process. Integrated businesses – groups or holdings absorbed by successful and cash-rich Russian financial and industrial groups are investing in the manufacturing sectors with good growth prospects, such as the automotive sector. The Russian government is also supporting innovation in the domestic manufacturing industry. Under its *"Concept for Automotive Industry Development till 2010,"* the government aims: "to integrate Russian industry into the global market and increase its efficiency with up-to-date competitive products. The state will encourage direct and portfolio investments into this sector, as well as joint ventures creation and other co-operation projects." Barriers for complete imported vehicles are already being implemented and these barriers will probably continue for several years.

Russia's mass transit rolling stock market is one of the world's largest and it will keep developing in the long run. Best prospects for international cooperation include, engines, transmissions, and braking systems, electronic systems like ESP and ABS, interior design and materials are among the technologies that Russian manufacturers have identified. Navigational systems, electronic passenger information systems and fare collection systems are also important identified innovations for the medium term. In addition, fleet management and monitoring systems will need to be improved and expanded.

3. 5th International Workshop on Public Transportation

The conference was convened on the morning of Monday, May 28 in Moscow's National Hotel, just yards from the city's iconic Red Square. Welcoming remarks and introductions were offered by Rita Daguillard, Director of the Federal Transit Administration's Office of Research Management, and Leslie Rogers Regional Administrator for District IX, representing the U.S delegation. Representing the Russian conference participants, welcoming remarks and introductions were returned by Galina Koronchik, Deputy Director of the Russian Federation's Ministry of Transport.

3.1 Panel Session 1: Transit Planning and Congestion Management

3.1.1 "Transit Project Planning, Development, and Implementation in the U.S."

- Sean Libberton, Chief of Analysis, Office of Planning and Environment, Federal Transit Administration, U.S DOT[2]

Funding

The U.S federal government is a major provider of public transit capital funding in the U.S. The speaker focused his discussion on the New Starts Program, which provides over $1.5 billion annually for locally planned "fixed guideway" transit investments. Such projects include light and heavy rail as well as Bus Rapid Transit. The current "pipeline" features 29 separate projects costing over $25.9 billion, of which $12.1 Billion is provided by the New Starts Program. Each project sponsor is required to identify a local financial commitment, to which the New Starts funding is matched, though the exact proportion of the match may vary from project to project. The higher the local match, the more competitive the project is for a Federal funding commitment.

Project Development

New Starts projects, like all transportation investments in metropolitan areas, must emerge from a regional, multi-modal transportation planning process. The process is based upon rational decision making that benefits from the information developed during the following three phases of New Starts project development:

Phase I – Alternatives Analysis

Local project sponsors are required to perform an alternatives analysis that evaluates the mode and alignment options for a particular corridor in the community. This analysis informs local officials and community members on the benefits, costs and impacts of transportation options, so that the community can identify a preference. This phase is complete when local and regional decision makers select a locally preferred alternative, and it is adopted by the metropolitan planning organization (MPO) into the region's long-range transportation plan.

[2] Some of the information provided in this section has been extracted from the following resource:
New Starts Fact Sheet. (2007). http://www.fta.dot.gov/planning/newstarts/planning_environment_2607.html

Phase II – Preliminary Engineering
During the preliminary engineering (PE) phase of project development for New Starts investments, local project sponsors consider their design options to refine the locally preferred alternative and complete the National Environmental Policy Act (NEPA) process. Preliminary engineering hones the estimates of project costs, benefits, and impacts. In addition, during the PE phase of project development, local sponsors finalize management plans, demonstrate their technical capabilities to develop the project, and commit local funding sources.

Phase III – Final Design
Final design is the last phase of project development and includes the preparation of final construction plans, detailed specifications and bid documents.

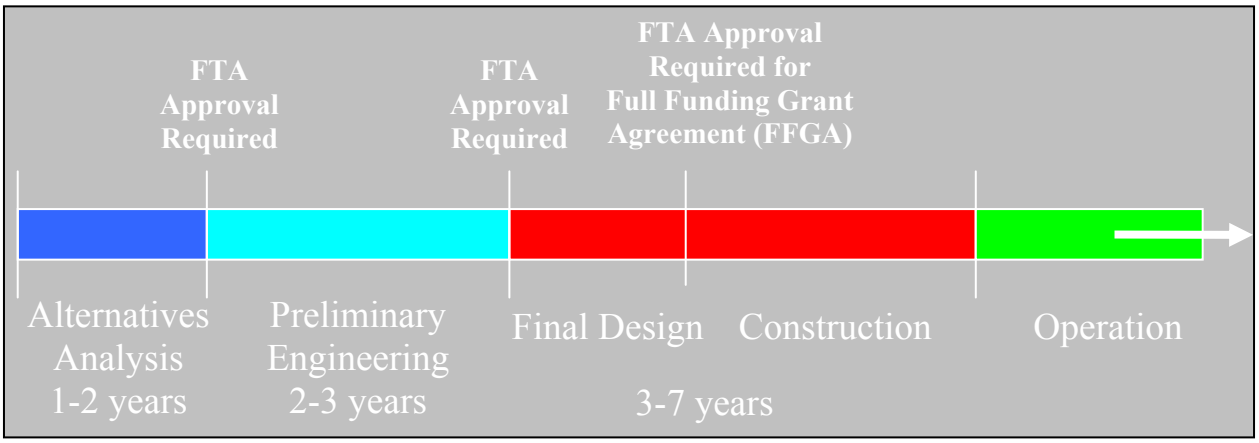

FIGURE 3.1 – New Starts Project Development Process

The speaker highlighted the fact that overall project development can take six to twelve years, and that it can be difficult to keep a project moving forward over such an extended timeframe, due to various political and financial pressures. The speaker noted that the FTA was actively seeking ways to reduce the average project development timeline.

Project Evaluation

New Starts projects must undergo evaluation by the FTA throughout the entire project development process. Projects are evaluated according to a variety of project justification and financial criteria. Specifically, FTA evaluates these criteria according to the following measures:

Project Justification:

- **Mobility Improvements**
  - measured by travel time benefits per project passenger mile, low-income households served, and employment near stations. Projects must deliver significant time savings.
- **Environmental Benefits**
  - measured by change in regional pollutant emissions, change in regional energy consumption, and EPA air quality designation

- **Cost Effectiveness**
  - measured as the cost per hour of travel time saved.
- **Operating Efficiencies**
  - measured by system operating cost per passenger mile.
- **Transit Supportive Land Use & Future Patterns**
  - measured by existing land use, transit supportive plans and policies and performance, and impacts of policies. A major reason for Federal investment in fixed-guideway transit is ability to influence corridor land usage and thus stimulate economic development
- **Other**
  - includes a number of optional factors, including the projected economic impact of project.

Financial Rating:

- The proposed **share of total project costs from sources other than New Starts**, including federal formula and flexible funds, the local match required by federal law, and any additional capital funding.
- The stability and reliability of the proposed **capital financing plan**.
- The ability of the sponsoring agency to fund **operations and maintenance** of the entire transit system (including existing service) as planned, once the project is built.

Based on its evaluation, the FTA makes decisions about moving projects forward, from preliminary engineering to final design, and, ultimately, to the execution of a multi-year grant agreement to construct the project.

New Starts Program Challenges

The speaker concluded his presentation by describing the current challenges facing the New Starts Program. These included:

- Maximizing the level of Federal investment
- Obtaining accurate estimates of projects costs and benefits
- Ensuring the evaluation of competing projects on a "level-playing field"
- Managing the implementation and integration of the two new Federal funding programs – "Small Starts" and "Very Small Starts"
- Streamlining the process wherever possible

3.1.2 "Transit Project Planning, Development, and Implementation - The Moscow Oblast Experience"

- Norayr Bloudyan, Deputy Minister of Transport, Moscow Oblast Government

The speaker provided an overview of transit provision in the Moscow Region, initiating his discussion with some staggering statistics;

- Moscow's regional transit system carries over 11 million passengers on an average weekday. Of which nine million use the metro.

- 131,000 people are employed by Moscow Oblast, 3.6 percent of the region's total workforce
- There are a total of 1,762 transit bus routes throughout the city. They are supported by 9 trolley routes and 11 tram routes. Together they transport over 2 million passengers each day.
- The transportation from the Moscow region (Oblast) to Moscow is provided by over 380 transit routes bringing passengers to 32 subway stations.
- Service is provided by a total of 280 private bus companies, one tram company, and three trolleybus companies. The number of transit vehicles is estimated at over 16,000. The primary carrier remains the state transport agency. Carriers are selected through a competitive bidding process.
- About 4.5 million residents of Moscow own gardens and vacation homes in Moscow region and visit them on the weekends especially in the summer time. Therefore, it is necessary to increase the number of routes and buses per route during the summer time.

In 2005 the transit subsidy was monetized. Some categories of customers with transit privilege use Moscow city and Moscow Oblast social transit pass. This pass gives them unlimited access to regionwide transit services. The speaker then provided an overview of current issues faced by the Moscow Oblast. These included:

- Establishing identical transportation standards for transporting passengers between Moscow Oblast and other regions;
- Establishing and enforcing regulations
- Establishing the system of licensed carriers
- Infrastructure funding
- Mitigating congestion

The speaker noted that while the density of paved roads in Moscow Oblast and Moscow is 15 percent higher than on average in Russia, the car ownership steadily outpaces the infrastructure development. This has resulted in increasing congestion problems. The speaker concluded by outlining the two main challenges now faced (i) ensuring year-round access to transportation infrastructure, and (ii) building high-speed roads.

FIGURE 3.2 – Traffic Congestion in Moscow

3.1.3 "Public Private Partnerships in the U.S"

- Nathaniel P. Ford, Senior Executive Director / CEO, San Francisco MUNI

Introduction

"Public-private partnerships" (also referred to as PPP or P³) refer to contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of transportation projects. Traditionally, private sector participation has been limited to separate planning, design or construction contracts on a fee for service basis, based on the public agency's specifications.

P³ enable public agencies to tap private sector technical, management and financial resources in new ways to achieve certain public agency objectives such as greater cost and schedule certainty, supplementing in-house staff, innovative technology applications, specialized expertise or access to private capital. The private partner can expand its business opportunities in return for assuming the new or expanded responsibilities and risks.

The success of public-private ventures in other sectors (utilities, telecommunications, public highway transportation) have pushed public transportation agencies to re-think public private partnership models as the growth in traditional transportation revenue sources (gasoline taxes and transit fares) continues to decline while transportation operation, maintenance, replacement and expansion needs and costs increase. Thus, transportation agencies face significant pressure to reduce costs and find new sources of revenue. (Source: Federal Register, Vol. 72 No. 12).

Current Models of Public and Private Sector Competition

While Public Private Partnerships have a strong track record in Europe and Asia (Bangkok Railway), in the United States, some basic models have just recently begun to take hold.

- DBB- traditional form of project delivery where the design and construction are awarded separately to private sector engineering and contracting firms. Under the DBB, the project sponsor is solely responsible for financing, operation and maintenance of the project.
- DB- the design build delivery approach combines the design and construction phases into one, fixed-fee contract. Under a DB contract, the design-builder, not the project sponsor, assumes the risk that the project specifications are free from error. The DB is performed under one contract, however, the DB may be one company or a team of companies working together. Primary benefits include: **cost savings** (e.g. reduced change orders due to collaborative involvement, reduced inspections, etc.); **time savings** (ability to work concurrently on design and construction; elimination of bidding process between design and construction phase in a traditional DBB); **shared risk** (e.g. public and private sector risk based on appropriate agency mitigation—public for environmental clearance, ROW acquisition, permitting and private for construction cost, delivery schedule adherence); **improved quality** by incorporating new technology or other innovations.
- An example of FT-Fast Track is the recent contract award for I-80 maze collapse; certain permitting, environmental clearance and procurement processes are streamlined; incentives provided to the winning bidder.

- DBO-contractor is responsible for design, construction, operation of a facility for a specified time. [Paired with DBOM]
- DBOM- the selected contractor is responsible for the design, construction, operation and maintenance of the facility for a specified time. Contractor must meet agreed upon performance standards i.e. capacity, physical condition. Potential benefits include incentives for delivery of a higher quality plan because DB is responsible for performance.
- BOO-design, construction, operation and maintenance of a facility is the responsibility of the contractor. Major difference is the ownership remains with the private contractor, thus they own the revenue risk and surplus revenues for the life of the facility.
- DBFO-a variation of the DBOM approach, but in addition, contractor is responsible for all or a major part of the project's financing. Benefits include transfer of financial risks to the contractor. The project sponsor (e.g. transit agency) retains ownership of the facility but attracts private financing to be paid with revenues generated during the facility's operation (e.g. user fees). Source: Federal Register, Vol 72 NO. 12 Jan 1 2007.

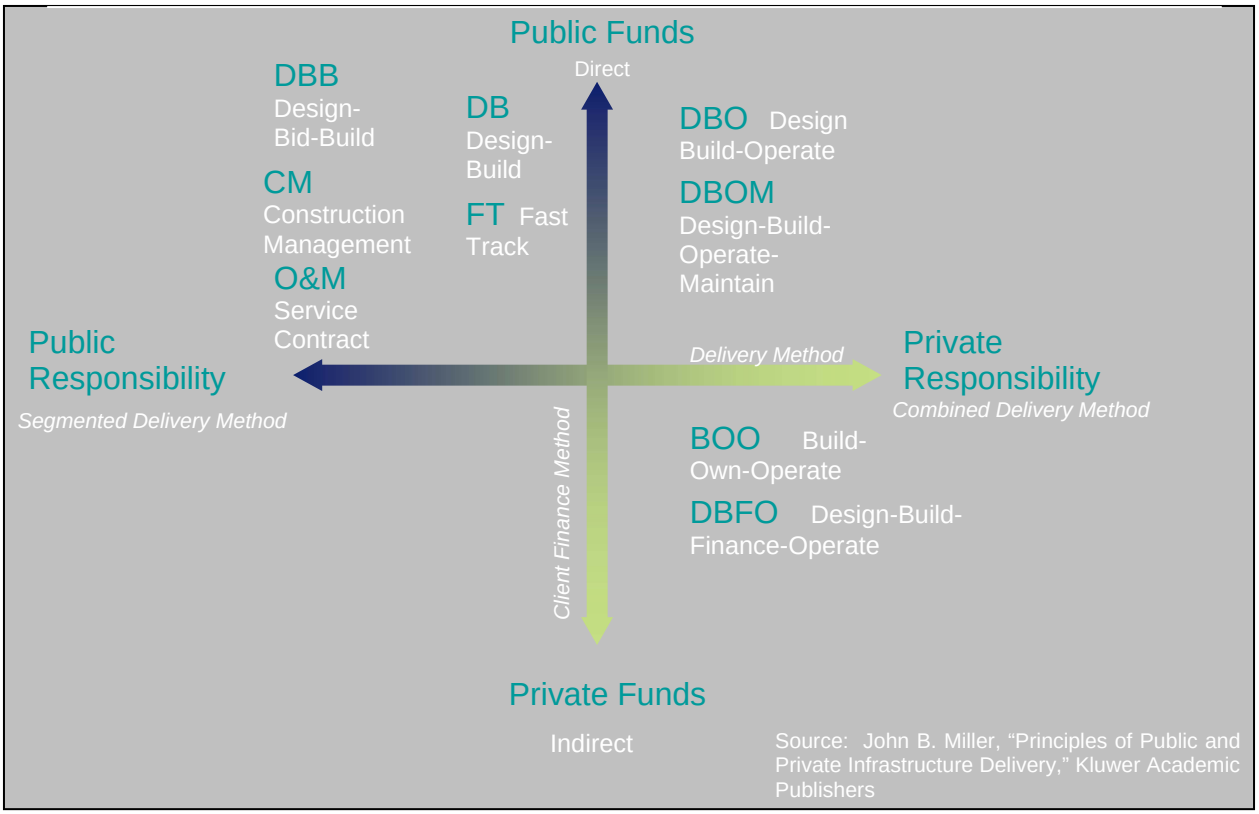

FIGURE 3.3 – Current Models of Public and Private Sector Participation

U.S public transit systems typically employ either the DB or DBB models.

