

**REQUEST FOR PROPOSALS**

**TECHNICAL ASSISTANCE FOR THE**

**BRAZIL PASSENGER RAIL REAL TIME VIDEO MONITORING PROJECT**

Submission Deadline: **4:00pm**  
**LOCAL TIME**  
**November, 15 2015**

Submission Place: ANPTrilhos  
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SEALED PROPOSALS SHALL BE CLEARLY MARKED AND RECEIVED PRIOR TO THE TIME AND DATE SPECIFIED ABOVE. PROPOSALS RECEIVED AFTER SAID TIME AND DATE WILL NOT BE ACCEPTED OR CONSIDERED.

**N.B.: Any and all questions pertaining to the RFP should be sent to:**  
[RFPQuestions@ustda.gov](mailto:RFPQuestions@ustda.gov)

## REQUEST FOR PROPOSALS

SECTION 1: INTRODUCTION .....	3
1.1 BACKGROUND SUMMARY.....	3
1.2 OBJECTIVE .....	
1.3 PROPOSALS TO BE SUBMITTED .....	
1.4 CONTRACT FUNDED BY USTDA.....	
SECTION 2: INSTRUCTIONS TO OFFERORS .....	
2.1 PROJECT TITLE.....	
2.2 DEFINITIONS.....	
2.3 DEFINITIONAL MISSION REPORT.....	
2.4 EXAMINATION OF DOCUMENTS .....	
2.5 PROJECT FUNDING SOURCE.....	
2.6 RESPONSIBILITY FOR COSTS .....	
2.7 TAXES.....	
2.8 CONFIDENTIALITY.....	
2.9 ECONOMY OF PROPOSALS .....	
2.10 OFFEROR CERTIFICATIONS .....	
2.11 CONDITIONS REQUIRED FOR PARTICIPATION.....	
2.12 LANGUAGE OF PROPOSAL.....	
2.13 PROPOSAL SUBMISSION REQUIREMENTS .....	
2.14 PACKAGING .....	
2.15 OFFEROR'S AUTHORIZED NEGOTIATOR .....	
2.16 AUTHORIZED SIGNATURE .....	
2.17 EFFECTIVE PERIOD OF PROPOSAL .....	
2.18 EXCEPTIONS .....	
2.19 OFFEROR QUALIFICATIONS .....	
2.20 RIGHT TO REJECT PROPOSALS .....	
2.21 PRIME CONTRACTOR RESPONSIBILITY .....	
2.22 AWARD .....	
2.23 COMPLETE SERVICES .....	
2.24 INVOICING AND PAYMENT .....	
SECTION 3: PROPOSAL FORMAT AND CONTENT .....	
3.1 EXECUTIVE SUMMARY .....	
3.2 U.S. FIRM INFORMATION.....	
3.3 ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL .....	
3.4 TECHNICAL APPROACH AND WORK PLAN .....	
3.5 EXPERIENCE AND QUALIFICATIONS .....	
SECTION 4: AWARD CRITERIA .....	

ANNEX 1	FEDBIZOPPS ANNOUNCEMENT
ANNEX 2	EDITED PORTIONS OF BACKGROUND DEFINITIONAL MISSION REPORT
ANNEX 3	USTDA NATIONALITY REQUIREMENTS
ANNEX 4	USTDA GRANT AGREEMENT, INCLUDING MANDATORY CONTRACT CLAUSES
ANNEX 5	TERMS OF REFERENCE (FROM USTDA GRANT AGREEMENT)
ANNEX 6	U.S. FIRM INFORMATION FORM

## **Section 1: INTRODUCTION**

The U.S. Trade and Development Agency (USTDA) has provided a grant in the amount of US\$675,000 to Associação Nacional dos Transportadores de Passageiros sobre Trilhos (the “Grantee”) in accordance with a grant agreement dated August 3, 2015 (the “Grant Agreement”). The grant will be used to finance Technical Assistance to assist with the development of a roadmap and implementation plan for a real time video monitoring project for passenger rail operators in Brazil. The Grant Agreement is attached at Annex 4 for reference. The Grantee is soliciting technical proposals from qualified U.S. firms to provide expert consulting services to perform the Technical Assistance.

### **1.1 BACKGROUND SUMMARY**

Brazil has recently seen a resurgence in passenger rail infrastructure investments primarily as a result of a policy change, which previously focused on road expansion. In 2012, Brazilian President Dilma Rousseff announced a series of long-term plans to improve cargo transportation and more effectively connect the interior of the country to the nation’s ports, as well as plans to improve passenger service. The plans aim to attract \$41.1 billion into the rail sector over 30 years.

Currently, several major cities are served by either passenger rail and/or metro systems mostly deployed through public-private partnerships. Although still lagging behind on coverage, the country’s metro systems are considered among the best managed and most modern in the world. But, overcapacity demand during peak hours has compromised the quality of service and regular maintenance of the systems. This has compelled operators to deploy new technologies and solutions on an individual and uncoordinated manner. Many passenger rail operators have analogic and non-interoperable video monitoring and communication systems which provide no real time capabilities, making their use difficult in accident prevention and incident response.

This technical assistance would primarily identify technologies, define standards and protocols and develop a roadmap and implementation procedures for the effective deployment of real time video monitoring solutions for passenger rail operators in Brazil. In addition, this technical assistance would produce a practical plan for the acquisition and implementation of core and complementary systems that would increase security and overall operational efficiency for the control and management of the various passenger rail trains throughout Brazil.

The selected U.S. firm would provide technical services to ANPTrilhos, the Brazilian National Association of Passenger Rail Operators. The association brings together both public and private passenger rail operators as well as passenger rail industry representatives with the main objective of furthering passenger rail transportation development within the country. Since 2013, ANPTrilhos has taken the lead and worked alongside operators, the passenger rail industry, and both transportation and communications regulatory agencies to identify solutions as well as establish standards and protocols, so that video monitoring solutions can be implemented with common communication frequencies and protocols, and real time capabilities.

Edited portions of a background Definitional Mission is provided for reference in Annex 2.

## 1.2 OBJECTIVE

The objective of this technical assistance is to develop a roadmap and implementation plan for a real time video monitoring project for passenger rail operators in Brazil. The Terms of Reference (TOR) for this Technical Assistance are attached as Annex 5.

## 1.3 PROPOSALS TO BE SUBMITTED

Technical proposals are solicited from interested and qualified U.S. firms. The administrative and technical requirements as detailed throughout the Request for Proposals (RFP) will apply. Specific proposal format and content requirements are detailed in Section 3.

The amount for the contract has been established by a USTDA grant of US\$675,000. **The USTDA grant of \$US675,000 is a fixed amount. Accordingly, COST will not be a factor in the evaluation and therefore, cost proposals should not be submitted.** Upon detailed evaluation of technical proposals, the Grantee shall select one firm for contract negotiations.

## 1.4 CONTRACT FUNDED BY USTDA

In accordance with the terms and conditions of the Grant Agreement, USTDA has provided a grant in the amount of US\$675,000 to the Grantee. The funding provided under the Grant Agreement shall be used to fund the costs of the contract between the Grantee and the U.S. firm selected by the Grantee to perform the TOR. The contract must include certain USTDA Mandatory Contract Clauses relating to nationality, taxes, payment, reporting, and other matters. The USTDA nationality requirements and the USTDA Mandatory Contract Clauses are attached at Annexes 3 and 4, respectively, for reference.

## **Section 2: INSTRUCTIONS TO OFFERORS**

### **2.1 PROJECT TITLE**

The project is called Brazil Passenger Rail Real Time Video Monitoring Project.

### **2.2 DEFINITIONS**

Please note the following definitions of terms as used in this RFP.

The term "Request for Proposals" means this solicitation of a formal technical proposal, including qualifications statement.

The term "Offeror" means the U.S. firm, including any and all subcontractors, which responds to the RFP and submits a formal proposal and which may or may not be successful in being awarded this procurement.

### **2.3 DEFINITIONAL MISSION REPORT**

USTDA sponsored a Definitional Mission to address technical, financial, sociopolitical, environmental and other aspects of the proposed project. Edited portions of the report are attached at Annex 2 for background information only. Please note that the TOR referenced in the report are included in this RFP as Annex 5.

### **2.4 EXAMINATION OF DOCUMENTS**

Offerors should carefully examine this RFP. It will be assumed that Offerors have done such inspection and that through examinations, inquiries and investigation they have become familiarized with local conditions and the nature of problems to be solved during the execution of the Technical Assistance.

Offerors shall address all items as specified in this RFP. Failure to adhere to this format may disqualify an Offeror from further consideration.

Submission of a proposal shall constitute evidence that the Offeror has made all the above mentioned examinations and investigations, and is free of any uncertainty with respect to conditions which would affect the execution and completion of the Technical Assistance.

