Brazil's Priority Transportation Projects

A RESOURCE GUIDE

FOR U.S. INDUSTRY

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6. MASS TRANSIT SYSTEMS

6.1 Brazil's Urban Passenger Transportation Overview

As urban populations in Brazil continue to grow, so does the demand for transportation options, posing a tremendous challenge for federal, state and municipal governments. The Ministry of Cities is an autonomous federal agency that works to establish strategies, direction and priorities supporting the development of Brazil's cities. One of the Ministry's largest federal programs involves public transportation initiatives such as metros, Bus Rapid Transit (BRT), mass transit and traffic improvement.

Public transportation agencies such as SPTrans in Sao Paulo and the Public Agency for Transportation and Circulation (EPTC) in Porto Alegre are planning to implement Advanced Public Transportation Systems (APTS) for their bus fleet, and associated control centers for bus management operations. There is strong interest in incorporating ITS and ICT in public transportation systems, as state and municipal transportation agencies seek solutions for improving the safety and efficiency of existing systems.

6.2 Passenger Rail Transportation Projects

ANPTrilhos is the national association of passenger rail operators and industry leaders in Brazil and its objective is to promote the development of passenger rail. The primary members of ANPTrilhos are Metro Bahia, Metro Rio, SuperVia, Metro Sao Paulo, CPTM, Metro DF, CBTU, Trensurb and ViaQuatro.

In 2014, 2.9 billion[1] passengers used rail transportation, and that number will only continue to grow as rail becomes more accessible and widespread. Many of the existing passenger rail systems are being

[1] ANPTrilhos

expanded in urban areas. Currently, there are a number of passenger rail systems under construction including metros, light rail systems (VLT) and monorail projects, as presented in the table below.

Table 7
Passenger Rail System Projects Under Construction in Brazil

Brazilian State	Project Description
Bahia	Expansion of Metro Salvador -Line 1
	Implementation of Metro Salvador - Line 2
Ceara	Implementation of Metro Fortaleza - East Line
	Implementation of VLT in Fortaleza
	Implementation of VLT in Sobral
Goias	Implementation of VLT in Goiania
Mato Grosso	Implementation of VLT in Cuiaba
Pernambuco	Expansion of Metro Recife – South Line
	Expansion of Metro Recife – Central Line
Rio de Janeiro	Implementation of Metro Rio de Janeiro- Line 4
	Implementation of VLT in Rio de Janeiro – Line 6
Sao Paulo	Expansion of Metro Sao Paulo – Line 4
Sao Paulo	Expansion of Metro Sao Paulo – Line 5
	Implementation of Metro Sao Paulo – Line 6
	Expansion of Line 9 of CPTM
	Implementation of Line 13 of CPTM
	Implementation of Monorail Sao Paulo – Line 15
	Implementation of Monorail Sao Paulo – Line 17
	Implementation of Monorail Sao Paulo – Line 18
	Implementation of VLT in Baixada Santista

ANPTrilhos reports that many passenger rail systems are currently under evaluation for expansion. Those are presented in the table below.

Table 8
Passenger Rail Systems Under Evaluation

Brazilian State	Project Description
Alagoas	Implementation of VLT in Maceio
Amazonas	Implementation of Monorail – Manaus
Distrito Federal	Implementation of VLT – Brasilia
Distrito Federal	Implementation of Regional Brasilia-Luziania Train Service
Distrito Federal	Implementation of Regional Brasilia-Goiania Train
Minas Gerais	Expansion and operation of Line 1 of Metro de Belo Horizonte
Minas Gerais	Implementation and operation of Line 2 - Metro de Belo Horizonte
Minas Gerais	Implementation and operation of Line 3 of Metro de Belo Horizonte
Minas Gerais	Implementation of Regional Betim-Divinopolis Train
Minas Gerais	Implementation of Regional Belo Horizonte –Sete Lagoas Train