Using the PPP Approach to Develop Public Transit Infrastructure

Infrastructure Development under a Public Agency is a Standard Model in the U.S. This standard model has the transportation agency bearing much of the financial and political risk, while contracting out traditional operations and construction management services. The speaker went on to illustrate the P3 approach to infrastructure development using two case studies as examples (a) The BART to SFO Extension, and (b) the Port of Miami Tunnel Project

Case Study – BART to SFO Extension

The San Francisco Bay Area Rapid Transit District is a local example of a design build model that utilized the expertise from the private sector to reduce costs and streamline construction time. The overall project was financed through a combination of federal, state and local dollars, along with system user fees and dedicated tax revenues.

FIGURE 3.4 – BART to SFO Extension

The $1.55 billion airport extension program extends BART more than 14 kilometers (8.7 miles), including 9.7 kilometers (6 miles) of cut-and-cover tunnels. It provides thousands of travelers with a direct mass transit link to the airport and shortens the travel time from downtown San Francisco to the airport to one half-hour for less than $5.

The Federal Transit Administration-sponsored airport extension project was BART's first experience with a design-build project delivery system, and the general engineering contractor provided a wide range of services, including program management, design and design review, procurement management, design support during construction, quality assurance/quality control and construction management. The contractor also assisted with testing and start-up for the extension, and helped integrate the extended BART system with existing and new airport facilities, provided IT and technical support, and supported all close-out activities. By using the design-build method of contract delivery, the team saved a year in construction time. The project was awarded the 2004 Caltrans Excellence in Intermodal Transportation Award, a 2004 Grand Award for Excellence in Engineering Design by the American Council of Engineering Companies, and a 2004 Engineering Excellence Honor Award from Consulting Engineers and Land Surveyors of California.

Case Study – Port of Miami Tunnel Project

One of the largest ports in the world, the Port of Miami is located on an island in Biscayne Bay. The port has been losing business because they did not have a good connection to their interstate

system; trucking lines were using city streets. Miami did not have a track record of expertise in building tunnels. Public policy decision was to not toll the truckway (lose competitive edge). Florida DOT and Miami Dade County issues an RFP. Sought to average out the operation and maintenance cost over a 35 year period—similar to US example of taking out a mortgage on your home. Estimated cost for public sector operation and maintenance was $69M per year to keep at state of good repair. Winning bidder came in at $34M per year in O & M cost, thus saving taxpayers $35M per year.

The PPP approach is applicable to mass transit for several reasons: 1) controls cost to maximize taxpayer's investment, 2) establishes a single point of accountability over a several year fixed term to maintain the state of good repair needed for the infrastructure project. For mass transit, this means looking at long-term cost savings, cost containment, accountability and maximizing life cycle cost. The risk is taken on by the private sector entity responsible for building, operating and maintaining over a fixed term.

Joint Development Opportunities

The speaker then discussed the different opportunities for joint development in the provision of mass transit. **Joint development projects** involve residential, commercial and retail facilities that are incorporated within or adjacent to transit facilities. Land can be sold for development rights for the highest and best use and to create additional transit ridership through mixed-use development. Joint Development projects offer two primary benefits to transit agencies;

(a) Can be a significant source of additional revenue for a transit agency or system
(b) Transit agencies can influence the type of development that occur around its facilities

FTA recently issued revised guidelines for facilitating joint development projects. The updated guidelines provide additional flexibility in working with the private sector by giving the public agency the responsibility of setting acceptable levels of private investment (flexibility with in-kind donations), and removing the monetary threshold requirement that previously aimed to ensure "fair share" of revenue.

The speaker then discussed different examples of successful joint development projects. One example was the Transbay Transit Center in San Francisco, CA. The Transbay project is a visionary housing and transportation plan that will transform downtown San Francisco and regional transportation well into the next century. It consists of three interconnected elements: (1) replacing the outmoded Transbay Terminal with the modern Transbay Transit Center; (2) extending Caltrain 1.3 miles from Fourth and King Streets

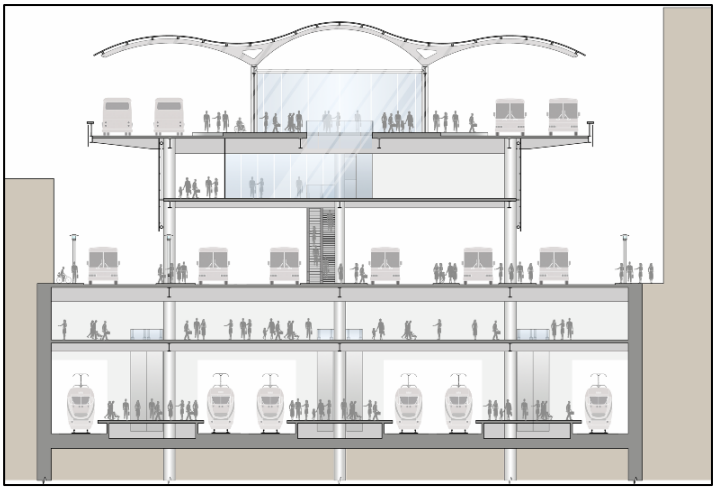

FIGURE 3.5 - Transbay Transit Center Building

downtown into the new Transbay Transit Center at 1st and Mission, with accommodations for future High-Speed Rail; and (3) creating a new transit-friendly neighborhood with 3,400 new homes (35% of which will be affordable), and mixed use commercial development. In June 2006 the project received authorization to proceed, and is expected to be completed by 2012.

3.1.4 "System for Implementation of Mass Transit Projects in the City of Moscow"

- Alexander Vorobiev, Deputy Head of the Department of Transportation and Communications, City of Moscow

The speaker began by highlighting the fact that the federal government is responsible for all ground transportation planning in Russia, and observed that both the U.S and Russia seem to suffer from a lack of federal government support. In general, transportation infrastructure improvements are financed from two sources: federal and regional budgets. Federal government says "we are ready, what do you want to do?" When we tell them, they don't always cooperate. There needs to be a closer working alliance between federal and local government. Transit planning in Moscow is based around a Three-Year Program, which has guaranteed funding for this period. However, you have to be able to justify the investment in order to receive federal funding. And very often, regions and local jurisdictions are not ready to implement projects under such severe time constraints. Currently, there are no transportation projects in the city that receive federal money with the exception of metro (subway). After the three years of the program, suggestions to improve/correct the program will be considered.

Public Private Partnerships is a fairly new concept in Russia, but such partnerships are beginning to emerge, with varying levels of success, typically when state financing is not sufficient. It is recognized that this approach is still in the pioneering stage and that more time is needed before it can be properly evaluated. Within the transportation sector, the PPP approach is also emerging as an option, though there are currently no fully implemented PPP-based transportation projects in Russia. At this point in time, PPP success appears to be determined by four primary factors: pre-project preparation, sufficient commitment from the public sector, attracting a high quality concessionaire, and ensuring that a legal framework is in place (a draft contract template has recently been approved). The main obstacles stem from the simple fact that this approach is so new and untested that there is limited understanding of how to get the approvals that are required. There is also a problem ctaused by the fact that officials question the justification and motives for pursuing this approach. The speaker stated that the main criticisms of the PPP approach are as follows:

- Why do we need the private sector to do a job that has always been done by public agencies?
- Why are we using federal and state taxes to give private companies a profit?

This suspicion will only be removed if these initial pioneering projects are successful in achieving returns on investment that would not be possible through the traditional approach.

3.1.5 *"Building and Managing Efficient Transit Projects"*[3]

- Leonid Bukhin, Engineering Project Manager, Los Angeles County MTA

In this presentation, the speaker provided an overview of Los Angeles County's Metro system. The Metro System consists of almost 85 miles (including the unique Metro Orange Line) of rail and asphalt spreading through neighborhoods of businesses, churches, homes, parks, and schools. When the Metro Gold Line Eastside Extension rail line debuts in late 2009, the Metro System will spread east another six miles, bringing light rail to neighborhoods eager for electric light rail. The Metro system is composed of both light rail and heavy rail, in addition to the recently implemented Orange Line, a 14-mile Bus Rapid Transit service running in a disused rail freight corridor. Average commercial speed on the Red Line (heavy rail / subway) and the Green Line (grade separated LRT) is 38mph. Average commercial speed on the Gold Line (at-grade LRT) is 21-25mph and 22mph on the Orange Line (at-grade exclusive Right-of-Way BRT).

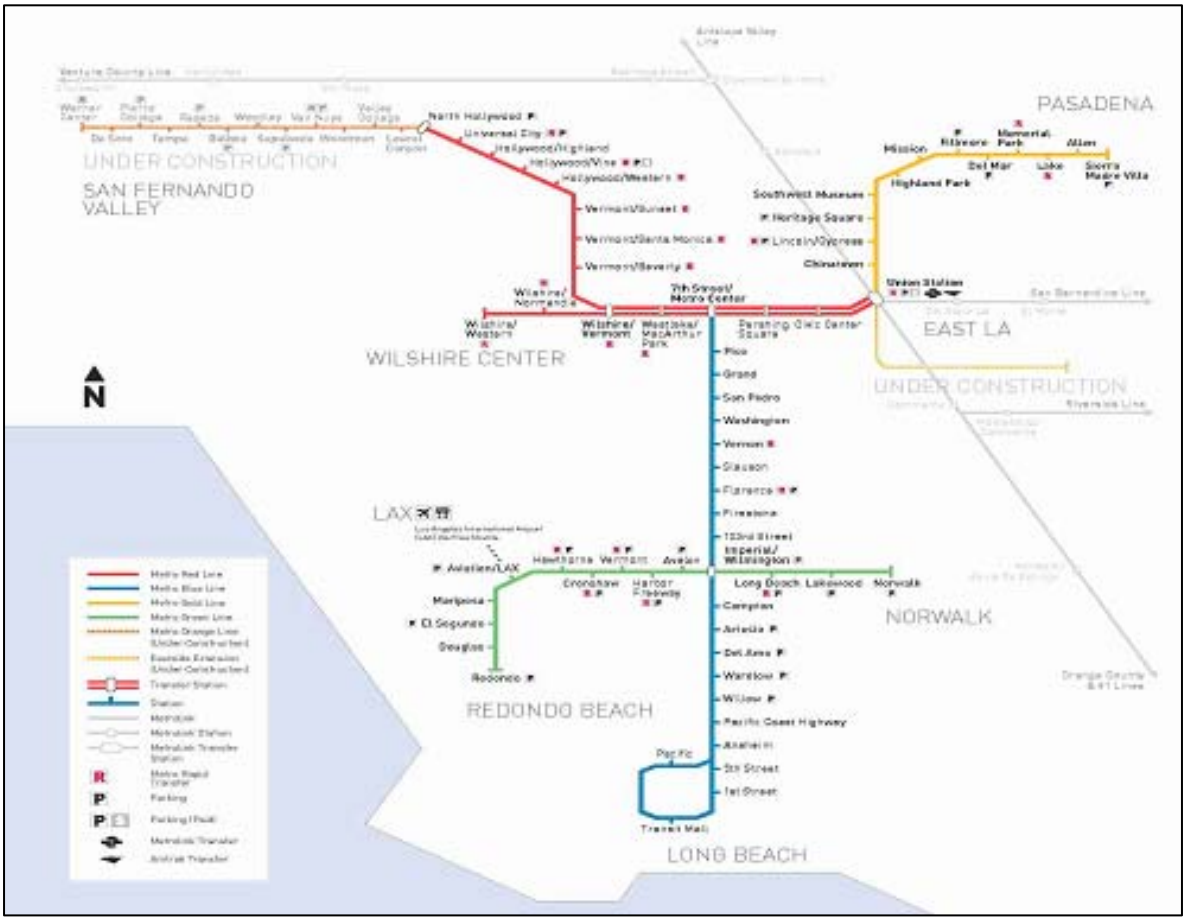

FIGURE 3.6 - The Los Angeles County Metro System

The speaker then discussed each of the system elements in more detail:

[3] This presentation was actually given in Panel Session 4 due to time constraints. It appears in this section of the Proceedings document due to the fact that the material is more applicable to Panel Session 1.

1. Fare Collection

The Universal Fare System (UFS) for all lines consist of Ticket Vending Machines (TVMs), Stand Alone Validator (SAVs) and station networking equipment.

FIGURE 3.7 –
LAMTA Ticket Vending Machines

2. Vehicles

For its high occupancy lines Metro employs several different types of vehicles:

a. NABI (North American Bus Industry) articulated buses for Metro Orange Line
b. BREDA heavy rail cars for Metro Red Line
c. Siemens and Breda light rail cars for the Pasadena Gold Line
d. Siemens light rail cars for the Green Line
e. Nippon Shario light rail cars for the Blue Line

3 Train Control

The Automatic Train Control (ATC) system provides automatic train supervision (ATS) and control capabilities to ROC, in addition to providing automatic train protection(ATP) and operation (ATO) for train safety, control of train movements, and directing train operations on The main line and in the yard.

4 Traction Power and Distribution

The power source for train operation is derived from the public utility AC supply which is converted to direct current by means of rectifier substations spaced along the alignment. The distribution system, either contact rail or overhead contact, provides the train with power supplied by the substations and the running rails are used to complete the circuit back to the substation from the trains

5. Communications

5.1 Radio

The Radio transmission provides the primary communication services for those areas where it is impracticable to provide cable communications. Two-way voice communications via radio serves trains and maintenance Vehicles and Portables with channels provided for operations, maintenance, security and fire/police emergency functions.

5.2 Telephone

The telephone service includes emergency, maintenance, administrative telephones, and passenger assistance intercom at passenger stations, wayside, the ROC, and the Yard, served by private automatic branch exchanges (EPABX). In keeping with regulatory practice, all emergency telephone communications are recorded. All patron assistance phone communications are also recorded.

5.3 Public Address (PA)

Provides a means of making audible announcements to selected areas in a station, station wide or to several stations, from ROC or, for a particular station, from the local EMP. Alternate access to PA system is also provided via the Telephone System
Enables live and pre-recorded voice transmission from ROC to the passenger stations

5.4 Variable Message Signs (VMS)

Electronic signboards compliant with ADA requirements enables transmission of text messages from the Control Center to passenger station platforms. Display safety and operations related messages to the traveling public.