## **2.5 PROJECT FUNDING SOURCE**

The Technical Assistance will be funded under a grant from USTDA. The total amount of the grant is not to exceed US\$675,000.

## **2.6 RESPONSIBILITY FOR COSTS**

Offeror shall be fully responsible for all costs incurred in the development and submission of the proposal. Neither USTDA nor the Grantee assumes any obligation as a result of the issuance of this RFP, the preparation or submission of a proposal by an Offeror, the evaluation of proposals, final selection or negotiation of a contract.

## **2.7 TAXES**

Offerors should submit proposals that note that in accordance with the USTDA Mandatory Contract Clauses, USTDA grant funds shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in the Host Country.

## **2.8 CONFIDENTIALITY**

The Grantee will preserve the confidentiality of any business proprietary or confidential information submitted by the Offeror, which is clearly designated as such by the Offeror, to the extent permitted by the laws of the Host Country.

## **2.9 ECONOMY OF PROPOSALS**

Proposal documents should be prepared simply and economically, providing a comprehensive yet concise description of the Offeror's capabilities to satisfy the requirements of the RFP. Emphasis should be placed on completeness and clarity of content.

## **2.10 OFFEROR CERTIFICATIONS**

The Offeror shall certify (a) that its proposal is genuine and is not made in the interest of, or on behalf of, any undisclosed person, firm, or corporation, and is not submitted in conformity with, and agreement of, any undisclosed group, association, organization, or corporation; (b) that it has not directly or indirectly induced or solicited any other Offeror to put in a false proposal; (c) that it has not solicited or induced any other person, firm, or corporation to refrain from submitting a proposal; and (d) that it has not sought by collusion to obtain for itself any advantage over any other Offeror or over the Grantee or USTDA or any employee thereof.

## **2.11 CONDITIONS REQUIRED FOR PARTICIPATION**

Only U.S. firms are eligible to participate in this tender. However, U.S. firms may utilize subcontractors from the Host Country for up to 20 percent of the amount of the USTDA grant for

specific services from the TOR identified in the subcontract. USTDA's nationality requirements, including definitions, are detailed in Annex 3.

## **2.12 LANGUAGE OF PROPOSAL**

All proposal documents shall be prepared and submitted in English and in Portuguese. Offerors should submit one copy in English, one copy in Portuguese, and an electronic copy of both versions on a flash drive. Annex VI does not need to be translated into Portuguese.

## **2.13 PROPOSAL SUBMISSION REQUIREMENTS**

The **Cover Letter** in the proposal must be addressed to:

Roberta Marchesi  
ANPTrilhos  
Setor de Autarquias Sul - Quadra 1 - Bloco J - Ed. CNT  
Torre A - 5º andar - Sala 510 - CEP 70.070-010 – Brasília, DF  
Brazil

**An English and Portuguese version of your proposal, as well as an electronic copy on a flash drive, must be received at the above address no later than 4:00pm, on November 15, 2015. Please call or e-mail Roberta Marchesi ([roberta.marchesi@anptrilhos.org.br](mailto:roberta.marchesi@anptrilhos.org.br) Tel. +55 (61) 3322-3158 – Brazil) once your proposal is en route.**

Proposals may be either sent by mail, overnight courier, or hand-delivered. Whether the proposal is sent by mail, courier or hand-delivered, the Offeror shall be responsible for actual delivery of the proposal to the above address before the deadline. Any proposal received after the deadline will be returned unopened. The Grantee will promptly notify any Offeror if its proposal was received late.

Upon timely receipt, all proposals become the property of the Grantee.

## **2.14 PACKAGING**

Each copy of the proposal must be sealed to ensure confidentiality of the information. The proposals should be individually wrapped and sealed, and labeled for content including the name of the project and designation of "English" or "Portuguese". The English and Portuguese copies should be collectively wrapped and sealed, and clearly labeled, including the contact name and the name of the project.

Neither USTDA nor the Grantee will be responsible for premature opening of proposals not properly wrapped, sealed and labeled.

## **2.15 OFFEROR'S AUTHORIZED NEGOTIATOR**

The Offeror must provide the name, title, address, telephone number, e-mail address and fax number of the Offeror's authorized negotiator. The person cited shall be empowered to make binding commitments for the Offeror and its subcontractors, if any.

## **2.16 AUTHORIZED SIGNATURE**

The proposal must contain the signature of a duly authorized officer or agent of the Offeror empowered with the right to bind the Offeror.

## **2.17 EFFECTIVE PERIOD OF PROPOSAL**

The proposal shall be binding upon the Offeror for NINETY (90) days after the proposal due date, and Offeror may withdraw or modify this proposal at any time prior to the due date upon written request, signed in the same manner and by the same person who signed the original proposal.

## **2.18 EXCEPTIONS**

All Offerors agree by their response to this RFP announcement to abide by the procedures set forth herein. No exceptions shall be permitted.

## **2.19 OFFEROR QUALIFICATIONS**

As provided in Section 3, Offerors shall submit evidence that they have relevant past experience and have previously delivered advisory, Technical Assistance and/or other services similar to those required in the TOR, as applicable.

## **2.20 RIGHT TO REJECT PROPOSALS**

The Grantee reserves the right to reject any and all proposals.

## **2.21 PRIME CONTRACTOR RESPONSIBILITY**

Offerors have the option of subcontracting parts of the services they propose. The Offeror's proposal must include a description of any anticipated subcontracting arrangements, including the name, address, and qualifications of any subcontractors. USTDA nationality provisions apply to the use of subcontractors and are set forth in detail in Annex 3. The successful Offeror shall cause appropriate provisions of its contract, including all of the applicable USTDA Mandatory Contract Clauses, to be inserted in any subcontract funded or partially funded by USTDA grant funds.

## **2.22 AWARD**

The Grantee shall make an award resulting from this RFP to the best qualified Offeror, on the basis of the evaluation factors set forth herein. The Grantee reserves the right to reject any and all proposals received.

## **2.23 COMPLETE SERVICES**

The successful Offeror shall be required to (a) provide local transportation, office space and/or secretarial support required to perform the TOR if needed; (b) provide and perform all necessary labor, supervision and services; and (c) in accordance with best technical and business practice, and in accordance with the requirements, stipulations, provisions and conditions of this RFP and the resultant contract, execute and complete the TOR to the satisfaction of the Grantee and USTDA.

## **2.24 INVOICING AND PAYMENT**

Deliverables under the contract shall be delivered on a schedule to be agreed upon in a contract with the Grantee. The Contractor may submit invoices to the designated Grantee Project Director in accordance with a schedule to be negotiated and included in the contract. After the Grantee's approval of each invoice, the Grantee will forward the invoice to USTDA. If all of the requirements of USTDA's Mandatory Contract Clauses are met, USTDA shall make its respective disbursement of the grant funds directly to the U.S. firm in the United States. All payments by USTDA under the Grant Agreement will be made in U.S. currency. Detailed provisions with respect to invoicing and disbursement of grant funds are set forth in the USTDA Mandatory Contract Clauses attached in Annex 4.

### **Section 3: PROPOSAL FORMAT AND CONTENT**

To expedite proposal review and evaluation, and to assure that each proposal receives the same orderly review, all proposals must follow the format described in this section.

Proposal sections and pages shall be appropriately numbered and the proposal shall include a Table of Contents. Offerors are encouraged to submit concise and clear responses to the RFP. Proposals shall contain all elements of information requested without exception. Instructions regarding the required scope and content are given in this section. The Grantee reserves the right to include any part of the selected proposal in the final contract.

The proposal shall consist of a technical proposal only. A cost proposal is NOT required because the amount for the contract has been established by a USTDA grant of US\$675,000, which is a fixed amount.

Offerors shall submit one (1) English and (1) Portuguese version of the proposal, as well as an electronic copy of both versions on a flash drive. Annex VI does not need to be translated into Portuguese. Proposals received by fax cannot be accepted.

Each proposal must include the following:

- Transmittal Letter,
- Cover/Title Page,
- Table of Contents,
- Executive Summary,
- Firm Background Information,
- Completed U.S. Firm Information Form,
- Organizational Structure, Management Plan, and Key Personnel,
- Technical Approach and Work Plan, and
- Experience and Qualifications.

Detailed requirements and directions for the preparation of the proposal are presented below.

### **3.1 EXECUTIVE SUMMARY**

An Executive Summary should be prepared describing the major elements of the proposal, including any conclusions, assumptions, and general recommendations the Offeror desires to make. Offerors are requested to make every effort to limit the length of the Executive Summary to no more than five (5) pages.

### **3.2 U.S. FIRM INFORMATION**

A U.S. Firm Information Form in .pdf fillable format is attached at the end of this RFP in Annex 6. The Offeror must complete the U.S. Firm Information Form and include the completed U.S. Firm Information Form with its proposal.