Minas Gerais	Implementation of Regional Belo Horizonte-Contagem Train
Paraiba	Implementation of VLT - Joao Pessoa
Pernambuco	Implementation of VLT - Petrolina
Pernambuco	Implementation of VLT - Recife
Parana	Implementation of Curitiba Metro
Parana	Implementation of Regional Londrina-Maringa Train
Rio de Janeiro	Implementation of Metro Line 3
Rio Grande do Sul	Porto Alegre Metro
Rio Grande do Sul	Implementation of Regional Bento Goncalves-Caxias do Sul Train
Sao Paulo	Implementation of VLT - Sao Jose dos Campos
Sao Paulo	Implementation of VLT - Guarulhos
Sao Paulo	Implementation of Intercity Train

One key priority with expanding and upgrading public rail involves implementing more effective safety measures. Surveillance systems are one example of technology that would help address crime on passenger railways. Public and private rail operators are searching for ways to transition from conventional video surveillance systems to more advanced technology that provides real time data. While video surveillance systems are commonly deployed in stations, platforms and other rail facilities, they have not been implemented on-board yet, as the technology has only been developed over the past ten years.

Currently, on-board video surveillance systems are recording-based, where images are captured on high-capacity hard-disks. These systems are limited to post-analysis only.

In 2015, USTDA awarded a technical assistance grant to ANPTrilhos for developing an implementation plan to integrate real-time video monitoring technologies. After that project is complete, individual operators will likely seek specific design plans for installing technologies recommended by the technical assistance.

Potential U.S. exports for this project are train wireless data transmission technologies that utilize a dedicated frequency for seamless data transfer inside the trains and throughout the track. Operators will look for technology that can transfer data in tunnel environments and can provide modern communication systems between on-board (train) and wayside (track) with reliable service. The implementation of real time wireless video systems requires interactive communications technology to transmit information from the train to control centers. This will require design and engineering services for implementation.

Additionally, a variety of supporting ICT systems associated with the Command and Control Centers and related professional services could pose opportunities for U.S. firms, specifically in the areas of:

- Data center technologies
- Servers and workstations
- Server and computer operating software
- Video Wall and other Information Display technologies
- Fiber Optic communication systems
- Communication interface equipment
- Core switching equipment
- Server Switches
- Application Switches
- Internet Routers
- Radius Servers
- VPN Gateway systems
- Network and Security Management Systems
- Wireless Communications and Mesh Networks
- Wireless Transceiver/Receiver/antennas
- Local Area Networks (LAN)
- Video Distribution Systems
- DC Firewall Systems
- Data Storage Systems
- Ethernet Networking/Synchronization Systems
- Ethernet Switches
- Power systems (emergency power systems)
- CCTV cameras and housing
- Video compressor units
- Planning and Development Services
- Engineering
- Communications Design Services
- Project Management Services

Contacts:

Project Contact	U.S. Trade and Development Agency	U.S. Commercial Service Brazil
Roberta Marchesi Superintendent ANPTrilhos Sector de Autarquias Sul- Quadra 1-Bloco J- Ed. CNT Torre A-5 andar- Sala 510-CEP 70.070-010- Brasilia/DF Brasilia, Brazil T: (61) 3322-3158 Email: Roberta.marchesi@anptrilhos.org.br	**Gabrielle Mandel** Country Manager for Brazil 1000 Wilson Boulevard Suite 1600 Arlington, VA 22209 Telephone: (703) 875-4357 Email: Gmandel@ustda.gov **Rodrigo Mota** Brazil Country Representative Consulate General of the United States of America Rua Henri Dunant, 700 04709-110 Sao Paulo, SP Brazil Telephone: 55-11-3250-5335 Mobile: 55-11-97575-9844 Email: rmota@ustda.gov	**Andrew Gately** Commercial Officer Embassy of the United States of America SES, Qd. 801, Lote 03 70403-900 – Brasilia, DF Brazil Telephone: 55-61-3312-7403 Email: Andrew.Gately@trade.gov **Ebe Raso** Commercial Specialist Transportation, Telecommunications, E-Commerce U.S. Consulate – Sao Paulo R. Thomas Deloney, 381 Sao Paulo, Brazil Telephone: + 55 11 3250-5339 Email: ebe.raso@trade.gov