**FIGURE 3.8 –
Variable Message Sign (VMS)**

5.5 Closed Circuit Television (CCTV)

CCTV provides surveillance of passenger stations and other areas as required. System-wide implementation of Pan, Tilt and Zoom cameras have been added for increased security.

FIGURE 3.9 – CCTV Surveillance

5.6 Online Information

Information for all LAMTA's services is provided online at the agency website, in the form of system maps, route maps and service schedules (timetables). Real-time service information is also provided online at www.rapidbus.net, and service information may also be downloaded to PDA's and cellular phones.

6. *Supervisory Control And Data Acquisition (SCADA)*

The Supervisory Control and data acquisition (SCADA) subsystem provides monitoring and control capability of systems and facility equipment to ROC. SCADA also provide train tracking and control to varying degrees depending on the line. Equipment monitored by SCADA includes:

- TPSS
- Ventilation
- Fire/Smoke/Seismic/Gas
- Fare Collection
- Elevators/Escalators
- Sump Pumps
- Intrusion Alarm
- Signal System
- Radio

7. *Emergency Management Panel (EMP)*

Provided in underground stations in accordance with Fire/Life Safety Criteria. Integrates alarms, telephone, PA, elevator/escalator controls, in a single console to permit their use as a consolidated command post in event of emergency conditions in stations/tunnels.

8. *Intrusion Detection and Controlled Access*

Unauthorized access to controlled areas is detected using magnetic door contacts, exit request devices (on secure side of the door) and key bypass switched in conjunction with an access control subsystem. Traction power substations, communication rooms, and emergency exit gates at the stations also employ door position detection switches. All security related indications and controls are interfaced to the station ID controllers for remote reporting and access control from the Control Center.

9. *Fire Detection and Suppression Monitoring*

This consists of fire control panels, fire detectors and suppression monitoring devices. Fire alarms, fire alarm control panels, and associated fire detector device status, fire suppression system equipment status, and suppression system alarms are monitored at the central control center. This system is provided for zoned alarms, local alarm annunciation and necessary automatic actuations of vents, fans, dampers and suppression equipment as required.

10. *Gas Monitoring and Seismic Activity Detection*

The gas monitoring subsystem includes sensors for monitoring gasses, as required, by results of soil sample test conducted during station construction and compliance with the Environmental Impact Study (EIS).

The Seismic Detection Subsystem provides event detection alarms to Rail Operation Control (ROC). The gas monitoring subsystem includes sensors for monitoring gasses, as required, by results of soil sample test conducted during station construction and compliance with the Environmental Impact Study (EIS)

11. *Rail Operation Control (ROC)*
Apparatus at ROC Central Control includes console equipment to support various manned positions, recorders, printers and special processing components. The operations control room consoles provide displays, LCD/CRT monitors, and controls for train/bus operations, communications, and traction power, as well as monitoring and control of the fixed facilities and emergency equipment.

The system status display console provides a dynamic representation of the condition of the train/bus control system monitoring traction power, line occupancy route alignment, traffic direction, slow speed orders, etc.

12. *Cable Transmission System (CTS)*
The CTS provides the primary means of information transmission between the ROC, passenger stations, wayside facilities), and the Yard and Shop. Transmits audio, video, and data between stations, ROC and field-based equipment

13. *Communications Power System*
Telephone equipment are powered from industry-standard negative 48V DC rectifier charges, float battery systems. PA, CCTV, and other non-telephone are powered from UPS. All communications equipment is capable of automatic start-up following a power outage without re-initialization and with full status memory and process recall, with power from battery or from inverter sources

3.1.6 Panel Session 1 – Question & Answer

Q: What is usually the outcome of the PPP (public or private ownership)?

A1: Results vary. Sometimes infrastructure ends up being sold to the private investor. The main benefit of PPP however, is that it allows to overcome the shortfall of public funding.

A2: (Ford): We feel that a long-term lease is more profitable to us (SFMTA) because it allows us to receive payments over a longer period of time.

Q: BRT projects are expensive; they require a lot of land, etc. Is investment in BRT justified? Isn't it better to invest in rail projects (street cars)?

A1 (Cain): This question comes up very often in the U.S. when considering transit alternatives. Rail is very expensive. BRT, on the other hand, can deliver comparable benefits to rail but at a lower capital cost. FTA does not dictate to local jurisdictions which transit mode to select. FTA only recommends that BRT be considered in the alternatives analysis process.

A2 (Daguillard): In many cities that previously had rail, ridership on trains dropped significantly and many rail lines were closed as a result. Now, with increased congestion there is more demand for transit and many cities are trying to implement transit projects. They are considering various modes, including BRT as a low-cost alternative to rail.

Q: Have parking restrictions or road tolls ever been considered as a means of mitigating traffic congestion in Moscow?

A (Vorobiev): You have to consider all aspects of the issue, including the history of car ownership in Russia and the ability to pay (i.e. the disposable income of the population). There are many people that have been saving for a long time to buy a car, and it would be unfair to further increase their motoring costs. We must investigate other available means of mitigating traffic congestion. Parking fees alone cannot solve traffic congestion problems as they have no impact on through traffic.

Q: How are the issues of organization and coordination of transportation services being solved?

A: There is a special advisory committee that is working on that. We have good working relations between Transportation Ministry and the Department of Transportation and Communication of the City of Moscow. The coordination should be mostly dealt with at the level of non-government organizations (e.g. consumer groups, associations of operators, etc). You can't build new subway stations and extend the existing lines because this will result in deterioration of service on the entire line. We have to solve the problem of transporting customers living on the outskirts of the city using different strategies (not just extend the subway lines).

Q: Is public transit profitable in the U.S.A.?

A: (Daguillard/Ford): No. That's why the government subsidizes public transit. There is no public transit system in the U.S. that is profitable. For example, in San Francisco passenger fares cover only 22% of operating costs. The remainder is recovered through subsidies, advertising, PPP, etc.

Q: At what stage are private companies invited to participate in PPP and what do they receive for their involvement?

A: (Ford) Using the example of Atlanta, where we owned 47 acres of land around the station that was used as a parking lot. We could either sell it or develop the land and receive revenue for 100 years. Developing the land looked more profitable to us. We went to real estate developers to determine the optimal mix of office buildings, retail and residential structures. The private businesses that participated in developing the land now collect revenue from operating the property as well as receiving tax benefits (this is the incentive for participation in PPP).

Q: What are the rules for selecting private transit operators in the U.S.?

A: Regarding transit service provision, the competitive tendering approach is typical, with individual contracts usually covering a series of routes for a specified period of time. Taxi drivers are private operators that are regulated by local taxi commissions.

Q: To what extent is transit profitable in Moscow and how does this affect private sector participation?

A: Moscow public transportation enterprise "Mosgortrans" has 5500 buses, 1900 trolleys, and 900 trams (street cars). It's owned by the state. The state sets fares (once a year) based on the suggestions from the operator. Currently, 50% of cost is covered by the fare, and another 50% is compensated by the government (based on the accurate count of transported

privileged passengers, that are not paying the full fare). There are 86 private companies (mostly minibuses). The operators determine the fares themselves. We are trying to develop quality and safety standards. We also look forward to centralize the planning of the transit routes network (on competitive basis).

3.1.7 Panel Session 1 - Synthesis

Both the Russian and US presentations highlighted the fact that similar problems are currently being experienced in both countries. Dramatic economic expansion in the closing years 20th century has resulted in exponential increases in levels of private vehicle ownership. This has placed great pressure to increase the capacity of existing transportation infrastructure, typically through increasing existing highway capacity, and building new highways, and providing enhanced public transit service. However, there are extremely high costs associated with this type of large scale infrastructure provision, both in financial terms, as well as in terms of social costs and environment impacts. The governments of both countries are aware that the funds required to provide such infrastructure is becoming increasingly difficult to obtain through traditional sources.

Both countries also acknowledge the important role that public transit has to play in addressing future transportation system challenges. In both countries, transit services depend heavily on the federal government, both for planning and building new services, and for funding existing ones. The process leading to provision of new services is time-consuming and often hindered by lack if co-ordination between local and federal government. A more streamlined evaluation and implementation process is required so that projects may be completed within reasonable timescales. This will require closer collaboration between local and federal government through the identification of common goals. Funding constraints have also led the U.S federal government to investigate the implementation of Bus Rapid Transit (BRT) as a low-cost rapid transit alternative to Light Rail. One of the most successful BRT projects in the U.S is the Metro Orange Line in Los Angeles, which, since its opening in 2005 has already exceeded 2020 ridership projections and has resulted in a marked reduction in traffic congestion on parallel highways.

The issues outlined above have stimulated increased interest in Public Private Partnerships (also known as PPP or P^3), as a way of leveraging private sector technical, management, and financial resources. Mr Ford of SFMTA discussed the multitude of different PPP models that are available, and explained which ones had been successfully employed in the US to provide transportation infrastructure and to develop real-estate through joint development arrangements. Mr Ford's discussion showed how PPP arrangements compare favorably to more traditional approaches in terms of delivering projects within challenging time and budget constraints, while reducing the financial and legal risk to the responsible public sector agency.

While the PPP approach to providing public transit infrastructure is in its infancy in the Russian Federation, this country has extensive experience in involving the private sector in transit service provision, with a multitude of private companies responsible for the provision of bus, tram, and trolleybus services in Moscow and other Russian cities. One innovative aspect of this approach is

the separation of transit services into Commercial Routes and Social Routes. Demand is high enough on the Commercial Routes to allow the private companies to set their own fare levels and concession structures, and to yield a profit without any government subsidy. Social Routes are provided where demand is not high enough to allow a profitable service to be operated. In this case the government provides a subsidy to the private company to operate the service, specifying the fare level and concession structure. In this way, areas of lower passenger demand are still provided with sufficient access to the transit system.

Overall it is clear that both countries share similar problems in terms of transit service planning and congestion mitigation. In both cases it seems that the federal government needs to develop a closer relationship with the local governments and that increased private sector involvement may be part of the solution. In this respect, the Russian delegates benefited from hearing how the PPP approach may be applied to transit infrastructure provision and joint development, while the U.S delegates were able to learn the innovative ways in which private companies are utilized in transit operations in Russian cities.

3.2 Panel Session 2: Ensuring Safety and Security on Transit Systems

3.2.1 "Transit Safety and Security – The American Experience"

- Greg Hull, Director of Operations, Safety and Security Programs, APTA

The speaker began by highlighting the scale of public transit provision in the United States, with over 10 billion passenger trips per year made on public transit. After the 9/11 attacks on the World Trade Center, significant investment was allocated to increased air travel security, even though public transit carries 16 times more trips than domestic air travel. It is important to recognize that public transit is also part of the country's critical infrastructure, and should also be a priority for security investment.

Security initiatives in the U.S employ the model summarized below:

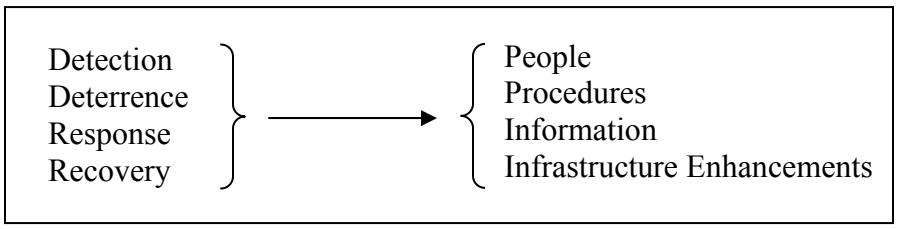

FIGURE 3.10 – Security Initiatives Model

The following table summarizes the different operation activities and capital investments that can be deployed to enhance transit security.

TABLE 3.1 – Operations and Capital Project Activities

Key Operation Activities	Key Capital Project Activities
Training employees	Upgrade of radio communications
Outreach to customers	Automatic vehicle location (AVL)
Sharing of best practices between transit agencies	CCTV (facilities and vehicles)
Increased visibility	Access control (fencing, locks, smart cards)
Increased staffing presence	Intrusion detection
Vulnerability assessments	Employee/ contractor ID
Use of canine units	Chemical agent detection
Development/refinement of security & emergency	Test beds for technology
preparedness plans	
Develop/strengthen inter-agency coordination	
Employee & contractor background checks	
Drills (field and table-top)	

The U.S Department of Homeland Security and U.S Department of Transportation have established a Memorandum of Understanding that formalizes the commitment to work together to address security risks on public transit. The following resources have subsequently been developed through federal partnership:

- Vulnerability & Risk Assessments
- Threat Level Guidelines
- Actionable Protective Measures
- Transportation Research Board Studies
- Transportation Safety Institute (various safety & security courses)
- *Handbook for Transit Safety & Security Certification*
- National Transit Institute:
  - *Security Awareness Training for Employees*
  - *Connecting Communities*

APTA plays a major role in ensuring U.S public transit systems are safe and secure. Security is one several areas included the APTA Standards Development Program. Three working groups have been established to address the following primary areas of concern: Fixed Infrastructure, Security Risk Management, and Emergency Management. Each working group is tasked with gathering information/research on their specified topic, developing draft standards, obtaining and incorporating industry feedback on the draft standards, and resolving comments from technical oversight groups the policy and planning committee in order to produce recognized industry standards. Table 3.2 summarizes the activities of the three working groups to date:

TABLE 3.2 – APTA Security Standards Development to Date

Fixed Infrastructure	Security Risk Management	Emergency Management
• Recommended Practice for Trash Container Placement to Mitigate the Effects of an Explosive Event • Video Camera Coverage Criteria for Passenger Facilities • Recommend Practice for Transit Facility Lighting • Recommended Practice for Fencing Applications for Access Control • Non-Ballistic Container Recommendations • Bus Stop Placement	• Transit Security Learning Objectives • Guidance for Security Risk, Vulnerability and Threat Analysis	• Preparation • Response • Recovery

These draft Security Standards are posted online at www.apta.com. Russian delegates interested in finding out more about the standards were encouraged to visit this website. The speaker concluded by highlighting three key areas to consider in ensuring safety and security on public transit systems:

- Consistent security funding
- Establishing government / industry collaboration to further the development of security technologies
- Don't become complacent!

3.2.2 *"Ensuring Safety and Security on Moscow's Metro System"*
- Alexander Yershov, Deputy Chief, Moscow Metro

Moscow's metro network is one of the largest in the world – 273 route miles, 170 stations, 133 understreet passages, and 120 stations with escalators, 9 million passengers transported daily. The trains' headway is 90 seconds including passenger loading/unloading at the stops (40 seconds without the stops). Clearly, ensuring the safety of over nine million people every day is a major challenge. Moscow metro's security resources focus on three primary areas:

1. Technical Safety
2. Safety from Criminals
3. Safety from Terrorism

Ensuring that security levels are maintained requires the close collaboration of the following groups:

(i) Metro Police Agency (created in 1935, and operates only in the metro)
- Patrolling stations and other metro premises
- Crimes prevention
- Investigation of criminal cases
- Prevention of public disorder offences
- Control of passenger flows on holidays, festivities and in cases of service interruption.
- A team to cope with adults vagrancy;
- A team to cope with juvenile delinquency and vagrancy;
- A team to control commercial activities within metro premises.
- A police dogs handling department (a hundred of dogs accommodated at a purposely built centre), employed primarily to search out explosives and drugs
- A field engineering and experts team.