### **3.3 ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL**

Describe the Offeror's proposed project organizational structure. Discuss how the project will be managed including the principal and key staff assignments for this Technical Assistance. Identify the Project Manager who will be the individual responsible for this project. The Project Manager shall have the responsibility and authority to act on behalf of the Offeror in all matters related to the Technical Assistance.

Provide a listing of personnel (including subcontractors) to be engaged in the project, including both U.S. and local subcontractors, with the following information for key staff: position in the project; pertinent experience, curriculum vitae; other relevant information. If subcontractors are to be used, the Offeror shall describe the organizational relationship, if any, between the Offeror and the subcontractor.

A manpower schedule and the level of effort for the project period, by activities and tasks, as detailed under the Technical Approach and Work Plan shall be submitted. A statement confirming the availability of the proposed project manager and key staff over the duration of the project must be included in the proposal.

### **3.4 TECHNICAL APPROACH AND WORK PLAN**

Describe in detail the proposed Technical Approach and Work Plan (the “Work Plan”). Discuss the Offeror’s methodology for completing the project requirements. Include a brief narrative of the Offeror’s methodology for completing the tasks within each activity series. Begin with the information gathering phase and continue through delivery and approval of all required reports.

Prepare a detailed schedule of performance that describes all activities and tasks within the Work Plan, including periodic reporting or review points, incremental delivery dates, and other project milestones.

Based on the Work Plan, and previous project experience, describe any support that the Offeror will require from the Grantee. Detail the amount of staff time required by the Grantee or other participating agencies and any work space or facilities needed to complete the Technical Assistance.

### **3.5 EXPERIENCE AND QUALIFICATIONS**

Provide a discussion of the Offeror's experience and qualifications that are relevant to the objectives and TOR for the Technical Assistance. If a subcontractor(s) is being used, similar information must be provided for the prime and each subcontractor firm proposed for the project. The Offeror shall provide information with respect to relevant experience and qualifications of key staff proposed. The Offeror shall include letters of commitment from the individuals proposed confirming their availability for contract performance.

As many as possible but not more than six (6) relevant and verifiable project references must be provided for each of the Offeror and any subcontractor, including the following information:

- Project name,
- Name and address of client (indicate if joint venture),
- Client contact person (name/ position/ current phone and fax numbers),
- Period of Contract,
- Description of services provided,
- Dollar amount of Contract, and
- Status and comments.

Offerors are strongly encouraged to include in their experience summary primarily those projects that are similar to the Technical Assistance as described in this RFP.

## **Section 4: AWARD CRITERIA**

Individual proposals will be initially evaluated by a Procurement Selection Committee of representatives from the Grantee. The Committee will then conduct a final evaluation and completion of ranking of qualified Offerors. The Grantee will notify USTDA of the best qualified Offeror, and upon receipt of USTDA's no-objection letter, the Grantee shall promptly notify all Offerors of the award and negotiate a contract with the best qualified Offeror. If a satisfactory contract cannot be negotiated with the best qualified Offeror, negotiations will be formally terminated. Negotiations may then be undertaken with the second most qualified Offeror and so forth.

The selection of the Contractor will be based on the following criteria:

### **Technical Experience**

#### **(40 points)**

- The Contractor shall have substantial and direct experience in modern communication and video surveillance technologies specifically utilized for the transmission of video images (in "real time") from digital cameras installed in trains to train control centers to include a variety of passenger rail operations (metro, underground facilities, commuter rail, light rail, and monorail systems). The Contractor shall have substantial expertise in the application of wireless technologies and digital surveillance systems as well as Information and Communications Technology (ICT) systems to support passenger rail operations, ICT passenger rail infrastructure, rail operations, passenger rail management systems, security and surveillance programs, rail safety, on-board security systems, and development of surveillance system programs for passenger rail operations. Additionally, the Contractor shall have specific experience in the design, installation, operation, and maintenance of modern communications and video surveillance systems and equipment in a passenger rail environment. It is paramount that the Contractor have full knowledge and complete understanding of all concepts and practices in developing recommendations for the application of communications and video surveillance systems for corridor passenger rail operations and management, including experience in the development of system-wide communications and video surveillance integration, development of surveillance system operational plans, and development of communications and video surveillance equipment and system specifications.
  
- The Contractor shall have substantial and direct experience and actual past involvement in studying, defining, reviewing, and recommending modern communication and video surveillance design plans, technologies, and implementation plans, as well as experience in supervising and guiding the implementation of large communications and video surveillance systems ("real time") for passenger rail operations. The U.S Contractor shall be knowledgeable in the proper use of communications (including wireless) and video surveillance ("real time") systems technical standards, regulations, and specifications, with specific knowledge and practicing experience in the utilization and selection of the most appropriate frequencies for data transmission.

- The Contractor shall have substantial experience in the integration of modern communications and video surveillance systems with other train control and train management systems, as well as overall security systems, including substantial knowledge in system inter-operability issues. The Contractor shall have expertise in the implementation of central security systems and communications infrastructure development for passenger rail applications. The Contractor shall have experience in working with national communications agencies or large (private sector) communications service providers involving the identification and recommendations of the most appropriate frequencies for stream video transmission under passenger rail environments.
- The Contractor shall have experience in the development of technical assistance and feasibility studies for modern communications and video surveillance (“real time”) systems for passenger rail operations capable of improving overall security, operational efficiency, and safety.

**Financial Experience  
(20 points)**

- The Contractor shall have direct experience in conducting economical and financial analysis for the application and implementation of modern communications and video surveillance systems, equipment and related information technologies for passenger rail applications. The Contractor shall have extensive experience in the development of capital investment plans/programs for communications and video surveillance modernization/rehabilitation projects, to include experience in project financing for technology modernization.
- The Contractor shall have experience and prior involvement in identifying eligible financial resources for the acquisition and implementation of communications and video surveillance (“real time”) systems, equipment and related information technologies (with assistance from the private sector and /or multilateral financial institutions), and experience in identifying new strategies and plans for new services.

**Transportation Developmental Impact Experience  
(5 points)**

- The Contractor shall have experience in analyzing and formulating potential developmental impacts as it relates to the application of ITS systems and related information technologies in connection with passenger rail operational efficiency, security, and safety. The Contractor shall have experience in the development and identification of passenger rail related benefits including the areas of infrastructure, market oriented reforms, human capacity building, technology transfer and productivity enhancement, and other developmental benefits.

**International ITS Experience  
(10 points)**

- It is preferred that the Contractor have experience at the international level, preferably with experience in Brazil and/or the Latin America Region.

**Work Plan and Project Methodology  
(25 points)**

Adequacy of the proposed work plan and proposed technical assistance approach in responding to the specified Terms of Reference for all activities identified in the TOR. Soundness and thoroughness of the technical approach and work plan presented in the technical proposal and the overall quality and succinctness of the technical proposal. The technical proposal shall include the identification of all key staff proposed for the conduct of the technical assistance with their respective qualifications, availability for the project, and a staffing schedule for each activity.

Proposals that do not include all requested information may be considered non-responsive.

Price will not be a factor in contractor selection.

## **ANNEX 1**

Roberta Marchesi; Superintendent; Associação Nacional dos Transportadores de Passageiros sobre Trilhos – ANPTrilhos; Setor de Autarquias Sul - Quadra 1 - Bloco J - Ed. CNT, Torre A - 5º andar - Sala 510 - CEP 70.070-010 – Brasília DF, Brazil, Phone: +55 (61) 3322-3158

2015-51022A - BRAZIL PASSENGER RAIL REAL TIME VIDEO MONITORING PROJECT

POC: Jennifer Van Renterghem, USTDA, 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901, Tel: (703) 875-4357, Fax: (703) 875-4009, Email: RFPQuestions@ustda.gov.

**BRAZIL PASSENGER RAIL REAL TIME VIDEO MONITORING PROJECT**

The Grantee invites submission of qualifications and proposal data (collectively referred to as the "Proposal") from interested U.S. firms that are qualified on the basis of experience and capability to provide Technical Assistance for the development of a roadmap and implementation plan for a real time video monitoring project for passenger rail operators in Brazil.

The *Associação Nacional dos Transportadores de Passageiros sobre Trilhos* (“ANPTrilhos”) is a national association representing passenger rail operators and industry leaders in Brazil, with the primary objective of furthering passenger rail transportation development within the country. Since 2013, ANPTrilhos has taken the lead and worked alongside operators, the passenger rail industry, and transportation and communications regulatory agencies to identify solutions and establish standards and protocols, so that video monitoring solutions can be implemented with common communication frequencies and protocols, real time capabilities and in an interoperable and coordinated fashion.

ANPTrilhos now seeks to build on these initiatives and its past successes by identifying cost effective technologies, defining standards and protocols, and developing a roadmap and implementation procedures for the effective deployment of real time video monitoring solutions for passenger rail operators in Brazil. This Technical Assistance will also produce a practical plan for the acquisition and implementation of core and complementary systems to increase security and overall operational efficiency for the control and management of the various passenger rail trains throughout Brazil.