6.3 Bus Public Transportation System Projects

In major cities, public transportation is conducted by bus systems made up of networks and routes that are managed by municipal and state transportation agencies. Major cities like Sao Paulo, Rio de Janeiro, Brasilia, Belo Horizonte, Fortaleza, Recife, Curitiba, Porto Alegre and Salvador have extensive bus systems providing service within their respective metropolitan areas.

Due to the population growth across major Brazilian cities, the demand for bus transportation systems continue to increase, which means local and state governments are pursuing expansion to existing systems and incorporation of ITS systems to improve efficiency.

Figure 1 – Curitiba Articulated Bus

6.3.1 Sao Paulo Bus Public Transportation System

The local bus system is managed by the Sao Paulo Transportation Secretariat (SPTrans), a municipal agency that operates under the Secretaria de Transportes of Sao Paulo. SPTrans concessions its bus system, which entails 1,300 bus lines and 15,000 buses. The Sao Paulo Bus Rapid Transit (BRT) System services 127 Km of streets that are used exclusively by buses. Connected to the BRT, the city operates 28 transfer terminals across the metropolitan area. In addition, Sao Paulo has more than 17,000 bus stops distributed over 4.5 million Km of street. The BRT is very popular and highly used: of the city's 11 million citizens, 7 million use the bus system daily, with 55 percent of intercity trips made on mass transit.

The bus concessions that SPTrans issued have expired which means that currently, the 1,300 bus lines are operated on an extended concession agreement until the contract is renewed. With the concessions likely to be renewed soon, SPTrans decided to modernize existing ITS systems on the buses, upgrade their bus monitoring system and expand the use of ITS technologies to better integrate public transportation in the city. This initiative is called the "Sao Paulo ITS Public Transportation System Project."

SPTrans plans to implement an Integrated Bus Command and Operational Control Center (CCO) that will require the utilization of various ICT, ITS systems, specialized bus control software and other bus automation and management systems under one architecture that will allow the CCO to interact with the rest of the bus ITS network.

As part of this project, the private sector will invest in and deploy on-board ITS technologies. This project will likely create export opportunities for U.S. suppliers offering ITS and ICT technologies.

ITS Systems Needed

- Computer Aided Dispatch Systems (CAD)
- Automatic Vehicle Location (AVL) Systems
- Advanced Communication Systems (ACS)
- Safety and Security systems
- Passenger Information Systems
- Automatic Passenger Counter Systems
- Wireless and Radio Communication Systems
- Fleet Management and Maintenance Systems
- Transit Signal Priority (TSP) Systems

ICT Equipment Needed

- Workstations, Switching Systems (core, server, ethernet)
- Gateway Systems
- Routers
- Firewall systems
- Local Area Networks (LAN)
- Web security, emergency power (back-up) systems
- Video Wall Display Systems
- Central Data Storage Systems
- Back-up Data Center Technologies
- Fiber optics cable and associated equipment (modems, transmitter, receivers)
- Professional services in ICT planning, design and implementation

6.4 Porto Alegre's Public Agency for Transportation and Circulation (EPTC)

Porto Alegre is the capital of Rio Grande do Sul with a population of 1.5 million and a fleet of 718,789 registered vehicles. The Public Agency for Transportation and Circulation (EPTC - Empresa Publica de Transporte e Circulacao) is responsible for concessioning bus routes, as well as monitoring and overseeing the economic and financial balance for the city's public transportation services.

The fleet includes 1,659 public transportation buses, 618 school buses and 3,917 taxis. The infrastructure consists of 55 Km of exclusive corridors for buses with 87 stations, and over 5,000 bus stops throughout streets in other cities. The public transportation system in Porto Alegre, not including the metro, transports 1.1 million passengers across over 400 bus routes every day.