Armed metro police patrol the system 24 hours a day, seven days a week. This agency is financed by the Moscow metro, costing 5 percent of total expenses.

(ii) Security Guards
Security teams are deployed on individual trains and in crowded areas, sensitive locations, and blind corners. Figure 3.11 shows how metro staff, security guards, and metro police are deployed to ensure sufficient coverage at each transfer station.

(iii) Metro Staff
Staff expected to remain vigilant to potential security breaches while on duty.

(iv) Passengers
Relied upon to relay information on potential security risks to metro staff.

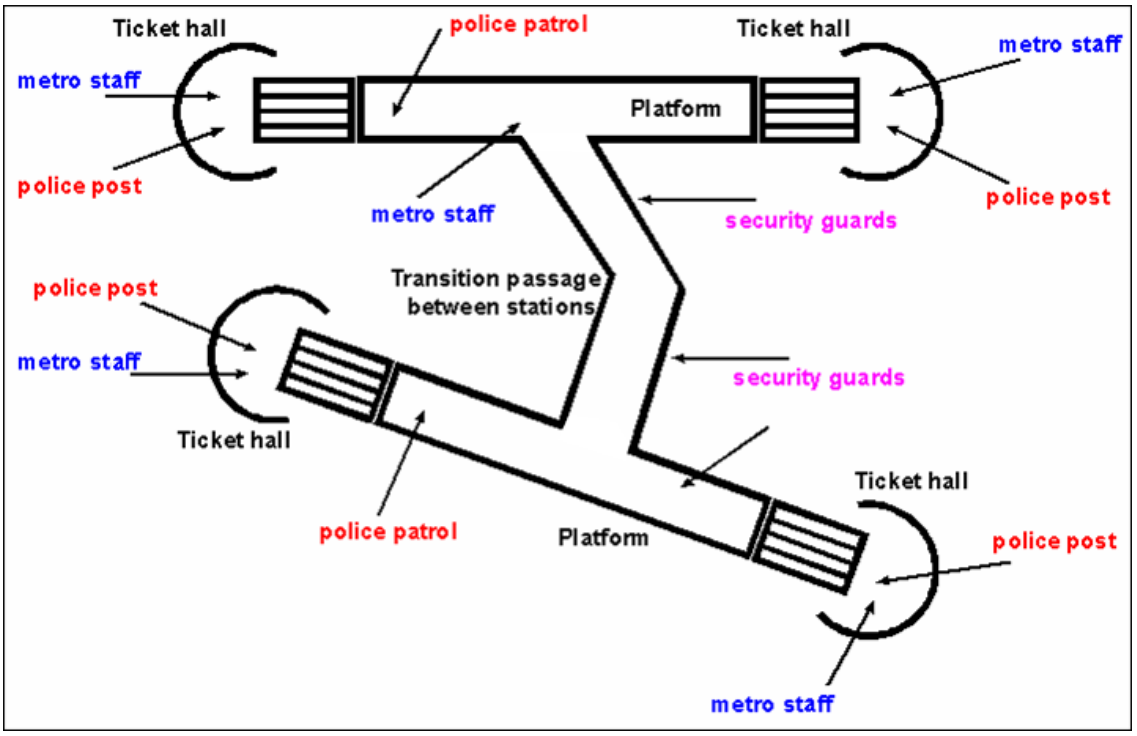

FIGURE 3.11 – Transfer Station Security Coverage

Security Technology

The following table summarizes the variety of security technologies that are either already in place on the system, or are in the process of being implemented.

TABLE 3.3 – Moscow Metro Security Technology

Currently Deployed	Being Implemented
- Public address system. - Local telephone communication system. - Special signaling devices. - CCTV. - Two-way radio communication in metro cars (passenger-driver). - Motion sensor alarms deployed on all ventilation ducts	- Video signals transmission system to the central control room and to the police department control room - Corporate and general cellular communication system - CCTV on trains (increasing numbers of trains have been fitted with camera, starting in 2003)

FIGURE 3.12 – Surveillance Images from CCTV System

Emergency Response

The following emergency situations may occur on the Moscow Metro:

- Subjects on rails
- Trespassers on rails and in unattended premises
- Collision of trains
- Fire or explosion
- Driver's disability to operate a train
- Power failure
- Tunnel flooding
-

The following diagram illustrates the three-step process to emergency response on the Moscow Metro.

Information	Prevention	Elimination of Sources
- Special departments - Passengers	- Approval of different facilities location in technical areas and in metro premises - Regular checks of metro premises and cars - Dogs handling department - Automatic devices to control blind areas and desolate premises - Timely information for passengers and citizens - CCTV in stations and on trains	- Operating staff and metro police - Continuous training of staff in emergency situations - Special 24 hour metro staff response teams provided with necessary tools and equipment - Interaction with the local city police - Interaction with special city rescue teams and fire fighters

FIGURE 3.13 – Emergency Response Process

Addressing the Terrorist Threat

Six terrorist attacks have occurred on the Moscow Metro since it opened in 1935:
- 1977; a bomb explosion on a running train (in tunnel) between Pervomaiskaya and Izmailovskaya stations (12 passengers killed, over 60 wounded)
- 1996; a bomb explosion on a running train (in tunnel) between Tulskaya and Nagatinskaya stations (4 passengers killed, 12 wounded)
- 1998; an explosive device found in Tretyakovskaya station transition passage taken to the safe area and suddenly exploded before the arrival of sappers. Three passengers lightly wounded)
- 2000; an explosion in the pedestrian underpass near Pushkinskaya metro station. (11 people killed, 60 wounded).
- 2001; a minor explosion on Byelorusskaya (circle line) station platform (without serious consequences).

In the vast majority of cases, potential terrorist attacks are thwarted by the metro police. The following counter-terrorism measures are employed to minimize this threat:

- 100% inspection of trains after each run at the last station on the line
- Visual inspection of platforms
- Every hour police visually inspects every room in the metro
- Security cameras on stations and inside the train cars
- Joint drills
- Instructions for passengers

Preventative measures to thwart terrorist activity include the elimination of the reasons and conditions for terrorist acts, as well as deterrence efforts. In 2006, there were 50 phone calls about bombs in the metro and 6 times law enforcement officials notified about the planned attacks on metro. 47 objects were found in metro in 2006. Each station has an explosives handling room. Ventilation shafts are equipped with intruder sensors to prevent unauthorized access.

In addition to the above measures, after the terrorist acts, the 25 meter restriction on retail outlets around the metro stations was put in place in order to clear the area around the stations to minimize the threat of further attacks.

The speaker concluded with a discussion of the issue of random checking. Random checks are permitted under certain circumstances, but these must be minimized due to political sensitivity and legality issues.

3.2.3 "New Safety and Security Technologies"

- Dave Turney, President and CEO, Digital Recorders, Inc.

The speaker began by noting that the security threat to public transit systems are very real, due to the fact that public transit systems are highly visible targets, and that the systems are open and accessible. This threat can never be completely eliminated, but the correct application of technology has a major role to play in mitigating risks to acceptable levels. The speaker identified the primary problem as being how to finance the acquisition of the security equipment. Two methods are available for addressing this problem; (i) expand the capability of technologies already in use to include security functions, and (ii) acquire new technology.

Expanding the Use of Existing Technologies

One example cited by the speaker was to make use of existing destination signage systems by adding the capability to display alarm messages during emergency situations, as illuatrated in Figure X.

FIGURE 3.14 – Using Destination Signage Systems for Security Purposes

Another example is expanding the use of existing GPS based Automatic Vehicle Tracking technology for the following security purposes:

- Detecting when the vehicle has deviated from the designated service route
- Using the wireless communication architecture for Incident Alert
- Wireless Transmission of Passenger Information
- Ability to facilitate remote vehicle shutdown in the event of take over by an unauthorized party

A final example cited by the speaker was expanding the use of an existing video recording system by using the system to provide incident "snapshots" and streaming live video for monitoring purposes by security personnel.

Acquire New Technology

The speaker provided several different examples of new security technologies.

Ion Mobility Spectrometry (IMS) Detection Equipment
This technology is used for the real-time identification of explosives, chemical agents, and toxic chemicals, including 60 different types of gas. The technology can be used in a static form or as a mobile, hand-held unit.

.

FIGURE 3.15 – Static and Mobile IMS Detection Equipment

Advanced Video Analytics Software

The speaker concluded by highlighting Video Analytics as having enormous potential for security applications. Currently under development, this technology is designed to permit the digital analysis of moving objects, such that potential security threats may be automatically detected. This has great potential for addressing the deficiencies and expense of human based surveillance. Once a potential security threat had been identified by the software, an alarm would be triggered to alert the attention of on-call security personnel.

Answering the question from the audience, the speaker noted that the above technology is not mandatory for installation on all buses in the U.S. but is rather installed at the discretion of individual transit agencies. The speaker also added that as of now very few of those systems have been installed on school buses.

3.2.4 *"Innovative Approaches to Metro Security"*

- Leslie M. Campbell, Mass Transportation Liaison Captain, Metro Transit Police, WMATA

The speaker began by illustrating the importance of Metrorail to the nation's capital; five to six lanes of additional highway capacity would be required on six of the cities major arterials to carry the people that currently use the system, with federal government employees accounting for almost half of peak period ridership. Metrorail also plays a strategic role in evacuation, as evidenced during the 9/11 attacks and during major city events such as the July 4th celebrations, when the system moved 400,000 people from the Mall in one hour.

Metrorail security is the responsibility of the Metro Transit Police Department. Its primary objectives are:

- Prevent Crime
- Protect Metro's customers, employees, facilities and revenue
- Enforce laws, ordinances, rules, and regulations

Counter-Terrorist Measures

The speaker discussed how terrorists attacks in other major cities, including New York, Tokyo and London, have influenced the approach to security taken by the Metro Transit Police. Post 9/11 Strategic Objectives focused on Deterrence, Prevention, Mitigation, Response, and Recovery. Specific measures included:

- Established bus and rail procedures for unknown and dangerous substances
- MTPD Explosive Ordnance Disposal Team
- Coordination with military
- Radiological pagers and equipment from DOE, DHS
- PPE Equipment and additional K-9 units
- Continuity of Operations Plan (COOP)
- Code Orange Alert Actions
- Public awareness campaigns

The Program for Response Options and Technology Enhancements for Chemical / Biological Terrorism (PROTECT) Program focuses specifically on chemical attacks. Implemented measures include:

- Began R&D for chemical sensor program
- Implemented WMD awareness training
- Issued PPE and escape hoods to officers
- Established evacuation procedures
- Assigned officer to JTTF

Measures implemented across the entire WMATA transit system include:

- Target hardening/enhanced intrusion detection at Metro facilities
- Install Automatic Vehicle Locator on Metrobuses
- Install bomb containment trash cans
- Provide facility and communications infrastructure for initial COOP capability
- Equip 100 Metrobuses with digital cameras

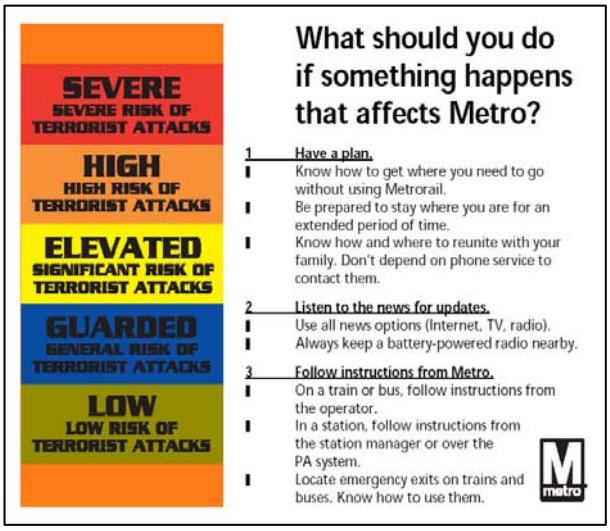

FIGURE 3.16 –
Public Awareness Campaign

FIGURE 3.17 –
Hazardous Materials Training

- Expanded regional training and exercises activities at WMATA's Emergency Response Training facility
- Install and expand chemical sensor program

WMATA's overarching security strategy is defined in its Readiness Assessment document. The document defines five key areas that are combined using a Layered Defense approach to ensure that the wide spectrum of security concerns are addressed.

TABLE 3.4 – The WMATA Readiness Assessment – The Layered Defense Approach to Security Risk Mitigation

Technology	Training	Rider Awareness	Strategic Policing	Intelligence Sharing
- Protect system - CCTV/DVR - Explosive containment trash cans - Intrusion detection	- Terrorism recognition and reaction - System security - Managing metro emergencies - Command officer training - Metro Citizen Corps - Joint training for first responders and DoD	- Public address announcements - Customer outreach - Advertising campaign	- Targeted train inspections - Tunnel inspections - High intensity targeted enforcement - Policy developments - K-9 Acquisition and deployment	- JTTF membership - NJTTF membership - Regional transit cooperation

3.2.5 Panel Session 2 - Question and Answer

There were no questions at the end of this session.

3.2.6 Panel Session 2 - Synthesis

Public transit is part of every nation's critical infrastructure. As such, safety and security are of paramount importance in both the Russian Federation and the United States. In both countries, activities focus on mitigating criminal and terrorist activity in transit vehicles and stations, and ensuring passenger safety at all times. Security measures have become an even higher priority since the 9/11 terrorists attacks in New York in 2001. The Moscow Metro employs a sophisticated range of measures to ensure safety and security, centered around the Metro Police Agency that operates an armed police presence 24 hours a day, seven days a week. The transit police are supported by teams of security guards, transit staff, and members of the public using the system. Moscow has also been the target of a total of six significant terrorist attacks since its opening in 1935. Each country now employs a range of similar counter-terrorism measures, which include regular inspections of transit facilities and extensive networks of security cameras in transit vehicles, stations, and platforms. Canine units, bomb containment units, and chemical sensing equipment are also employed. The Moscow Metro also employs motion sensors in ventilation shafts, and explosive handling rooms in each station.

In the U.S, the Department of Homeland Security and the Department of Transportation work in collaboration to address security risks on U.S transit systems. The American Public Transportation Association has also played an important role by developing a series of draft security standards for three primary areas of concern; (i) Fixed Infrastructure, (ii) Security Risk Management, and (iii) Emergency Management. These standards may be viewed at www.apta.com.

The presentations provided in this session illustrate the major commitment already being made by both countries in this post 9/11 environment to ensure safety and security on their transit systems. Of significant interest to delegates were the range of new security technologies capable of enhancing traditional measures. These technologies include new static and mobile Ion Mobility Spectrometry Detection Equipment, capable of real-time detection of explosives, chemical agents and toxic chemicals. Another emerging technology with significant potential is Advanced Video Analytics Software, which is capable of providing real-time image recognition of moving objects. Though the application of this technology to the security field is still in the developmental phase, it has great potential for addressing the deficiencies and expense of human-based surveillance.