The U.S. firm selected will be paid in U.S. dollars from a \$675,000 grant to the Grantee from the U.S. Trade and Development Agency (USTDA).

A detailed Request for Proposals (RFP), which includes requirements for the Proposal, the Terms of Reference, and portions of a background definitional mission/desk study report are available from USTDA, at 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901. To request the RFP in PDF format, please go to:

<https://www.ustda.gov/businessopps/rfpform.asp>. Requests for a mailed hardcopy version of the RFP may also be faxed to the IRC, USTDA at 703-875-4009. In the fax,

please include your firm's name, contact person, address, and telephone number. Some firms have found that RFP materials sent by U.S. mail do not reach them in time for preparation of an adequate response. Firms that want USTDA to use an overnight delivery service should include the name of the delivery service and your firm's account number in the request for the RFP. Firms that want to send a courier to USTDA to retrieve the RFP should allow one hour after faxing the request to USTDA before scheduling a pick-up. Please note that no telephone requests for the RFP will be honored. Please check your internal fax verification receipt. Because of the large number of RFP requests, USTDA cannot respond to requests for fax verification. Requests for RFPs received before 4:00 PM will be mailed the same day. Requests received after 4:00 PM will be mailed the following day. Please check with your courier and/or mail room before calling USTDA.

Only U.S. firms and individuals may bid on this USTDA financed activity. Interested firms, their subcontractors and employees of all participants must qualify under USTDA's nationality requirements as of the due date for submission of qualifications and proposals and, if selected to carry out the USTDA-financed activity, must continue to meet such requirements throughout the duration of the USTDA-financed activity. All goods and services to be provided by the selected firm shall have their nationality, source and origin in the U.S. or host country. The U.S. firm may use subcontractors from the host country for up to 20 percent of the USTDA grant amount. Details of USTDA's nationality requirements and mandatory contract clauses are also included in the RFP.

Interested U.S. firms should submit their Proposal in English one copy of the Proposal in English and Portuguese, as well as an electronic copy of each proposal on a flash drive, directly to the Grantee by 4:00pm, November 15, 2015 at the above address. Evaluation criteria for the Proposal are included in the RFP. Price will not be a factor in contractor selection, and therefore, cost proposals should NOT be submitted. The Grantee reserves the right to reject any and/or all Proposals. The Grantee also reserves the right to contract with the selected firm for subsequent work related to the project. The Grantee is not bound to pay for any costs associated with the preparation and submission of Proposals.

## ANNEX 2

## TABLE OF CONTENTS

A.	EXECUTIVE SUMMARY .....	1
B.	PROJECT DESCRIPTION.....	3
1.0	Surface Transportation Overview – Brazil .....	3
2.0	Assessment of Intelligent Transportation Systems Projects in Brazil .....	4
6.0	The National Association of Passenger Rail (ANPTrilhos) .....	5
7.0	Passenger Rail Operators in Brazil .....	6
7.1	Metro Sao Paulo.....	6
7.2	Metro Line 4.....	6
7.3	Companhia Paulista de Trens Metropolitanos – CPTM .....	6
7.4	Summary of Project Evaluation.....	6
8.0	Brazil Integrated Communications and Video Surveillance Systems Technical Assistance.....	6
C.	PROJECT SPONSOR’S CAPABILITY AND COMMITMENT .....	8
1.0	ANPTrilhos.....	8
D.	IMPLEMENTATION FINANCING.....	9
1.0	Financial Review.....	9
2.0	Financial Assessment for ANPTrilhos' Operating Members .....	10
3.0	Financial Institutions.....	11
3.1	BNDES.....	11
3.2	World Bank.....	11
3.3	The Inter-American Development Bank – IDB .....	12
3.4	International Finance Corporation - (IFC) .....	13
3.5	Overseas Private Investment Corporation - (OPIC) .....	13
3.6	The Export- Import Bank (Ex-Im Bank).....	13
4.0	Estimated Capital Cost for Project Implementation .....	13
E.	U.S. EXPORT POTENTIAL .....	14
1.0	U.S. Export Potential Assessment .....	14
2.0	U.S. Export Potential .....	14
2.1	U.S. Companies - Interest and Capabilities .....	18

3.0	Summary of U.S. Export Potential Assessment .....	22
F.	FOREIGN COMPETITION.....	23
1.0	Foreign Competition Key Elements.....	23
2.0	Market Entry Issues.....	25
G.	EVALUATION STRATEGY.....	26
H.	DEVELOPMENTAL IMPACT .....	27
1.0	Primary Development Impact.....	27
1.1	Infrastructure .....	27
1.2	Technology Transfer and Productivity Enhancement.....	28
1.3	Human Capacity Building .....	28
1.4	Other Benefits.....	28
1.5	Alternatives .....	29
I.	IMPACT ON THE ENVIRONMENT .....	29
J.	IMPACT ON U.S. LABOR .....	29
K.	QUALIFICATIONS.....	29
1.0	Brazil Integrated Communications and Video Surveillance Systems Project .....	29
L.	JUSTIFICATION .....	32
1.0	Personnel Requirements.....	34
2.0	Other Direct Costs.....	37
2.1	Travel.....	<b>Error! Bookmark not defined.</b>
3.0	Technical Assistance Schedule .....	37
O.	RECOMMENDATIONS.....	38
P.	CONTACTS.....	38

## **A. EXECUTIVE SUMMARY**

In April 2014, The U.S. Trade and Development Agency (USTDA) funded a Definitional Mission (DM) with the purpose to support and improve its decision-making process relative to the funding of technical assistance in the area of Intelligent Transportation Systems (ITS) in Brazil. USTDA received a proposal from the Brazilian National Association of Passenger Rail (ANPTrilhos) for the conduct of technical assistance.

ANPTrilhos is the national association representing passenger rail operators and industry leaders in Brazil and its objective is to promote the development of rail transportation for passengers in the country. The primary members of ANPTrilhos include Metro Bahia, Metro Rio, SuperVia, Metro Sao Paulo, CPTM, Metro DF, CBTU, Trensurb, and ViaQuatro. In 2013, Brazil recorded 2.9 billion passengers transported by rail transportation. This high level of passengers utilizing rail transportation in Brazil demands that security be at its highest level requiring the most advanced technologies for the surveillance of trains, stations, and other rail facilities.

ANPTrilhos reports that the passenger rail operators in Brazil have been searching for new solutions to transition from the conventional video surveillance systems to a more advanced technology that provides “real time” stream video capabilities for the operators. Brazilian passenger rail operators have enlisted large human and technical resources in order to secure its customers and its employees, to dissuade people from committing criminal acts, to secure rail lines, stations, trains, platforms, other premises, and to protect their property. Video surveillance systems are one of these technical resources that have been used by operators. However, if video surveillance systems have been largely deployed in stations, platforms, and other rail facilities over the years, their deployment on board the trains have started in the past ten years when the technologies for “real time” video transmission was not fully developed.

Today, on-board video surveillance systems are recording-based systems. Images are recorded on high-capacity hard-disks. These systems allow just a post-analysis of the video-flows coming from the video-cameras installed in the trains. When a security event occurs, an operator has to identify the train, locate it and to go where the train is in order to manually extract the related recordings. With the generalization of on-board video surveillance systems, the number of alarms has increased and this procedure is becoming more and more complicated and expensive. Even if these systems have a dissuasive impact and certainly have reduced the number of thefts and aggressions, from a security and from an operational standpoint, they are quite inefficient and costly. The post treatment of the event does not allow for prevention, neither to reduce its impact on the operation of trains.

ANPTrilhos wishes to conduct a technical study (under a technical assistance titled - Brazil Integrated Communications and Video Surveillance Systems Project) of the current video surveillance situation in Brazil with the purpose to evaluate various alternatives for operational concepts, develop and validate a more intelligent on-board video surveillance system for allowing the “real-time” transmission of the video flows coming from on-board cameras towards the control centers. The technical assistance will concentrate mainly on the need for efficient and modern communication systems between on-board (train) and wayside (track) with a reliable level of service (high quality

transmissions) which will be required to transmit “real-time” video images delivered by the on-board cameras. Additionally, the technical assistance will review the frequencies at which the transmission of “real time” video could be provided, as well as the identification of intelligent, robust, and efficient video techniques and technologies, respecting the operational requirements and constraints that other systems may present (train control system).

The ANPTrilhos technical assistance is expected to develop the functional design and operational concepts for the on-board technologies and the communications systems needed to deliver an advanced “real time” video surveillance system for passenger rail systems in Brazil. The new technologies and its implementations are expected to provide social benefits to Brazilian end-users, both for passenger's confidence (in terms of security of the transportation system and comfort) and for transportation efficiency. Additional benefits expected from “real time” video surveillance systems include safer train operations, identification/verification of fire/smoke incidents inside the train, “real time” monitoring of passengers in the cabin, ensuring the safety and security of passengers and preventing accidents and crime, as well as supporting the establishment of an integrated wireless network for train operations.