EPTC plans to deploy ITS systems on the city's fleet where information will be transmitted to EPTC's traffic management center. The project is similar to the one being launched by SPTrans in Sao Paulo, yet on a much smaller scale. EPTC's project will likely be financed by the private operators as part of the concession renewal agreement. Currently, the project is expected to be announced for public bid in 2016.

ITS Systems Needed

- Computer Aided Dispatch Systems (CAD)
- Automatic Vehicle Location (AVL) Systems
- Advanced Communication Systems (ACS)
- Wireless and Radio Communication Systems
- Fleet Management and Maintenance Systems

ICT Equipment Needed

- Workstations, Switching Systems (core, server, ethernet)
- Firewall systems
- Web security, emergency power (Back-up) systems
- Central Data Storage Systems
- Back-up Data Center Technologies
- Fiber optics cable and associated equipment (modems, transmitter, receivers)
- Professional services in ICT planning, design, and implementation

Contacts:

Project Contact	U.S. Trade and Development Agency	U.S. Commercial Service Brazil

Adauto Farias **Prefeitura de Sao Paulo Transportes (SPTrans)** **Economic and Financial Management Director** **Rua 3 de dezembro, 34 – 2nd andar – Centro** **01014-020 Sao Paulo SP – Brazil** **Tel: 55-11-3293-2719** **Fax: 55-11-3293-2888** **Email:** **adauto.farias@sptrans.com.br** **www.sptrans.com.br** **Selma Strublic** **Prefeitura de Sao Paulo Transportes (SPTrans)** **Diretoria de Gestao Economico-financeira** **Rua 3 de dezembro, 34 – 2nd andar – Centro** **01014-020 Sao Paulo SP – Brazil** **Tel: 55 11 3293-2720** **Fax: 55 11 3293-2888** **Email:** **Selma.strublic@sptrans.com.br** **www.sptrans.com.br**	**Gabrielle Mandel** Country Manager for Brazil 1000 Wilson Boulevard Suite 1600 Arlington, VA 22209 Telephone: (703) 875-4357 Email: Gmandel@ustda.gov **Rodrigo Mota** Brazil Country Representative Consulate General of the United States of America Rua Henri Dunant, 700 04709-110 Sao Paulo, SP Brazil Telephone: 55-11-3250-5335 Mobile: 55-11-97575-9844 Email: rmota@ustda.gov	**Andrew Gately** Commercial Officer Embassy of the United States of America SES, Qd. 801, Lote 03 70403-900 – Brasilia, DF Brazil Telephone: 55-61-3312-7403 Email: Andrew.Gately@trade.gov **Ebe Raso** Commercial Specialist Transportation, Telecommunications, E-Commerce U.S. Consulate – Sao Paulo R. Thomas Deloney, 381 Sao Paulo, Brazil Telephone: + 55 11 3250-5339 Email: ebe.raso@trade.gov
EPTC – Porto Alegre **Vanderlei Luis Cappellari** **Diretor-Presidente** **Empresa Publica de Transporte e Circulacao S.A. (EPTC)** **Rua Joao Neves da Fontoura, No. 7** **Barrio Azenha – CEP 90050-030** **Porto Alegre, RS, Brazil** **Telephone: 55 51 3289-4200** **Email:pvidal@eptc.prefpoa.com.br**	**Maria C. Molina Ladeira** Diretora de Transporte Empresa Publica de Transporte e Circulacao S.A. (EPTC) Rua Joao Neves da Fontoura, No. 7 Barrio Azenha – CEP 90050-030 Porto Alegre, RS, Brazil Telephone: 55 51 3289-4350 Email: ladeira@eptc.prefpoa.com.br	

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HEP Transportation Consulting
2245 Rivermont Place
Charleston, SC 29414
Tel: (843) 763-8513
Email: Traffictransp@hotmail.com