3.3 Panel Session 3: Providing Accessible Public Transit to the Mobility Impaired

3.3.1 "The Structure of Paratransit in the U.S and the Americans with Disabilities Act"

- Matthew Welbes, Chief of Staff / Acting Associate Administrator, FTA

The speaker began by describing the Americans with Disabilities Act (ADA). This landmark legislation, passed in 1991, synthesized a series of existing laws into a comprehensive statute that prevents discrimination based on physical or cognitive disabilities in a variety of settings such as employment, government services, transportation, public accommodations, telecommunications, and commercial facilities. Regulations are implemented by the United States Department of Justice. The ADA protects people with disabilities or those who are related or associated with a disabled individual. The following definition of disabled is provided by the ADA: "a person who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment." (Washington DOGA, 2006).

Subchapter II of the ADA text specifically applies to Public Transportation. As part of ADA regulation, public transportation agencies must provide paratransit service wherever a fixed route system is in operation, unless the agency would incur an unbearable financial burden as a result (USDOJ, 1990). The agencies responsible for ADA accordance are the Federal Transit Administration and the U.S. Department of Transportation. Most ADA regulations take into account the financial burdens encountered and allow leniency when the proper documentation is provided. Public transportation is no exception. Nonetheless, agencies are expected to provide adequate accessibility in newly constructed and existing facilities. These include stops, stations, terminals, vehicles, fare booths, and any other components of the transit trip. There should be enough assistance, services, and resources so that a disabled individual can make a trip just as efficiently as any other passenger (USDOJ, 1994). Accessibility is essential in the operating vehicles, buses and rail. Rail vehicles usually operate under the rule of one car per train, meaning that at least one car of each rail vehicle must be accessible according to ADA standards (USAB, 1994).

Regulations for buses and terminals are provided in the text of the Americans with Disabilities Act, Title III, and the ADA Accessibility Guidelines for Buildings and New Facilities. The specifications and requirements providing exact numbers and measurements are found in Title III and Section 4 of the Accessibility Guidelines. These include the exact specifications that new facilities, existing altered facilities, new vehicles, and remanufactured vehicles should follow to be accessible by people with disabilities. Section 4 of the Accessibility Guidelines addresses all of the technical requirements for scopes and spaces, which include ramps, entrances, bathroom facilities, doors, parking, lifts, signage, and any other physical aspect to be considered in the construction of a facility. All of these physical aspects must be designed to accommodate wheelchairs and other auxiliary devices for physical impairments. Hallways, elevators, lifts, ramps and doors must meet the design measurements shown in the ADA List of Figures. These specifications also include minimum requirements for people with visual, hearing, and cognitive impairments. Signage at stations, stops, and aboard vehicles has to follow the requirements presented in Section 4 and at the locations and instances provided in Section 10. Section 10 delineates how "every station, bus stop, bus stop pad, terminal, building or other transportation

facility" will abide by all the design conditions of Section 4. Within Section 10, specific references are made to vehicles as well. The regulations have had a positive impact on accessibility for the 43 million disabled Americans; over 90 percent of the nations buses are now wheelchair accessible.

Universal Design

The speaker went on to discuss the concept of universal design, which describes the notion that the design of products and environments should be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. Such an approach increases usability for as many people as possible at little or no extra cost, benefits people of all ages and abilities. Seven design principles were highlighted:

- Equitable use
- Flexibility in use
- Simple and intuitive
- Perceptible information
- Tolerance for error
- Low physical effort
- Size and space for approach and use

Successfully implemented examples of universal design include:

- Oxo International "Good Grips"
- Voice-recognition software
- Low-floor buses

FIGURE 3.18 –
Examples of Universal Design

The speaker concluded his presentation by discussing future issues. He noted that people are living longer, such that the number of affected by some form of mobility impairment is expected to increase steadily over time. Three areas were identified as showing promise for further enhancing accessibility; transit oriented communities, technology, and intermodalism. Examples of emerging technoligcal advances in this area include GPS systems that provide real-time information via web, mobile phones and kiosks, and mobile phones that can be used as navigation aids.

3.3.2 *"Transport Service for Passengers with Disabilities in Russia"*
- Victor Baklanov, Director General, MOSGOTRANS

Mosgortrans enterprise employs 40,000 people on bus, trolley and tram lines. The administration of Moscow is undertaking extraordinary efforts for preparing the infrastructure for the limited-mobility citizens. Roughly 11-12% of the population of Moscow has various types of disabilities. All new buses (produced in Russia or Belorussia) have low floors and are capable of accomodating wheelchairs. There are 17 transit routes put in place in coordination with the Social Ministry, that are completely equipped for transporting disabled persons. There are also 13 trolley routs suited for the use by people with disabilities. Trams are currently not equipped to accomodate disabled passengers. The manufacturers of tram cars are not doing enough in that area.

FIGURE 3.19 – Examples of Vehicle Adaptations for Disabled Passengers

The main problem with providing accessibility by the disabled persons is related to the vehicles/rolling stock. The requirements for accessibility by persons with disabilities have been formlated and provided to the vehicle manufacturers. Currently, all new buses and trolleys have low floors and wheel chair ramps. Approximately 10% of the transit rolling stock is being replaced by new vehicles each year, and it is anticipated that by 2015 all the buses and trolleys in the city will be replaced by the new ones that are fullty accessible by the disabled persons. All the bus stops will also be replaced by the new ones, that are suitable for the disabled. However, this process is not occuring as fast as we would like.

3.3.3 "The Integration of Accessibility into Bus Rapid Transit Projects in the U.S"

- Alasdair Cain, Senior Research Associate, Center for Urban Transportation Research, University of South Florida

The speaker began by providing a brief overview of Bus Rapid Transit in the U.S. BRT has characteristics of both fixed-route bus and rail operations, and can be described as a hybrid service that can be more like either bus or rail depending on locally-determined variables. BRT is operated using buses that resemble rail cars, with service characteristics that resemble rail service. The major elements of BRT are as follows:

1. **Runningways** – BRT systems can operate on a variety of running way types that range from mixed flow arterials and freeways, dedicated arterial and shoulders lanes, exclusive at-grade busways, to fully grade-separated transitways above or below the surface.
2. **Stations** – Aesthetically designed stations enhance the permanence and attractiveness of the system and station areas with passenger amenities such as shelters, benches, lighting, ticket vending machines, security features, and next vehicle arrival information.
3. **Vehicles** – Stylized and specialized buses provide comfort, modern design, accessibility, maintainability, good passenger circulation, and environmentally-friendly propulsion.
4. **Intelligent Transportation Systems** – Applications such as transit signal priority (TSP), advanced communication systems, automated scheduling and dispatch, and real-time traveler information at stations and on vehicles allow faster and more convenient trips.
5. **Fare collection** – Electronic fare cards, off-board fare collection, or proof-of-payment options allow for shorter dwell times and shorter overall travel times.
6. **Service and operations plan** – BRT systems generally include rapid transit features like more frequent service than local bus service, all-day service spans, and greater spacing between stations. The flexibility and lower-cost of BRT allow it to provide greater network coverage.
7. **Branding and marketing** – Distinctive logos, colors, styling and technologies for vehicles and facilities help develop a system identity. BRT services can be marketed as a new tier of service or as part of a multi-modal rapid transit network.

The speaker began his discussion of the accessibility topic by highlighting the fact that in replicating the high quality infrastructure and service of rail transit, many of the accessibility benefits of rail transit are also captured. Subsequently, the regulatory needs for BRT can be largely met by drawing from existing bus and/or rail regulations. However, additional federal

guidance may be required to clarify which elements of the bus and rail regulations apply to BRT systems, and how locally-determined variations within the BRT characteristics affect whether a community's BRT service operates more like a bus or more like rail. Until such guidance is published, communities planning BRT services should consult with their FTA regional office for guidance on applying the ADA regulations to their specific BRT services. Some accessibility issues have been identified:

Ramp Design and Deployment: The use of low-floor vehicles aligned with the height of station platforms and rapidly deployable ramps will help ensure accessibility of BRT services. Other factors that affect accessibility include side barriers on the ramp, operator training, and slope of the ramp (related to platform design).

Platform Design: Platform design is integral to the issue of ramp design. A difference in heights of the vehicle floor and platform creates a "vertical gap" or level change that passengers experience when moving between the platform and the vehicle. Distance between the vehicle and the platform is called the "horizontal gap." Ideally, these gaps are minimal so that all passengers can walk or wheel across the vehicle threshold without a noticeable change in level or surface continuity. If the vertical gap exceeds 5/8 of an inch or the horizontal gap exceeds 3 inches, a ramp or "bridge plate" that spans these gaps, and meets the requirements of the ADA Accessibility Guidelines (ADAAG) for Transportation Vehicles, must be used. Use of precision docking technology (described below) can help minimize gaps.

FIGURE 3.20 – Level Boarding (Las Vegas Max BRT)

Wheelchair Securement: Accessibility for the variety of mobility devices and their securement is an issue for all transit modes, including BRT. The number, location and design of securement positions are interrelated with vehicle size and passenger circulation. Rear-facing securement, stability of securement, support structures surrounding each securement position (such as handrails, walls and partial walls) and the additional use of lap belts and shoulder harnesses are important to consider in designing BRT vehicles.

FIGURE 3.21 – Wheelchair Securement

Interior Configuration and Circulation: Vehicle configuration design presents challenges for meeting multiple and changing needs. Circulation through a BRT vehicle, can be different from traditional bus service which uses single-side boarding. Accessibility issues to be considered in designing BRT vehicles include interior

surfaces, traction needs, traversable areas for people with disabilities including those who use wheelchairs, and marking transition through floor texture and color were included in discussions. The fare collection location also affects circulation. Interior configuration profoundly affects the speed of passenger boarding and egress for all passengers.

Running Way Treatment and Markings: BRT stations may be located in the middle of the roadway, requiring customers to cross running ways to get to and from the station. Running ways, safe crossing locations, platform edges, and other potentially hazardous features need to be conveyed to customers in accessible formats. Tactile warnings and visual warnings using color and contrast strips are potential solutions for some issues.

FIGURE 3.22 – Median Busways Present Accessibility Challenges

Precision Docking: This technology can minimize the horizontal gap between the vehicle and platform and therefore maximize the accessibility and safety of the threshold between vehicle and platform. Consistency in controlling the vertical and horizontal gap at each station is important for ensuring accessibility, and precision docking is a means of achieving this consistency, though extreme temperatures and weather conditions may affect its effectiveness. Vehicle manufacturers in the U.S. are beginning to understand the value in adding this technology to BRT vehicles as the number of BRT systems in the U.S continues to grow.

Passenger Information – Signage and Displays: As with other transit services, BRT accessibility is affected by the accessibility of the information provided to passengers. Traveler information (such as vehicle arrival time, next-stop information, and way-finding directions to guide passengers in and around the station) needs to be accessible to everyone, including passengers with vision and hearing disabilities. Information should be provided in visual, tactile and audible formats. This information needs to be easy to access throughout the station and vehicle. For example, LED displays on a vehicle should be visible to both forward and rear-facing passengers. Audible announcements need to be understandable and at a volume that does not interfere with other audible cues.

Signal Priority: Transit signal priority technology minimizes the time spent by BRT vehicles waiting at traffic signals by either extending green time or truncating red time. A drawback of this is that this can reduce the amount of time pedestrians have to complete street crossings.

While buses may operate more quickly, people with disabilities and slower moving people generally may not have adequate time to safely cross the street. The use of transit signal priority timing needs be balanced with the needs and safety of all pedestrians.

Access to Stations: Station placement in relation to intersections, pedestrian crossing locations and timing, and overall pedestrian facilities surrounding stations are key accessibility issues for BRT. Walkways and pathways for passengers with and without disabilities should be the same, so that this distinction between the two customer groups would be eliminated. Since the ADAAG requirement already says that the two paths should coincide to the maximum extent feasible, that requirement would also apply to BRT. BRT stations placed in the center median will have different pedestrian access issues from stations placed to the bus-traditional right side of traffic lanes, particularly with regard to street crossings. The Access Board is currently developing standards regarding pedestrian street crossings in the context of public rights-of-way rulemaking. More information on this is available at http://www.access-board.gov/prowac/index.htm

The speaker concluded his presentation by stating that BRT is a multi-faceted rapid transit mode offering a wide range of different treatments and performance characteristics. Accessibility is a high priority in order to maintain high commercial speeds and levels of reliability for all users, and also to ensure that mobility impaired users are able to use the service. Each of the seven primary BRT elements incorporates features that address accessibility. Combining the different elements makes it possible to provide high quality infrastructure capable of replicating the standards of accessibility normally associated with rail transit

FIGURE 3.23 – Station Access and Off-board Fare Payment

3.3.4 *"New Technologies and Services for the Disabled – The MSAA Initiative"*[4]

- Leslie Rogers, Regional Administrator for District IX, Federal Transit Administration

For most people, getting to work, to the doctor, or to worship services means getting in the car. But for others, it's not that easy. There are often challenges that individuals face when trying to "get a ride." This is despite the recognition by nearly every human service program that transportation is important. In fact, transportation services are currently spread among 62 federal programs. And Americans – through taxes and charitable contributions – are spending a significant amount of money in order to help. In this presentation, the speaker provided an overview of a new program that aims to address this issue using advanced technologies.

[4] The information provided in this section has been extracted from the U.S DOT website: http://www.its.dot.gov/msaa/

Overview

The primary goal of the Mobility Services for All Americans (MSAA) initiative is to improve transportation services and simplify access to employment, healthcare, education, and other community activities by means of the advanced technologies of Intelligent Transportation Systems (ITS) and through extending transportation service partnerships with consumers and human service providers at the federal, State, and local levels. Another program goal is to improve the efficiency with which federal transportation funding resources are used.

This ITS initiative is related to the United We Ride (UWR) national campaign that requires ten federal departments to work together to enhance transportation access, minimize duplication of federal services, and facilitate the most appropriate, cost-effective transportation for older adults, people with disabilities, and low-income populations. MSAA and United We Ride envision a coordinated one-stop, customer-based travel reservation, information, and trip planning service. Several ITS technologies will be applied, including:

- Geographic information systems (GIS)
- Integrated vehicle dispatching and scheduling
- Automatic vehicle location (AVL)
- Communications systems
- Electronic payment systems/financial tracking and billing systems
- Advanced traveler information systems (ATIS)

Background

There are 62 federal programs that fund transportation services for the transportation disadvantaged. Currently, due to inefficiencies, limited resources, and a lack of coordination, delivery of human services transportation is challenging. In many locations, human services transportation is fragmented, resulting in service area gaps (geographical areas where service is not provided) or limited service area size due to an absence in trip transfers between transportation providers. Often, customers have to contact multiple case workers for multiple funding programs, trip requests have to be made well in advance, scheduled trip times are inconvenient, pick-up wait times are long and difficult to estimate, trip travel times are long, and accessibility to transit for seniors and persons with disabilities is limited. New capabilities and opportunities are being created in both the transportation and health and human services communities through the use of emerging technologies and innovative services. However, the two communities are often unaware of the research, new approaches, and advances that each is making, and neither may have direct communication with the transportation disadvantaged community at large.