The technical assistance would consider the various communication systems for “real time” video surveillance to include satellite, cellular 3G and 4G, Standard Wi-Fi, standard mobile Wi-Max, and others available in the market at the time of the conduct of the technical assistance. Additionally, other aspects of the communications system review will involve trackside communications, interconnectivity between internal wired, internal wireless, and external wireless systems, internet protocol gateways, horizontal and vertical seamless handover functions on external wireless links, coverage and multiple access communications in order to guarantee “end-to-end” delivery of “real time” images to the control centers.

The technical assistance will result in the development of a practical plan and will identify short and medium-term milestones for the acquisition and implementation of various communication and “real time” video surveillance systems that in turn are expected to increase security and operational efficiency for the control and management of the various passenger rail systems in Brazil. As a result of the technical assistance, ANPTrilhos and its operating members are expected to utilize the recommendations from the final report for their decision-making process in the acquisition and deployment of the required communication and “real time” video surveillance technologies for passenger rail systems Brazil.

Subsequent to the completion of the technical assistance, it is expected that individual operators will seek to develop specific design plans for the deployment of the recommended technologies as specific projects with different applications will be recommended.

It is clear that the technical expertise needed to evaluate the potential deployment of modern communications and “real time” video surveillance technologies will have to come from foreign firms. Already European firms have seen an opportunity of the large market for “real time” video surveillance systems in Brazil and these companies have started to offer solutions to the operators in that country. USTDA is in an excellent position to offer assistance to the Brazilian passenger rail operators for the development of several projects that carry a high priority for ANPTrilhos and the operators in Brazil.

A review of the Brazil Integrated Communications and Video Surveillance Systems Project indicates that this activity is economically, financially, and technically feasible and that the proposed project could represent excellent opportunities for U.S. exports. Passenger rail development projects are expected to surge in the next few years in Brazil, as current passenger rail systems are expanded for larger coverage areas, as well as the introduction of new rail systems to cope with the ever increasing populations and transportation needs throughout the country.

The initial U.S. export potential associated with the Brazil Integrated Communications and Video Surveillance Systems Project has been estimated to be approximately U.S. \$ 50 million and the technologies and technical services most likely to be required for the proposed project are available and ready for exports from U.S. companies to Brazil.

The DM results indicate that U.S. companies have the expertise required to provide the services and technologies likely to be required by all the passenger rail operators in Brazil. A number of U.S. firms contacted demonstrated great interest in the potential to export their communication and “real time” stream video surveillance services and technologies to Brazil.

Passenger rail operators in Brazil have demonstrated their commitment to invest in the modernization of their communication and security systems in order to provide its customers the highest level of security and comfort by deploying “real time” stream video capabilities and the operators have expressed interest in evaluating and considering U.S. technologies for possible applications in Brazil.

The DM findings indicate that the Brazilian passenger rail operators have the governmental and/or corporate structure and staffing to support the transition from conventional video surveillance systems to the more modern “real time” stream video technology. There is adequate supporting infrastructure to allow for the deployment of “real time” stream video systems in Brazil and the operators have sound financial standings and are able to finance the deployment of “real time” video surveillance systems.

## **B. PROJECT DESCRIPTION**

### **1.0 Surface Transportation Overview – Brazil**

Vehicular traffic has continued to increase in many of Brazil’s largest metropolitan areas over the last fifteen years and the trend is expected to continue with additional demand for surface transportation infrastructure in the country. The impact of surface transportation in Brazil’s state and municipal economies has grown substantially and has continued to spur demand for additional transportation services in mass transit including bus and rail transportation systems, as well as highway infrastructure. However, building roadway and highway infrastructure is very costly and due to the recent economic downturn, local governments have not been able to keep pace with the need to construct additional capacity by building a significant amount infrastructure.

Instead, some municipal governments in Brazil are seeking the implementation of Intelligent Transportation Systems (ITS) to improve the efficiency of existing roads, highways, and public transportation services such as bus and rail passenger systems. Cities like Sao Paulo, Rio de Janeiro, Belo Horizonte, and Curitiba have been implementing ITS systems with the purpose to improve traffic conditions in city streets as well as increase in traffic safety.

On the other hand, some Brazilian states have resorted to the use of Public-Private-Partnerships (PPP) for the construction and management of state highways under private concessions that allow the private sector to invest in the construction of highways under the Build-Operate-Transfer (BOT) concept where the return on the initial private investment is recovered based on toll collection and other highway services. The Ecorodovias Group, Grupo CCR, Arteris, and Invepar are examples of large highway concessionaries in Brazil that combined have invested billions of dollars in highway infrastructure and currently manage the operation of several Brazilian highways with the utilization of ITS systems.

Some cities and states in Brazil have taken important steps to improve surface transportation in their respective geographical areas while trying to address the increased demand for transportation operations and services. Some municipal and state agencies such as Sao Paulo, Rio de Janeiro, Curitiba, and Belo Horizonte have resorted to the use of ITS systems to improve the bus and passenger rail (metro, commuter rail, light rail, etc) transportation systems and some highway concessionaries have invested significantly in the development of ITS infrastructure and advanced technologies for the management of surface transportation facilities. Other cities in Brazil are starting to experience increased traffic congestion, but some cities lack the proper infrastructure to introduce ITS technologies at this time. As time progresses, smaller cities in Brazil will eventually experience significant traffic congestion that will require some form of ITS implementation.

Key players in supporting bus and passenger rail transportation systems in Brazil are the Inter-American Development Bank (IDB), the World Bank, and Brazil's National Development Bank (BNDES). These financial institutions have provided financial support to Metro Sao Paulo, SPTrans, Metro Rio, Linea Quatro, Metro DF, CPTM, CET-SP, CET-Rio and other traffic management and mass transit organizations in the country.

SPTrans for example is planning the implementation of ITS technologies in its 15,000 bus fleet in Sao Paulo aimed at continuing to modernize the city's ITS infrastructure and to provide the required technologies for increased public transportation service, capacity, safety, and efficiency. Accordingly, these types of technology applications represent good opportunities for U.S. exporters of ITS systems and equipment. As population and commercial growth continues in Brazil, the ITS market in that country is expected to increase substantially.

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**6.0 The National Association of Passenger Rail (ANPTrilhos)**

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

In 2013, Brazil recorded 2.9 billion passengers transported by rail transportation. This high level of passengers utilizing rail transportation in Brazil require that security in the passenger trains be at its highest level requiring the most advanced technologies for security and monitoring of trains, stations, and other rail facilities.

ANPTrilhos reports that the passenger rail operators in Brazil have been searching for new solutions to transition from the conventional video surveillance systems to a more advanced technology that provides “real time” stream video capabilities for the operators. Currently, the technologies being utilized in Brazil do not have the capability to transmit video images in “real time” from the train (metro, light rail, commuter rail) to control centers, but rather consist of video cameras that record the activities in the train cabin and the data is then downloaded to servers at the rail yard at the end of each day. The Brazilian operators, as well as the industry in Brazil are said to be working on finding a solution that is most appropriate to provide operators with “real time” stream video capabilities.

According to ANPTrilhos, the “real time” stream video surveillance systems tested so far have not produced the level of accuracy and reliability that is required to provide the optimum security for passenger rail operations, as the systems have often presented failures, handover problems, only presenting partial information, and other fundamental deficiencies that has created concerns for the operators. At this time, it is unknown if these deficiencies are related to the actual technologies being used in the trains or if

these can be attributed to the communications architecture offered by the Brazilian communications market.

The current system of recording activities inside the train throughout the day and then waiting for the download of the data at the end of the day falls short of the expectation of the operators and does not provide the optimum level of security that is required by the Brazilian operators. Since 2013, ANPTrilhos has been working alongside the operators, the passenger rail industry, and the transportation and communications regulatory agencies, attempting to find a solution and technologies, including the appropriate frequencies for “real time” video data transfer, but additional technical expertise is now required in order to assess the problem and identify the solutions.

ANPTrilhos, as a representative of the passenger rail operators in Brazil, intends to conduct a technical assistance that would evaluate the various technologies and alternative operational concepts available in the international market in an attempt to define the best technologies and applications for “real time” stream video surveillance in Brazil. The objective would be for ANPTrilhos to define the characteristics and standards of those technologies that could represent a solution for the Brazilian operators. The technical assistance findings are expected to contribute to defining the technologies recommended for the accurate and reliable transmission of video monitoring data in “real time” in order to improve the quality of service provided by the passenger rail operators in Brazil.

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## **8.0 Brazil Integrated Communications and Video Surveillance Systems Technical Assistance**

Based on the DM evaluations, HEP developed the concept for Brazil’s Integrated Communications and Video Surveillance Systems Project for which a technical assistance should be considered. The technical assistance assessments will result in the development of a practical plan for the acquisition and implementation of various communication and stream video systems that in turn are expected to increase security and operational efficiency for the control and management of the various passenger rail systems in Brazil. The technical assistance will identify short and medium-term

milestones for the acquisition and deployment of the various communication and video surveillance systems that are required by the rail operators in Brazil.

As a result of the technical assistance, ANPTrihos and its operating members are expected to utilize the recommendations from the final report for their decision-making process in the acquisition and deployment of the required technologies for passenger rail systems Brazil. It is expected that the technical assistance will be conducted over a period of seven months and the implementation plan would recommend the various technologies, including the necessary systems, equipment, certifications, implementation procedures, operating frequencies and required personnel and training. The



technical assistance will evaluate the current infrastructure and technical aspects of the communication and video surveillance for the various passenger rail operators in Brazil and determine how the existing systems should be upgraded, enhanced, and/or replaced with modern technologies, as well as the identification of new technologies that are likely to improve passenger rail security, safety, and operational efficiencies.

There continues to be new developments in communications and video surveillance technology that lead to enhancements in security, operation, train management and safety. At the same time, there are a number of applications and software programs that address and support “real time” video operations in maintaining an efficient and systematic flow of train along the track. The technical assistance will consider the technologies and applications that may be relevant to improving the management and operation of security measures for passenger rail operations in Brazil.

The final product of the technical assistance will be the development of a practical implementation plan for the acquisition and deployment of communication and video surveillance systems for various operators in Brazil. Subsequent to the completion of the technical assistance, it is expected that individual operators will seek to develop their specific design plans for the deployment of the recommended technologies as specific projects with different applications will be required. This is expected to create the need for additional consulting services as each operator requires design, installation, supervision, and training services that could possibly come from the U.S. Contractor that performs the original technical assistance and/or other U.S. companies.

The technical assistance will develop a strategic communications and “real time” video surveillance implementation plan that will: (a) provide an objective assessment of the Grantee’s technical environment in terms of staff, equipment, infrastructure, architecture, and services; (b) define communications and video surveillance technology vision for the project; (c) recommend communications architecture and design guidelines (to address video applications, data, technology, networks, integration, and transmission requirements, etc.); (d) recommend policies, standards and procedures for communications and video surveillance decision making; (e) recommended organizational structure for supporting the new communications and video surveillance

program and; (f) develop a comprehensive implementation plan that recommends solutions and technology acquisitions and includes a schedule and budget. The Contractor will evaluate the Grantee's communications and video surveillance infrastructure needs by assessing and analyzing proven, available technologies and applications, and through benchmarking of relevant technologies.

## **C. PROJECT SPONSOR'S CAPABILITY AND COMMITMENT**

This section of the report describes the project sponsor capability and commitment as it relates to finding solutions and technologies to achieve "real time" video surveillance operations.

### **1.0 ANPTrilhos**

ANPTrilhos has taken a lead role in working with all the passenger rail operators, the national rail industry, and the transportation and communications regulatory entities, to tackle one of the predominant technology shortcomings that operators face in Brazil. The leadership of ANPTrilhos is comprised of representatives from all the operating companies (public and private) in Brazil and as such the organization works on common goals to support the local industry. HEP met with Roberta Marchesi, Superintendent of ANPTrilhos who confirmed her and the organization's commitment to find solutions that will allow the deployment of "real time" stream video for passenger rail operations in Brazil.

Additionally, HEP met with Mr. Conrado Grava de Souza, Technical Manager for Metro Sao Paulo and Mr. Laurindo Junqueira, from Metro Sao Paulo's Technical Cooperation Division, as well as Mr. Neemias Santos, CPTM's Train Control Systems Coordinator who demonstrated their full support to developing a strategy for the deployment of "real time" stream video that would benefit all passenger rail operators in Brazil and indicated that financing their respective implementation projects would not be an issue for their organizations. Additionally, other members of ANPTrilhos also support the conduct of a technical assistance in the area of communications and video surveillance technologies for passenger rail.

All of the passenger rail operators in Brazil have implemented train control centers and many have instituted CCTV systems that have provided good results as far as monitoring activities at train stations, platforms, track and other facilities, but operators have not implemented efficient and reliable systems for monitoring real time activities inside the trains.

One of ANPTrilhos' organizational objectives is to improve the safe and efficient movement of people through rail by supporting the utilization of modern technologies, to develop and sustain security and safety programs, to work and advise the passenger rail industry on technical issues affecting rail transportation issues, and to assist with the development government policies that support passenger rail transportation in Brazil.

Furthermore the transition of conventional video monitoring/recording method to an integrated “real time” stream video application is not a matter of whether the operators will contemplate deploying it, but rather a necessity that each operator views as a critical advancement for their respective operations. Throughout the DM investigation process, there was clear evidence of commitment for a communications and video surveillance technical assistance from ANPTrilhos, Metro Sao Paulo, ViaQuatro, CPTM, and others.

The Brazilian passenger rail operators recognize that they have made significant investments in the development of infrastructure, rolling stock, and train related technologies and as such, it is imperative to establish a new technology platform for enhanced train security with the purpose to continue to provide the citizens of Brazil with the best transportation service possible.

The DM findings indicate that Metro Rio, SuperVia, Metro Sao Paulo, CPTM, Metro DF, CBTU, Trensurb, and ViaQuatro all have the capability to undertake the development of a new technology platform in their respective systems that would include the deployment of “real time” stream video. Additionally, these agencies have demonstrated the commitment to support and strengthen the passenger rail transportation sub-sector in Brazil as evidenced by their investments and development of metro and commuter rail projects throughout the country.

## **D. IMPLEMENTATION FINANCING**

### **1.0 Financial Review**

This section of the report describes the process that was followed during the financial evaluation of potential ITS projects in Brazil, the financing methods expected to be utilized for the implementation of ITS related projects, a summary of the discussions held with those financial institutions that were contacted during the DM assessment process, and an estimate for the capital cost of the Brazil Integrated Communications and Video Surveillance Systems Project.

The financial review as part of the DM consisted of the following steps:

- Identification of ITS technology modernization projects and objectives;
- Evaluation of assumptions for future passenger forecast;
- Identification and screening of reasonable ITS projects and alternatives;
- Review of potential implementation periods;
- Identification of potential projects in the passenger rail area in Brazil;
- Measurement of impact of modern technologies on passenger rail systems;
- Evaluation of cost estimates for project implementation;
- Evaluation of financial resources likely to be utilized for funding proposed projects;

The project proposed by ANPTrilhos was evaluated on the basis of the objectives that each project sponsor is attempting to meet, in addition to evaluating other critical factors that included the following:

- Improve security, efficiency, surveillance, and safety for passenger rail transportation operations;
- Supplement current train control systems and surveillance systems;
- Support the passenger rail transportation infrastructure with modern technologies;
- Improvement of rail user comfort and convenience;
- Potential for lower user operating costs and labor in downloads of video data from trains;
- Potential increase of revenue collections as passengers feel safer in the train environment.

## **2.0 Financial Assessment for ANPTrilhos' Operating Members**

As part of the DM assessment, the financial standings for those passenger rail companies in Brazil were discussed with the Superintendent of ANPTrilhos, Ms. Roberta Marchesi. Ms. Marchesi reported that all the operators (Metro Rio, SuperVia, Metro Sao Paulo, CPTM, Metro DF, CBTU, Trensurb, and ViaQuatro) are funded either through public sources such as in the case of Metro (Sao Paulo) and CPTM and others by private concessions and the reports indicate that their financial standings are sound. Furthermore, ANPTrilhos reports that the operators are willing and able to fund the deployment of modern communications and video surveillance systems given the fact that these technologies have a direct impact on their revenue stream. This is predicated on the fact that the higher the security levels at the trains, the higher the ridership could be as well as the quality of service.

While some passenger rail operators around the world have experienced a decrease in revenues collected due primarily to the global economic downturn, operators in Brazil have maintained or increase their ridership levels which has translated into higher revenues. With the significant population growth that Brazil continues to experience, rail passenger ridership has seen an increase over the last five years. Additionally, the introduction of new metro and commuter lines, as well as the integration of public transportation bus lines with passenger rail, has allowed for increased interconnections across modes as well as increase ridership in passenger rail service.

Representatives from the various passenger rail operators indicated that the likely sources of financing the acquisition and deployment of modern technologies would come from the companies' operating and annual capital budgets. Since the utilization of communication and video surveillance technologies are an integral part of the overall operation, passenger rail company representatives understand the importance of investing in the acquisition and implementation of state-of-the-art ITS systems.