The USDOT ITS Joint Program Office launched the MSAA initiative in partnership with the UWR program as a way to bring all communities together to provide a coordinated effort and apply technological solutions to the barriers to accessibility and mobility for the transportation disadvantaged.

Approach

Embracing the notions of inter-agency coordination and cooperation and technology integration, this initiative adopts a five-phase approach with two embedded go/no-go decision points to advance the quality and efficiency of human service transportation (HST) delivery. The approach is summarized in Table 3.5 below:

TABLE 3.5 – The MSAA Approach

Phase	Objective	Approach
Phase 1	- Facilitate stakeholder participation	- Coalition building
Phase 2	- Conduct foundation research	- Foundation research
Phase 3	- Develop model plans and designs	- Planning and design of ITS-enhanced HST models
Phase 4	- Conduct model deployment	- Deployment and evaluation of ITS-enhanced HST models
Phase 5	- Perform knowledge transfer, outreach and education	- Documentation and outreach

The program is essentially a demonstration program that is separated into (i) planning and design, and (ii) deployment. The program focuses on developing **Scalable** and **Replicable** models of Travel Management Coordination Centers (TMCC), for urban, small urban and rural areas. The speaker discussed how eight project sites will be selected for evaluation at the planning and design stage, of which a smaller number of project sites (to be determined) will progress to the deployment stage.

The speaker concluded by discussing the project timeline. The project was initiated in March 2007, with the planning and design stage completed in June 2008. Evaluation and selection of deployment sites will occur between July and December 2008, with deployment beginning in December and running for 12 months.

3.3.5 Panel Session 3 – Question and Answer

Q: What is being done in Russia for accommodating blind and def transit users?

A: The special program of providing audio information inside and outside of the buses is being developed. But the program is still in an infant stage.

Q: How is the problem of access to bus stops by disabled being resolved in Moscow?

A: We have lots of difficulties with that issue because different parts of transportation infrastructure are handled by different agencies. For example, sidewalks are maintained by the city and the transit agency has no control over them (and their design).

Q: What fastening mechanisms are used for fastening multiple modifications of wheelchairs on transit buses in Moscow?

A: Securing wheelchairs on transit buses is a major problem because there are so many different wheelchairs. Therefore, we have to design universal fastening devises like straps and belts.

Q: Is there a quota system in the U.S. for determining the number of transit buses and taxis?

A: (Daguillard): Federal law does not require any level of transit service, therefore, there are no requirements on the number of buses. But, there is a formula to determine funding that is based on population. As a result, larger cities get more money but the level of service is determined by the municipalities locally. No city in the U.S. is forced to have public transit. As for the taxicabs, their number is also determined locally by the local transportation commissions.

Q: What cities in the U.S. are currently seeing the revival of trolleys?

A: Many cities see that trend. Trolleys and trams were very prevalent in the beginning of 20-th century. Very few American cities, however, have trolleys with overhead wires. Only San Francisco, Philadelphia and Cleveland have them. This is because Americans don't like the appearance of the wires.

Q: How is the fare paid by the disabled transit riders in the U.S.?

A: Disabled persons enter the bus through the front door like all other riders and pay the fare the same way.

3.3.6 Panel Session 3 – Synthesis

This session provided an overview of the measures provided in both countries to ensure transit service access to the mobility impaired. Provisions in the U.S are governed largely by the Americans with Disabilities Act (ADA), which was passed in 1991. This landmark legislation contained a raft of regulations designed to prevent discrimination based on any physical or cognitive disability. Of significance to the public transit industry was the stipulation that transit services should provide the same level of access to disabled people as is provided to other able bodied passengers, and that transit agencies must provide paratransit service wherever a fixed-route service is in operation. Due to financial constraints, such accessibility requirements are often only applied to new facilities and vehicles. The regulations have had a huge positive impact on disabled passenger accessibility, and over 90 percent of the nations buses are now wheelchair accessible.

Roughly 11 to 12 percent of Moscow's population suffers from some form of mobility impairment, and all new buses and trolleybuses in the city are low-floor and fully wheelchair accessible. While the majority of buses and trolleybuses are wheelchair accessible, the city's trams are not accessible to disabled people, largely due to the design of the vehicles. Accessibility regulations have been administered to the vehicle manufacturers though it will take time for the existing vehicles to be replaced by new ones. Approximately 10 percent of the rolling stock is being replaced each year and it is anticipated that by 2015 all buses and trolleybuses will be disabled person accessible. Barriers to more widespread disabled access in Russia are the fact that there is a lack of formal legislation and the fact that there are a multitude of organizations that have jurisdiction over different aspects of transit accessibility. Thus, high levels of inter-agency coordination are required.

Bus Rapid Transit is an emerging transit mode that aims to replicate the high levels of service speed, comfort, and accessibility normally associated with rail systems at a much lower capital cost. The concept of universal design, where products are designed for maximum usability to all users, including the mobility impaired, is particularly applicable to Bus Rapid Transit. A wide range of station, vehicle and runningway design features aim to maximize ease and speed of access to and from the transit vehicle, in order to raise commercial service speeds and levels of reliability. Such design features can be grouped into station access, vehicle access, and vehicle interior. Station access depends heavily on runningway type, with many BRT systems operating in exclusive lanes either in the median or on the edge of the highway. While median operation maximizes service efficiency, getting to and from the station can be challenging – high quality pedestrian crossings or overhead walkways may be provided. Vehicle access may be optimized by providing level boarding to all passengers (a classic example of universal design). Precision docking technology may be employed to ensure that vertical and horizontal gap widths are minimized to the extent that ramps are not required, greatly reducing dwell time. The interior of the BRT vehicle should be designed to be open and spacious, allowing unrestricted access to wheelchair passengers. Wheelchair docking facilities need to be quick, easy and safe to use to ensure that commercial service speeds are maintained.

As with other areas of transit service, new technology has an important role to play in raising accessibility levels for the mobility impaired. The goal of the Mobility Services for All Americans (MSAA) Initiative is to improve accessibility levels using advanced technologies. This federal program is designed to work in collaboration with local and state agencies to provide coordinated technology-based solutions to transit industry partners. Potenial applications include; Geographic Information Systems (GIS), Automatic Vehicle Location (AVL), and Advanced Traveler Information Systems (ATIS).

3.4. Panel Session 4: Training Transit Professionals[5]

3.4.1 "Training Tomorrow's Transit Workforce"

- Richard Hodges, President, Hodges Transportation Consulting LLC

The responsible and efficient operation of the nation's transportation system depends on a well-trained workforce. Successfully addressing transportation workforce issues requires a collective effort involving the agencies, the federal government, the private sector, and a wide range of academic institutions, as well as the transportation workforce. In this presentation, the speaker covered two topics:

(i) The findings of a recently completed study on training transit professionals
(ii) The training activities of the National Transit Institute (NTI)

The Workforce Challenge: Recruiting, Training, and Retaining Qualified Workers for Transportation and Transit.

This report examined what is needed for transportation agencies to strategically alter key human resource activities—recruiting, training, retaining, and succession management—and made recommendations designed to enable these agencies to continue to meet emerging workforce challenges and adjust to labor market realities. Also addressed is the important leadership role of the federal government in this effort.

Transportation workforce issues are complex. There are more than 50 state departments of transportation, nearly 6,000 transit agencies, and many other public agencies with transportation responsibilities. Each has its own set of responsibilities, organizational structure, history, and culture. Each must adapt to internal and external social, political, and institutional working environments, often in different ways. Agencies vary widely, and although each has its own unique capabilities and resources to address workforce needs, all have limited resources. Few have addressed their future workforce needs in a comprehensive fashion, which further complicates efforts to predict how many people in specific job categories for each type of agency will be needed in 5 or 10 years. The committee did not attempt to estimate specific agency needs—what kinds of workers are needed for what kinds of jobs—in any detail because the basis for any such estimate is insufficient. Most agencies do not have mechanisms in place for identifying the skill sets they need. Each agency must decide what skills it needs and set out to obtain them.

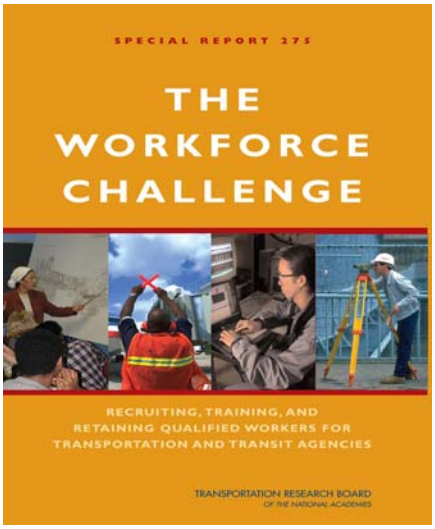

FIGURE 3.24 – Research Study on Transit Training

[5] The information provided in this section is based on the Executive Summary of the following report: (author?). (2003). *TRB Special Report 275 - The Workforce Challenge: Recruiting, Training, and Retaining Qualified Workers for Transportation and Transit.* Transportation Research Board, Washington, D.C.

It is evident that in recruiting, training, and retaining employees in transportation agencies, one size does not fit all. Agencies must adopt and adapt practices that are best suited to their individual circumstances from a wide range of possible alternatives. This is a complex endeavor because in addition to competing with each other, transportation agencies compete with the private sector for qualified staff. With these constraints in mind, the committee focused on how agencies can meet their workforce needs, now and in the future, regardless of specific or cumulative need. To their credit, all the agencies—in both the public and the private sector—have a long history of working together successfully to address common problems in a systematic and coordinated fashion. The Interstate highway system is an example of such successful collaboration.

In the course of this study, it became clear to the committee that many factors require immediate action and that the situation may, in fact, be far worse than anticipated. Among the factors are high levels of anticipated retirements; insufficient numbers of midlevel managers available to fill forthcoming vacancies; the need for new workforce skills required to keep pace with new methods and advanced technologies, including systems analysis, computer-aided design and engineering, new materials, robotics, and intelligent transportation technologies; and increasing demands on surface transportation agencies. The needs are critical. The committee makes recommendations that can be implemented to avoid the severe consequences of inaction that are quickly approaching or already affecting the nation's transportation and transit agencies.

The committee's recommendations were aimed at a broad range of agency needs and apply to surface transportation agencies but recognize that others—the federal government, the private sector, educational institutions, unions, and employees—must be involved in addressing the key issues. A summary of the committee's recommendations and its views on the potential consequences of inaction follow.

- **Training must be a key priority for all involved.** Surface transportation agencies at all levels—federal, state, and local—in partnership with the federal government, the private sector, educational institutions, unions, and employees, should establish training as a key priority. Training must be viewed as an investment providing needed knowledge, skills, and abilities. It can be a key component of alternative pathways to transportation agency careers by providing those from undergraduate programs (including community college programs) in business, planning, environmental science, public policy, and other areas with access to the transportation workforce. Commitment to training is measured by the amount of training and the effectiveness of the training.

- **The agencies must invest more in training than they are now.** An investment goal of 2 percent of salaries for training—as suggested from benchmarking surveys of many successful organizations— is appropriate for transportation agencies. This is equivalent to about 40 hours of training annually for each employee. While this benchmark goal is important, the training must be effective as measured in terms of improved performance, lower costs, and other metrics. The committee also supports reauthorization proposals to increase funding for existing federal programs that directly support education and training, including the University Transportation Centers (UTC) program, the Federal Highway Administration's National Highway Institute, the Federal Transit Administration's National Transit Institute,

and the Local Technical Assistance Program (LTAP). In conjunction with increasing the federal program funds available for agency education and training, Congress should also introduce incentives that trigger more federal funding if states and agencies invest their own funds in education and training for the transportation workforce. Incentives should be added to the UTC program to encourage the UTCs to partner with community colleges to provide specific education and training in areas for which the community colleges are best suited. Increased training investment must be accompanied by systematic evaluation of training outcomes.

- **USDOT should partner with transit agencies**. Federal partnerships with transportation agencies, the private sector, educational institutions, unions, and employees, should be established to focus on innovation in human resource practices and addresses recruitment, training, retention, and succession management for transportation agency personnel. Such an initiative can provide leadership; a focal point for federal, state, and local agency efforts; and a basis for creating partnerships among all key parties. The federal government, because of its national transportation responsibilities and the resources within the human resource organizations in USDOT and its modal agencies, is in an excellent position to lead this initiative as a follow-up to the USDOT-sponsored 2002 National Transportation Workforce Summit.

- **Transportation agencies should partner with educational institutions;** universities, community colleges, training institutes, and the LTAP centers may be employed by transit agencies to meet agency training and workforce development needs. These institutions are well organized to provide education and training and have the technical expertise to deliver the curricula, courses, and training materials required to meet agency skill needs. Many have already done so. More needs to be learned about the appropriate role of each, individually and in combination, in delivering efficient and effective education and training to the workforce.

All these recommendations aim at improving the performance of transportation agencies and, ultimately, the nation's transportation system. They reflect the goals and benchmarks of successful public-and private-sector organizations. They also reflect the primary goal—improving human capital—of President Bush's 2002 Management Agenda.

The National Transit Institute

NTI was established at Rutgers, The State University of New Jersey, with the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and had received continued support through the TEA-21 Act of 1999 and the SAFETEA-LU Act of 2005. It is funded through a grant from the U.S. Department of Transportation's Federal Transit Administration. NTI's mission is to provide training, education, and clearinghouse services in support of public transportation and quality of life in the United States. To that end, NTI promotes, develops, and delivers high quality training programs and educational resources to meet the needs of the industry through collaborations with transportation organizations, government, institutions, and associations. The institute receives $4.3M annually in federal funding to provide courses in workplace safety and security ($1M) and other general transit training ($3.3M).

NTI offers a variety of courses in different program areas. Except where noted, courses are free to public transit agency employees and government employees involved in public transportation. Tuition fees apply to all other participants. Transit organizations can receive a guaranteed number of seats in a course and reduce employee travel costs by volunteering to host a session.

TABLE 3.6 – NTI Training Topics

General Program Training	Workplace Safety and Security
• Federal Planning Requirements • Procurement • Technologies • Advanced Technologies • Civil Rights • Management Development	• Terrorist Activity Recognition and Reaction • System Security Awareness • Musculoskeletal Disorders Awareness and Prevention • Infectious Disease Awareness and Prevention • Workplace Violence • Fatigue

Educational Resources

NTI produces a variety of educational resources including written materials such as handbooks, reports, fact sheets, and pocket guides; videos; interactive CD-ROM training; and audio teleconferences. In addition, the Fellows Program provides a unique opportunity for transit professionals to share their knowledge and experience on a particular topic with their transit colleagues. A complete listing of resources is available at www.ntionline.com.