Several representatives from passenger rail companies confirmed that funding would be available for the acquisition and implementation of modern ITS systems, but the operators need to understand the level of funding required, the most suitable and effective ITS technologies available, and ultimately a plan that paves the way for the effective and efficient deployment of ITS technologies to maintain and/or increase operational efficiencies, security, and safety for the various passenger rail operator in Brazil.

Operators in Brazil utilize several procurement methods depending on the type of agency. State owned operators such as Metro Sao Paulo, CPTM, and other public organizations follow the Brazilian state procurement guidelines, while private sector operators are free to select the technologies of their choice. However, both public and private operators are very careful in their reviews for the acquisition of systems and are constantly seeking the highest quality that provide substantial level of accuracy and reliability with cost usually being a secondary factor in the decision making process for rail equipment acquisition. Even with public operators, these often develop specifications geared towards specific technologies due to quality, reliability, and life-cycle costs. The fact that the Brazilian operators are seeking the best technologies possible to find solutions to the video surveillance problem is important to USTDA because it could promote U.S. companies' competitiveness as opposed to other procurement environments where low bids are the standard for product selection.

Furthermore, the IDB, World Bank, and the Japanese Development Agency are just a few of the international financing agencies that have supported the various passenger rail companies in Brazil through financial loans and support programs with the purpose to strengthen the public transportation sector in the different cities. These financial institutions have recognized the operators' commitment to project execution and financial capabilities over the years.

### **3.0 Financial Institutions**

HEP met and communicated with several financial institutions in the United States and in Brazil with the purpose to determine if the Brazil Integrated Communications and Video Surveillance Systems Project would meet the requirements for financial participation from the institutions identified, as well as to determine if these institutions had any on-going financing activities in the passenger rail sub-sector in Brazil.

#### **3.1 BNDES**

The Brazilian National Development Bank (BNDES) is a federal public company that is associated to the Brazilian Ministry of Development, Industry, and Foreign Trade, which has an objective for long term financing of endeavors that contribute towards the development of the country. Representatives from ANPTrihos, Metro Sao Paulo, and CPTM indicated that BNDES has been a strong supporter in the development of passenger rail infrastructure in the country, having contributed significantly to the financing of many metro and commuter rail projects in Brazil. While BNDES presents an alternative to financing additional passenger rail systems, the implementation of stream video and communications technologies is expected to be financed by operating and capital budgets from the various project sponsors (ANPTrihos' operating members).

#### **3.2 World Bank**

The bank is heavily involved in Brazil and has been a major supporter of transportation infrastructure activities in that country, including various metro projects and public transportation programs. HEP had communications with Ms. Deborah Wetzel, Country Director for Brazil, Latin American and The Caribbean concerning the various ITS

projects considered by USTDA and she indicated to be interested in learning the specifics of the projects to determine if there were any opportunities to partner with USTDA.

HEP met with Mr. Paul Kriss, Sector Operations Coordinator for the World Bank's office in Brasilia and by conference call with Mr. Aurelio Mendez, World Bank Transport Specialist for Latin America to inquire about the bank's support for mass transit projects (bus, metro, rail, other) in Brazil. Mr. Kriss and Mr. Mendez indicated that the bank is supporting various public transport projects in Brazil including a planning effort for SPTrans for the reorganization of the public transportation system in Sao Paulo. In addition, the bank has supported Metro Sao Paulo in various occasions, but more recently with the completion of Line 4. Metro Sao Paulo is also communicating with the bank for future metro expansion projects. Mr. Mendez indicated that ITS projects that further support the development of public transportation such as metro and bus lines represent good opportunities for the bank to finance as part of larger transportation projects that the bank may finance for municipal or state entities. Mr. Mendez indicated that he would be interested in learning more about specific projects that USTDA decides to support to determine if there are mutual opportunities for the agencies to work together.

### **3.3 The Inter-American Development Bank – IDB**

The Inter-American Development Bank has been active in Brazil for many years assisting the Brazilian governments of all levels in the development of social, environmental, technological and infrastructure sectors. The bank has provided financial assistance to the Municipality of Sao Paulo in many areas of public transportation including financing metro system infrastructure and bus transportation systems for SPTrans, CET-SP, and others. The IDB (through the Procentro Program) has provided financing for the implementation of ITS systems including the areas of traffic signal systems for approximately 185 intersections in downtown Sao Paulo, CCTV systems for corridors in Rio de Janeiro, and other activities involving surface transportation.

HEP communicated with Mr. Paulo Carvalho from the IDB's Brasilia's office to discuss the proposed ITS projects in Brazil. The IDB is currently supporting one of the Greater ABC Inter-municipal Consortium members with the Sao Bernardo do Campo Urban Transportation Program. Additionally, the IDB is also providing support to the City of Curitiba to improve city logistics performance in that city. In terms of supporting SEIL's RECEI project, Mr. Carvalho reported that at this time there is no evidence to indicate that the IDB is considering the RECEI project as part of the potential IDB loan for the Curitiba Metro.

On other areas, the IDB has provided substantial financial assistance to the Municipality of Sao Paulo and the State of Sao Paulo for major transportation projects. In 2008 the IDB issued a loan to the State of Sao Paulo in the amount of U.S. \$168 million for the purchase of new trains and systems as well as financing for technical studies to expand the metro system in the southern part of the City of Sao Paulo. Other loans from the IDB to State and Municipality of Sao Paulo include a U.S. \$362 million financing for Sao Paulo's metro expansion, public transportation system (SPTrans), and reconstruction of state rural roads.

### **3.4 International Finance Corporation - (IFC)**

HEP contacted Mr. Ravi Bugga and Mr. Andrew Dervishi, from the IFC’s Transport Sector Team to learn about opportunities to support the private sector in the development and deployment of ITS systems in Brazil. Mr. Dervishi is the IFC expert in ICT system projects and reported that security management, fleet management, fare management and structured financing related to these activities are some aspects of innovations that the IFC sees as future potential opportunities and that there is more to come in the future. Mr. Dervishi demonstrated interest in learning more about the ITS projects for mass transit in Brazil and would be willing to discuss any opportunities for the IFC to possibly engage in future support of ITS deployment by the private sector.

### **3.5 Overseas Private Investment Corporation - (OPIC)**

HEP contacted Nancy Rivera from OPIC’s Structured Financing section to inquire about the proposed ITS projects in Brazil and the possibility that OPIC may be interested in supporting the private sector in participating in any of the prospective ITS projects in that country. Ms. Rivera indicated that unfortunately, OPIC has not been active in the transport sector in Brazil as public/private entities normally resort to BNDES or local private banks for financing of transport projects.

### **3.6 The Export- Import Bank (Ex-Im Bank)**

HEP contacted Ms. Kate Bishop, Business Development Officers for Ex-Im Bank to inquire about the bank’s participation in the transport sector in Brazil, as well as to determine if any of the proposed ITS projects in Brazil could present opportunities for Ex-Im Bank support. Ms. Bishop indicated that the ITS sub-sector of transportation does not lend itself to Ex-Im bank participation, therefore it is unlikely that Ex-Im Bank would be a player in the ITS projects in Brazil.

## **4.0 Estimated Capital Cost for Project Implementation**

The Brazil Integrated Communications and Video Surveillance Systems Project contemplates the deployment of “real time” stream video for all the Brazilian operators. Given the fact that each individual passenger rail system in Brazil has its own characteristics, it is difficult to estimate the capital costs for each video surveillance system project. As such, HEP has selected Metro Sao Paulo as the model in order to demonstrate the types of technologies that are expected to be required and its associated costs for implementation. The table below represents the capital cost estimates for the deployment of an integrated communications and “real time” video system for Metro in Sao Paulo.

**Table 4**  
**Integrated Communications and Video Surveillance System Project –**  
**Metro Sao Paulo**  
**Capital Cost Estimates**

<b>No.</b>	<b>Project Categories</b>	
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<b>1.0</b>	Central Control and Operation Center Systems	13,500,000
<b>2.0</b>	Central Control and Operations Center Installations/Construction	3,500,000
<b>3.0</b>	Communications Systems	21,000,000
<b>4.0</b>	Communication Infrastructure Installation and Construction	6,500,000
<b>5.0</b>	On-Board Systems	10,000,000
<b>6.0</b>	On- Board System Installations	3,000,000
<b>7.0</b>	Contractor’s Project Commissioning	500,000
<b>8.0</b>	Communications Licenses, fees, permits, insurance	1,500,000
<b>9.0</b>	Planning and Development Services	1,000,000
<b>10.0</b>	Engineering – Communications Services	1,500,000
<b>11.0</b>	Wireless Communications Design Services	1,000,000
<b>12.0</b>	Video Surveillance Network Design Services	1,000,000
<b>13.0</b>	Project Management Services	1,000,000
	<b>Grand Total</b>	<b>\$65,000,000.00</b>

\* The investment amounts cited in this report are estimates and do not reflect the exact items/amounts of what the Passenger Rail Operators in Brazil may ultimately procure.