3.4.2 *"New Approaches to Training Technical Transport Specialists"*

- Alexander Chubukov, Associate President, Moscow Motor Road Institute (MADI)

The behavior models of passengers and drivers are different in Russia and in the USA. In Russia there is a shortage of road surface. The average standard for the Western cities is that transportation infrastructure takes 18-20% of the city area. This number is 10-12% in Moscow and even lower in other cities in Russia. Traffic movement in Moscow is typically as follows:

- Right lane: parked cars (under "no parking" signs);
- Next lane: Full buses and trolleys;
- Next two lanes: passenger cars stuck in traffic jam.

Preparing highly-educated transportation specialists is vital. Great emphasis is placed on involving (and encouraging) MADI professors in doing research activities. Practical training of students receives special attention. The companies where the training takes place are chosen through a thorough review.

There are currently nine research centers at MADI. These centers are financed through a combination of federal (40%) and self-earned (60%) funds. The newest educational projects include the following approaches: starting from the freshman year the students work during the

day at a leading transportation company (e.g. Design Bureau "Motor" – military production) and take night classes after work.

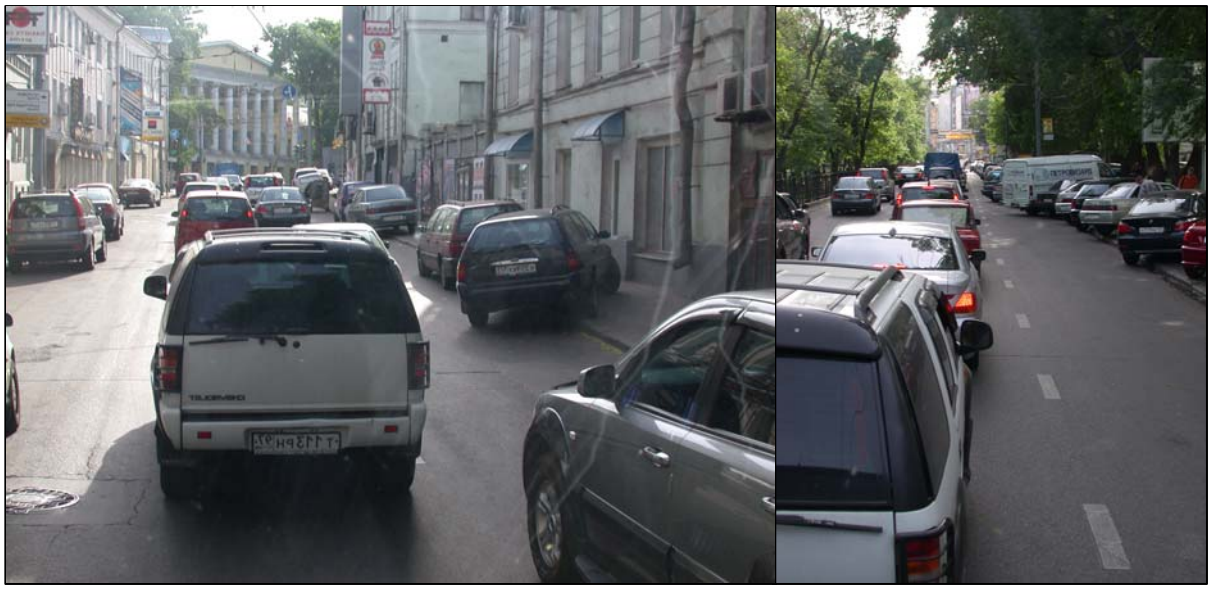

FIGURE 3.25 – Highway Capacity Loss due to Lack of Parking Enforcement in Moscow

3.4.3 Panel Session 4 – Question and Answer

Q: How are the traffic signals coordinated when they are changed to accommodate buses with signal prioritization (since lights are connected to each other)?

A: This is a complicated algorithm. It is done using Intelligent Transportation Systems (ITS)

Q: How do different transit modes (bus, trolley, metro, BRT) in the U.S. compare in terms of average speed and safety?

A: Metro – 38 miles per hour (mph)
BRT – 22 mph
Light rail – 25 mph
Bus – 12 mph

The National Safety Council tracks safety statistics. It shows that safety on transit (all modes) is comparable to aviation and the statistics shows constant improvement.

3.4.4 Panel Session 4 - Synthesis

The long-term ability of the transit industry to provide high quality mobility to the people of the world depends on the maintenance of a well-trained workforce. Successfully addressing transportation workforce issues requires a collective effort involving the agencies, the federal government, the private sector, and a wide range of academic institutions. The need to fully understand the issues governing professional transit training prompted a major study in the U.S titled "*The Workforce Challenge: Recruiting, Training, and Retaining Qualified Workers for Transportation and Transit"*. The report examined what is needed for transportation agencies to strategically alter key human resource activities—recruiting, training, retaining, and succession management—and made recommendations designed to enable these agencies to continue to meet emerging workforce challenges and adjust to labor market realities. The report also addressed the role of the federal government in this effort, and made a series of recommendations:

- Training must be a key priority for all involved.
- The agencies must invest more in training than they are now.
- The U.S Department of Transportation should partner with transit agencies.
- Transportation agencies should partner with educational institutions;

All these recommendations focused on improving the performance of transportation agencies and, ultimately, the nation's transportation system. They reflect the goals and benchmarks of successful public-and private-sector organizations and the primary goal of President Bush's 2002 Management Agenda, improving human capital.

The National Transit Institute plays a major role in transit professional training in the U.S, providing training, education, and clearinghouse services and delivering high quality training programs and educational resources to meet the needs of the industry. NTI offers a variety of courses in different program areas. Courses are typically free to public transit agency employees and government employees involved in public transportation. Tuition fees apply to all other participants. Transit organizations can receive a guaranteed number of seats in a course and reduce employee travel costs by volunteering to host a session. Training course are divided into General Program Training and Workplace Safety and Security Training. NTI also produces a variety of educational resources including written materials such as handbooks, reports, fact sheets, and pocket guides; videos; interactive CD-ROM training; and audio teleconferences. A complete listing of resources is available at www.ntionline.com.

The Russian Federation also recognizes that preparing highly-educated transportation specialists is vital. Within the City of Moscow, great emphasis is placed on involving (and encouraging) MADI professors in research activities. Practical training of students receives special attention. The companies where the training takes place are chosen through a thorough review process. There are currently nine research centers at MADI. These centers are financed through a combination of federal (40%) and self-earned (60%) funds. The newest courses prioritize the flexibility to participate in professional training while working full-time. For example, starting in the freshman year, students work during the day and take night classes after work.

4. Conclusions and Next Steps

Following the completion of the panel sessions, Rita Daguillard, Director of FTA's Office of Research Management, provided some closing remarks. On behalf of the U.S delegation, she congratulated the speakers for the quality of their presentations and thanked her Russian co-sponsors, the Russian Ministry of Transport, the Moscow Oblast, the City of Moscow, and MADI, for organizing the event and being such exceptional hosts.

It was noted that the conference had provided a great sense of insight into the similar challenges being faced by both countries, with both suffering from severe traffic urban congestion problems. Public sector responsibility for the provision of transportation infrastructure has resulted in recurring over-utilization of this infrastructure, caused fundamentally by private vehicle owners not paying the full marginal cost of their travel. In both places, this breakdown between supply and demand has resulted in severe negative economic, environmental, and social impacts. While adding capacity to existing infrastructure has become a critical need, both countries have found it increasingly difficult to obtain the necessary funding to do so through traditional means. This problem is further exacerbated by the complexity of organizational responsibilities within the realm of urban transportation, often leaving it marginalized as an "institutional orphan".

As well as highlighting these challenges, the conference made significant progress in identifying the manner in which they should be addressed. Innovative financing approaches are required, and the technical and organizational expertise of the private sector must be engaged. Public Private Partnerships are being increasingly adopted as a reliable model for infrastructure provision, economic development, service operation and maintenance. The application of new technology will continue to play an important role and investment in Research and Development was recognized as being of crucial importance in both countries. Finally, progress needs to be made in both countries toward the establishment of clear institutional responsibilities and inter-agency coordination. Only by clear delegation of responsibility between federal, state and local government bodies will lasting improvements be made.

In closing, Ms Daguillard stated that she views this conference as the catalyst for the establishment of an ongoing relationship between the two countries in their mutual efforts to improve their transportation systems. She defined three primary steps that needed to be taken to ensure that this occurs:

1. Publish the conference proceedings and disseminate to all delegates and participating organizations
2. Develop an Action Plan for joint projects and activities to be undertaken through collaboration between the two countries in each of the four defined research areas
3. Define points of contact for each of the four research areas

In closing, Ms Daguillard extended an invitation to the Russian Delegation to visit the United States, so that the U.S participants may have the opportunity to reciprocate the exceptional Russian hospitality experienced on this trip.

Appendix I – Trade Mission Delegates and Conference Attendees

This list includes both invitees and attendees of the conference. Attendees are marked with an X sign.

№	Organization	Name	Title	Atten-dance
	Ministries and Agencies:			
1	Ministry of Transport of the RF	Moskvichev, Yevgeniy S.	Deputy Minister of Transport of the RF	
2	Ministry of Transport of the RF	Starovoytov, Oleg I.	Director, State policy department for road management, automobile and city passenger transport, geodesics and cartography	
3	Ministry of Transport of the RF	Sherstnev, Alexander Y.	Deputy director, State policy department for road management, automobile and city passenger transport, geodesics and cartography	
4	Ministry of Transport of the RF	Koronchik, Galina N.	Deputy director, State policy department for road management, automobile and city passenger transport, geodesics and cartography	X
5	Ministry of Transport of the RF	Romanenko, Yuriy F.	Deputy director, Department of international cooperation	X
6	Ministry of Transport of the RF	Ibrayev, Kanatabek A.	Head of technical policy section, State policy department for road management, automobile and city passenger transport, geodesics and cartography	
7	Ministry of Transport of the RF	Sokolov, Leonid N.	Head of automobile transport section, State policy department for road management, automobile and city passenger transport, geodesics and cartography	
8	Ministry of Transport of the RF	Timofeyev, Valeriy V.	Head of bilateral cooperation section, Department of international cooperation	

9	Ministry of Transport of the RF	Sologubova, Alla P.	Deputy head of passenger transport section, State policy department for road management, automobile and city passenger transport, geodesics and cartography	X
10	Ministry of Transport of the RF	Tereschenkova, Yelena V.	Deputy head of forecasting and development section, State policy department for road management, automobile and city passenger transport, geodesics and cartography	X
11	Ministry of Transport of the Moscow Region	Bludyan, Norayr O.	Deputy Minister of transport of Moscow Government region	X
12	Ministry of Transport of the Moscow Region	Ivanushkin, Vladimir N.	Head of Passenger transport regulation department	X
13	Ministry of Transport of the Moscow Region	Kuznetsov, Alexander I.	Head of Automobile transport development department	X
14	Ministry of Transport of the Moscow Region	Kvashennikova, Olga P.	Deputy head of Administration	
15	Ministry of Transport of the Moscow Region	Krotova, Kariya K.	Deputy head of Passenger transport regulation department	
16	Ministry of Transport of the Moscow Region	Tyneyev, Nikolay N.	Head of Regulatory department	
17	Ministry of Transport of the Moscow Region	Ivanovsky, Oleg G.	Head of Passenger transportation section	X
18	Ministry of Transport of the Moscow Region	Pik Yevgeniy A.	Head of section	X
19	Ministry of Transport of the Moscow Region	Ulitina, Irina V.	Head of Section for scientific and technology policy	X

20	Ministry of Transport of the Moscow Region	Krymov Dmitry B.	Head of Department	X
21	Department of Transport and Communications, Moscow	Vorobjev, Alexander G.	Deputy head	X
	Territorial Agencies, Federal Authorities of the Moscow Region			
22	State road control department of the Moscow region, Federal control transportation service	Usan, Aleksey A.	Head of department	X
23	Department of state road control of the Moscow region, Federal control transportation service	Chinyakov, Yuriy V.	Deputy head of department	
24	Administration and transportation inspection of the Moscow region	Verkhoglyadov, Sergey A.	Deputy director	X
25	Ministry of Social Protection of the Moscow Region	Garafeyev Oleg M.	Deputy Minister	X
26	Ministry of Transport of the Moscow Region	Kurtyanik Nadezhda V.	Consultant	X
	Motor Carriers, Moscow Region			
27	GUP MO Mostrasnavto	Zhizhayev, Alexander N.	General director	
28	GUP MO Mostransavto	Shvedov, Gennadiy D.	First deputy general director	X
29	GUP MO Mostransavto	Rogozhin, Sergey V.	Deputy general director	
30	GUP MO Mostransavto	Grivas,	Chief engineer	X

		Nikolay M.		
31	GUP MO Mostransavto	Samoseyev, Vladimir V.	Deputy general director on security	X
32	GUP MO Mostransavto	Shvedova, Tatyana P.	Chief of economic section	X
33	GUP MO Mostransavto	Akhundov, Rasim A.	Inspector for control over assignments execution	X
34	GUP MO Mostransavto	Postolit, Anatoly V.	Head of Informatization department	X
35	DMU ATP Reys	Gorodetsky, Vasily P.	Deputy director, Transportation	X
36	OOO Auto	Kotelnikov, Dmitry S.	Deputy head, Operations department	
37	OOO Lobnyatrans	Stepanchikov, Aleksey A.	Chief engineer	X
38	OOO Gamma Plus	Shramko Galina V.	Head of Department	X
39	OOO Kontrast	Starovoytov Aleksey S.	Director General	X
40	OOO Perelput	Melkinov Viktor A.	Director General	X
	Municipal Transport Organizations, Moscow			
41	GUP Moskovsky Metropoliten	Ershov, Aleksandr V.	First deputy chief	X
42	GUP Mosgortrans	Ivanov, Pyotr V.	General director	
43	GUP Mosgortrans	Tkachyuk, Boris I.	First deputy general director	
44	GUP Mosgortrans	Baklanov, Victor V.	Deputy general director	X
45	GUP Mosgortrans	Adamov, Evgeny G.	Deputy general director	
46	GUP Mosgortrans	Khalzov, Victor V.	Deputy general director	
47	GUP Mosgortrans	Roschak, Sergey V.	Head of Technical department	
48	GUP Mosgortrans	Lyulko, Vitaly V.	Head of Electric transport department	X

49	GUP Mosgortrans	Ivanov, Dmitry M.	Deputy head of Technical department	X
50	GUP Mosgortrans	Potapov, Evgeny A.	Head of Production and technical department	X
51	GUP Mosgortrans	Gavrilov, Igor V.	Deputy head of bus transportation department	
52	GUP Mosgortrans	Scherbakov, Ilya A.	Head of Rolling stock department, Bus transportation department	X
53	2nd Bus depot	Kazanin, Aleksey G.	Director	X
54	3rd Bus depot	Akopyan, Georgy A.	Director	X
55	18th Bus depot	Krasikov, Sergey A.	Director	X
56	Filyovsky bus-trolleybus depot	Khalyapin, Vladimir I.	Director	X
57	5th bus depot	Karlikov, Leonid L.	Director	X
58	7th bus depot	Strerbkov, Victor F.	Director	X
59	8th bus depot	Scherbakov, Sergey L.	Director	X
	Private automobile operators, Moscow			
60	OOO Trans-Profi	Pivazi, Roman T.	General Director	
61	OOO Orbita 21 vek	Ganich, Andrey N.	Director	
62	ZAO Taksomotorny park №20	Tesler, Efim R.	Cahirman of the Board	X
63	ZAO Taksomotorny park №20	Sabirsyanov, Rafik F.	General Director	X
64	OOO Don-Avto	Privalov, Sergey N.	General Director	
65	Lyubertskoye Transport Agency	Belov Igor N.	Commercial Director	X
	Service providers for operators			
66	ZAO TK Novatorrus-Invest	Kats, Aleksandr S.	General Director	
	Operators and urban electric transport manufacturers (tramway, trolley bus)			
67	GUP MO Mosoblelectrotrans	Farberov, Mikhail M.	General Director	X

68	MUP Vidnovsky trolley bus depot	Kruglov, Aleksandr Yu.	Director	X
69	MUP Kolomeskoe tramway depot	Novikova, Natalia P.	Director	X
70	MUP Podolsky trolley bus depot	Yurov, Vladimir K.	Director	
71	MUP Khimkielectrotrans	Vasiliev, Aleksandr V.	Head of Rolling stock department	X
72	Division Avtobusy, UK Gruppa GAZ, OOO CTD Russkie Avtobusy	Sumakov, Aleksey V.	Director of Sales Department, Moscow Region	
73	Division Avtobusy, UK Gruppa GAZ, OOO CTD Russkie Avtobusy	Sheyenkov, Sergey N.	Deputy Director, R&D	
74	OOO Kubinsky bus depot	Nosikov, Grigory G.	Director	
75	ZAO Tushino-Avto	Bystrov, Yury V.	General Director	X
	Public Organizations			
76	Moscow Region Association of trade union organizations	Kabanova, Valentina V.	Chairman	X
77	Moscow Region Association of All-Russia society of disabled	Zelyony, Ilya I.	Chief Editor	X
78	Moscow Region Association of All-Russia society of disabled	Zelikov, Nikolay I.	Chairman	X
79	Moscow Region Association of All-Russia society of disabled – All-Russia of the Red Banner of Labour Association of the Blind	Konyaev, Aleksandr I.	Deputy Chairman	X
80	Moscow Region Association of All-Russia society of disabled – All-Russia, of the Red Banner of Labour Association of the Blind	Sedykh, Tamara N.	Specialist	X
81	Moscow Region Association of the All-Russia amateur motorists society (MOO VOA)	Kascheev, Sergey Ya.	Deputy Chairman	
82	Russian Autotransport Union	Lagutin, Vladimir V.	Head of department	X
83	Moscow Region Transport Union	Vinokurov, Boris A.	President	X

84	Moscow Transport Union	Abramyan, Georgiy M.	Vice President	
85	Moscow Transport Union	Sveshnikov, Yuriy Yu.	Executive Director	X
86	Moscow Transport Union	Morozenko, Victor M.	Director of Department for In-Town Conveyance of Passengers	X
87	Moscow Transport Union	Gusarov, Vladimir F.	Director of Intercity Bus Service Department	
88	Moscow Transport Union	Andreyev, Pavel A.	Director of Taxi Transportation Department	
89	Moscow Division of the All-Russian Public Organization of Small and Medium Business "OPORY ROSSII"	Logvinenko, Yuri K.	Executive Director	
90	Public Movement "Muscovites for Trams"	Morozov, Alexander S.	Chairman	
	Scientific, Design and Educational Institutes:			
91	NIIAT	Matantseva, Olga Yu.	Deputy eneral Director for Scientific Activities	
92	NIIAT	Batischev Ivan I.	Director-Manager of Scientific Center	
93	NIIAT	Yenin, Dmitry V.	Acting Director Manager of Scientific Center	X
94	NAMI	Zagarin, Denis A.	Head of Department, GNTS RF FGUP NAMI	
95	NAMI	Berberya, Vladimir V.	Head of Laboratory	X
96	MADI	Chubukov, Alexander B.	Associate President	X
97	MADI	Gerami Viktoria D.	Head of Chair	X
	Mass Media – Editorial Boards of Journals			
98	«Automobile Transport»	Kuzmina, Vera F.	Deputy Chief Editor	X
99	«Automobile Transport»	Balabayeva, Irina A.	Senior Editor	X
100	«Motor-Transport Enterprise »	Polyakov, Yury A.	Special Reporter	X
	Region Line Journal	Platoshyn, Gleb		X

	Administrations of Municipal Regions and City Districts			
101	City District Podolsk	Panin, Alexander N.	Leading Specialist, Administration of Transport and Road Infrastructure	X
102	Sergievo-Posadskiy Region	Ponomarev, Nikolai P.	Deputy Head of Department of Housing and Utilities Infrastructure	X
103	Balashikhinskiy Region	Yakunin, Dmity A.	Leading Specialist of Department for Transport and Communications	X
104	Leninskiy Region	Strelkov, Yevgeniy S.	Director of Vidnoye PATP	X
105	Pushkinskiy Region	Nuzhnyi, Igor N.	Deputy Director of the Head of Municipal Region	
106	Pushkinskiy Region	Pronin, Vladimir I.	Head of Department for Transport and Communication	X
107	Mytischinskiy Region	Pavlyuk, Valery F.	Head of Department for Transport and Communication	X
108	Tchekhovskiy Region	Zamogilniy, Aleksander I.	Head of Department of Industry and Engineering Infrastructure	X
109	Tchekhovskiy Region	Komarov, Vladimir F.	Director of Chekhov PATP	X
110	City District Electrostal	Davydov, Vadim P.	Deputy Head of City District	X
111	City District Dolgoprudniy	Petrov Nikolai N.	Head of Department for Transport and Communication	
112	Istrinskiy Region	Nevzorova Valentina N.	Deputy Head	X
113	City District Korolev	Diordiev Aleksey N.	Head of Sector for Transportation Service for the City's Population	
114	Pavlovo-Posadskiy Region	Maikov, Igor A.	Head of Department for Transport and Communication	X
115	Pavlovo-Posadskiy Region	Kolabushkin, Konstantin I.	Deputy Director of Pavlovo-Posadskiy PATP	X
116	Odintsovskiy Region	Zhabina, Svetlana V.	Deputy Head of Committee for Transport and Communication	
117	Odintsovskiy Region	Fedorov, Alexander V.	Head of Department for Road Infrastructure and Transport	
118	City District of Khimki	Zharavin, Victor D.	Head of Committee for Industry, Transport and Communication	X
119	City District Bronnitsy	Stabrova, Lyudmila A.	Deputy Head of Bronnitsy PATP for Services and Operations	X

120	City District Serpukhov	Antonov Alexander V.	Acting Head of Department of Transport and Communication	X
121	Stupinskiy Region	Chernolikov, Anatoliy V.	Head of Department of Automobile Roads, Transport and Communication	X
122	Administration of Ramenskiy Region	Skibko, Andrey V.	Chief Specialist	X
123	Noginskiy Region	Volkov, Sergey B.	Deputy Head of Committee for Industry, Transport and Communication	
	U.S. Embassy			
124	U.S. Commercial Service	Dorothy L. Lutter	Minister Counselor for Commercial Affairs	X
125	U.S. Commercial Service	E. Scott Bozek	Deputy Senior Commercial Officer	X
126	U.S. Commercial Service	Mark O'Grady	Commercial Officer	X
127	U.S. Commercial Service	Cheryl Dukelow	Commercial Officer	X
128	U.S. Commercial Service	Vladislav Borodulin	Commercial Specialist	X
129	U.S. Commercial Service	Elizaveta Minyaeva	Commercial Specialist	
130	U.S. Commercial Service	Vladimir Goryachev	Commercial Specialist	X
	MASS TRANSIT DELEGATION			
	Federal Transit Administration			
131	Federal Transit Administration, U.S. Department of Transportation	Rita E. Daguillard	Director, Office of Research Management	X
132	Federal Transit Administration, U.S. Department of Transportation	Linda Lasley	Assistant Chief Counselor	X
133	Federal Transit Administration, U.S. Department of Transportation	Sean Libberton	Chief Analyst, Department of Planning and Environment	X
134	Federal Transit Administration, U.S. Department of Transportation	Matthew Welbes	Chief of Staff / Acting Associate Administrator, FTA	X

135	Federal Transit Administration, U.S. Department of Transportation	Leslie Rogers	Regional Director	X
	American Public Transportation Association			
136	American Public Transportation Association	Frances Hooper	Staff Advisor	X
137	American Public Transportation Association	Greg Hull	Director of Operations, Safety and Security Programs	X
	Center for Urban Transportation Research			
138	Center for Urban Transportation Research, University of South Florida	Alasdair Cain	Senior Research Associate	X
139	Center for Urban Transportation Research, University of South Florida	Alexander Kolpakov	Research Assistant	X
	San Francisco Municipal Transportation Agency			
140	San Francisco Municipal Transportation Authority	Nathaniel P. Ford, Sr.	Executive Director/CEO	X
	Washington Metropolitan Area Transit Authority			
141	Metro Transit Police Department, Washington Metropolitan Area Transit Authority	Leslie M. Campbell	Mass Transportation Liaison Captain	X
	Los Angeles County Metropolitan Transit Authority			
142	Los Angeles Country Metropolitan Transit Authority	Leonid Bukhin	Engineering Project Manager / Systems Mail Stop 99-16-2	X
	U.S. Companies			X
143	Russell New Urban Development, LLC	H. Jerome Russell	President	X
144	DRI	David L. Turney	Chairman, CEO and President	

Appendix II – Workshop Agenda

5TH INTERNATIONAL WORKSHOP ON PUBLIC TRANSPORTATION
Sponsored by the Federal Transit Administration
and the U.S. Embassy Moscow
May 28-29, 2007

National Hotel, Moscow, Russia

Time	Event

May 28, 2007

9:00	REGISTRATION BEGINS
10:00-10:15	INTRODUCTIONS BY RITA DAGUILLARD DIRECTOR, OFFICE OF RESEARCH MANAGEMENT, FEDERAL TRANSIT ADMINISTRATION, UNITED STATES DEPARTMENT OF TRANSPORTATION
10:15-10:25	WELCOME ADDRESS BY YEVGENIY MOSKVITCHEV, DEPUTY MINISTER OF TRANSPORTATION OF THE RUSSIAN FEDERATION
10:25-10:35	ADDRESS BY SHERRY LIITLE, DEPUTY ADMINISTRATOR FEDERAL TRANSIT ADMINISTRATION, UNITED STATES DEPARTMENT OF TRANSPORTATION
10:35-10:45	*KEYNOTE ADDRESS BY REPRESENTATIVE OF MOSCOW OBLAST*
10:45	GROUP PHOTOGRAPH
10:45-11:20	COFFEE/TEA BREAK

11:20-13:30 TRANSIT PLANNING AND CONGESTION MANAGEMENT

Moderator: *Deputy Minister of Transport, Moscow Oblast Government* **Norayr Bloudyan**	
Panelists:	
11:20-11:40	*Chief Analyst, Department of Planning, Federal Transit Administration, U.S. Department of Transportation* **Sean Libberton** 'Transit Project Planning, Development and Implementation – The American Experience'
11:40-12:00	*Deputy Minister of Transport, Moscow Oblast Government* **Norayr Bloudyan** 'Transit Project Planning, Development and Implementation – The experience of Moscow Oblast (motor transport)'
12:00-12:20	*Executive Director, CEO, San Francisco Municipal Transportation Agency* **Nathaniel Ford, Sr.** 'Public/Private Partnerships in the U.S.'
12:20-12:40	*Deputy Head of the Department of Transport and Communications, Moscow City Government* **Alexander Vorobiev** **'**System for implementation of mass transit projects in the city of Moscow'
12:40-13:30	*DISCUSSION OF PANELIST PRESENTATIONS. Q & A*
13:30-15:00	*LUNCH*

15:00-17:30 ENSURING SAFETY AND SECURITY ON PUBLIC TRANSIT SYSTEMS

Moderator: *Deputy Head of the Department of Transport and Communications, Moscow City Government* **Alexander Vorobiev**	
Panelists:	
15:00-15:20	*Director of Operations, Safety and Security Programs,* American Public Transportation Association ***Greg Hull*** 'Transit Safety and Security – The American Experience'
15:20-15:40	Head of Moscow Metro ***Dmitry Gayev*** 'Transit Safety and Security – The Russian Experience'
15:40-16:00	*President and CEO, Digital Recorders, Inc.* ***Dave Turney*** 'New Safety and Security Technologies'
16:00-16:20	COFFEE/TEA BREAK
16:20-16:40	*Mass Transportation Liaison Captain* *Metro Transit Police, Washington Metropolitan Area Transit Authority* **Leslie M. Campbell** 'Innovative Approaches to Metro Security'
16:40-17:30	DISCUSSION OF PANELIST PRESENTATIONS. Q & A
17:45	RECEPTION
18:30	WELCOME ADDRESS BY DANIEL RUSSELL, DEPUTY CHIEF OF MISSION, U.S. EMBASSY
19:45	RECEPTION ENDS

May 29, 2007

9:00-10:50 PROVIDING ACCESSIBLE PUBLIC TRANSIT TO THE MOBILITY IMPAIRED

Moderator: *Director, Office of Research Management, Federal Transit Administration, US Department of Transportation* **Rita Daguillard**	
Panelists:	
8:30	REGISTRATION BEGINS
9:00-9:20	*Chief of Staff / Acting Associate Administrator, FTA* **Matthew Welbes** 'Structure of Paratransit in the United States and the American with Disabilities Act (ADA)'
9:20-9:40	*Director General, MOSGORTRANS* Pyotr Ivanov 'Transport Service for Passengers with Disabilities'
9:40-10:00	*Senior Research Associate, Center for Urban Transportation Research, University of South Florida* **Alasdair Cain** 'Integration of Accessibility into Bus Rapid Transit Projects in the U.S.'
10:00-10:20	*Administrator, Region 9, Federal Transit Administration, US Department of Transportation* **Leslie Rogers** 'Use of New Technologies in Services for the Disabled'
10:20-10:50	DISCUSSION OF PANELIST PRESENTATIONS. Q & A
10:50-11:10	COFFEE/TEA BREAK

11:10-13:00 TRAINING PUBLIC TRANSIT PROFESSIONALS

Moderator: *Deputy Minister of Transport, Moscow Oblast Government* **Norayr Bloudyan**	
Panelists:	
11:10-11:30	*Engineering Project Manager, Los Angeles County Metropolitan Transit Agency* **Leonid Bukhin** 'Building and Managing Efficient Transit Projects'
11:30-11:50	*President, Hodges Transportation Consulting, LLC* **Richard Hodges** 'Training Tomorrow's Transit Workforce'
11:50-12:10	*Associate President of the Moscow Motor Road Institute (MADI)* **Pavel Pospelov** 'New Approaches to Training of Transport Specialists of the Technical Field'
12:10-13:00	DISCUSSION OF PANELIST PRESENTATIONS. Q & A
13:00-13:15	CONFERENCE ENDS. Closing remarks by Rita Daguillard
13:30-18:00	SITE VISITS