It is estimated that if Metro Sao Paulo was to engage in the deployment of “real time” video surveillance systems, the capital cost estimates could be approximately U.S.\$ 65 million. Other deployments throughout Brazil could represent lower or higher costs than the estimated costs for Metro Sao Paulo and that will be determined during the conduct of the technical assistance.

## **E. U.S. EXPORT POTENTIAL**

### **1.0 U.S. Export Potential Assessment**

This section of the report summarizes the findings that resulted from the U.S. export potential assessment conducted as part of the DM. The U.S. export potential was developed from discussions held with the various Brazilian transportation officials, from site inspections conducted at transportation facilities in Brazil, and from the review of documentation as part of the DM research. The U.S. export potential assessment was conducted based on the potential acquisition and implementation of a wide range of technologies for in the area of communications and video surveillance, more specifically dedicated to passenger rail transportation.

### **2.0 U.S. Export Potential**

The technologies that could represent U.S. exports associated with the Brazil Integrated Communications and Video Surveillance Systems Project will mainly be found in the area of train wireless data transmission technologies that utilized a dedicated frequency to provide seamless wireless data transfer inside the trains and throughout all segments of track, including tunnel environments. The implementation of “real time” wireless video systems requires interactive communications technology in order to transmit information from the train to control centers. Additionally, by utilizing cameras inside the train, space availability can be evaluated at the cab and control center levels, therefore strengthening passenger safety against various elements and potential accidents within the cabin.

An estimate of potential procurements of U.S. goods and services has been developed using Metro Sao Paulo as the model to estimate U.S. export potential. The table below specifically identifies the systems and equipment that are likely to be required for the implementation of the integrated communications and “real time” video surveillance system project.

<b>Table 5</b> <b>Integrated Communications and Video Surveillance Systems Project – Metro Sao Paulo</b> <b>U.S. Export Potential</b>				
<b>Metro Operational Areas</b>	<b>Equipment</b>	<b>Quantity</b>	<b>Unit Price U.S.\$</b>	<b>Total Price U.S. \$</b>
<b>I. Primary Central Control Center</b>				
	Primary Data Center	1	\$2,000,000.00	\$2,000,000.00
	Software and Operating Licenses	1	\$1,000,000.00	\$1,000,000.00
	Core Switches	2	\$320,000.00	\$640,000.00
	Server Switches	4	\$45,000.00	\$180,000.00
	Application Switches	2	\$313,000.00	\$626,000.00
	Servers	10	\$15,000.00	\$150,000.00
	Workstations	5	\$2,000.00	\$10,000.00
	Central Network Real Time Video Management System	1	\$1,500,000.00	\$1,500,000.00
	Reporting and Analytics	1	\$300,000.00	\$300,000.00
	Video Wall and Monitors	1	\$1,000,000.00	\$1,000,000.00
	Back-up power units	10	\$10,000.00	\$100,000.00
	Fiber Optic Transmitter/Receivers units	600	\$600.00	\$360,000.00
	Internet Router	2	\$80,000.00	\$160,000.00
	Communications System Racks/Interface	20	\$10,000.00	\$200,000.00
	VPN Gateway	2	\$40,000.00	\$80,000.00
	Web Security	2	\$80,000.00	\$160,000.00
	Wireless network	1	\$250,000.00	\$250,000.00
	Network & Security Management System	1	\$180,000.00	\$180,000.00
	Prime Security for other devices	1	\$50,000.00	\$50,000.00
	Radius Server	1	\$15,000.00	\$15,000.00
	Campus Local Area Network (LAN)	1	\$5,800.00	\$5,800.00
	Video Distribution Systems	20	\$16,000.00	\$320,000.00
<b>Subtotal</b>				<b>\$9,286,800.00</b>
<b>II. Backup Central Operation Control Center</b>				
	Backup Data Center	1	\$2,000,000.00	\$2,000,000.00

	Core Switch	2	\$280,000.00	\$560,000.00
	Server Switch	2	\$45,000.00	\$90,000.00
	DC Firewall	2	\$97,000.00	\$194,000.00
	Computing Equipment	2	\$635,000.00	\$1,270,000.00
	Data Storage	2	\$100,000.00	\$200,000.00
	<b>Subtotal</b>			<b>\$4,314,000.00</b>
	<b>III. Communications Infrastructure</b>			
	Wireless Communications - Mesh Networks	1	\$10,000,000.00	\$10,000,000.00
	Ethernet Networking/Synchronization	150	\$2,000.00	\$300,000.00
	Ethernet Switches	2,000	\$700.00	\$1,400,000.00
	Routers	1,000	\$2,000.00	\$2,000,000.00
	Video distributed system	500	\$1,200.00	\$600,000.00
	Optical Switching for network	400	\$300.00	\$120,000.00
	Wireless Transmitter/Receivers Trackside/Antennas	400	\$14,000.00	\$5,600,000.00
	Trackside base station electronic & Power	400	\$1,250.00	\$500,000.00
	Trackside electronics and power source cabinet	400	\$1,200.00	\$480,000.00
	<b>Sub-total</b>			<b>\$21,000,000.00</b>
	<b>IV. On-Board Equipment (Train)</b>			
	Cameras and housings	1,800	\$650.00	\$1,170,000.00
	Video Compressor units and video distribution	450	\$1,300.00	\$585,000.00
	Wireless Transmitter/Receiver Units	450	\$2,000.00	\$900,000.00
	Antennas	400	\$1,350.00	\$540,000.00
	Wireless Access/network routing	450	\$1,500.00	\$675,000.00
	Microprocessor unit	450	\$2,400.00	\$1,080,000.00
	Network video recorders	450	\$1,500.00	\$675,000.00
	Power converters	1800	\$600.00	\$1,080,000.00
	Router	450	\$3,000.00	\$1,350,000.00
	LCD monitors	150	\$200.00	\$30,000.00
	Ethernet switches	450	\$700.00	\$315,000.00
	On-Board Wi-Fi	450	\$1,600.00	\$720,000.00
	Electronic wiring harness/connectors	2000	\$390.00	\$780,000.00
	<b>Sub-total</b>			<b>\$9,900,000.00</b>
	<b>V. Professional Services</b>			
	Planning and Development Services	1	\$1,000,000.00	\$1,000,000.00
	Engineering – Communications infrastructure	1	\$1,500,000.00	\$1,500,000.00
	Wireless Communications Design Services	1	\$1,000,000.00	\$1,000,000.00

	Video Surveillance Network Design Services	1	\$1,000,000.00	\$1,000,000.00
	Project Management Services	1	\$1,000,000.00	\$1,000,000.00
<b>Sub-total</b>				<b>\$5,500,000.00</b>
<b>Grand Total</b>				<b>\$50,000,800.00</b>

The U.S. export potential associated with the initial deployment of an integrated communications and “real time” video surveillance system for Metro Sao Paulo has been estimated at U.S.\$ 50 million.

Furthermore, the technologies identified in Table 5 are also expected to represent U.S. export potential for other (existing) passenger rail operations in Brazil which further increases the value for potential U.S. exports. Table 6 below represents an estimate of value for the cost of all the technologies (communications and “real time” video surveillance systems) that are expected to be required for the various passenger rail systems in Brazil.

<b>Table 6 Brazilian Passenger Rail Systems – Total Estimated Value for Communications and Real Time Video Surveillance Systems</b>		
<b>Rail System</b>	<b>Number of Cars-2013</b>	<b>Communication and Video Surveillance Systems Estimated Value</b>
<b>Metro SP</b>	900	\$50,000,000
<b>CPTM</b>	1356	\$76,000,000
<b>Metro Rio</b>	296	\$17,500,000
<b>SuperVia</b>	663	\$37,000,000
<b>Trensurb</b>	100	\$6,000,000
<b>Metro DF</b>	120	\$6,500,000
<b>Via 4</b>	84	\$4,500,000
<b>CBTU Recife</b>	151	\$8,000,000
<b>CBTU Joao P.</b>	13	\$3,000,000
<b>CBTU Natal</b>	9	\$3,000,000
<b>CBTU Maceio</b>	26	\$3,000,000
<b>CBTU Belo H.</b>	96	\$5,500,000
<b>Total</b>	<b>3814</b>	<b>\$220,000,000</b>

In addition, as existing rail systems are expanded and additional passenger rail systems are constructed over the next five to ten years, additional technology sales could be realized and could represent additional U.S. exports.

## 2.1 U.S. Companies - Interest and Capabilities

HEP visited with and contacted representatives from the Washington Metropolitan Area Transit Authority (WMATA) as this agency utilizes “real time” video monitoring for the D.C. Metro. WMATA has recently converted from the traditional video monitoring in their trains to stream video of images that are now seen live at WMATA's train control center and WMATA's Metro Police center. WMATA representatives indicated that it is very important to engage in a planning process in order to achieve the transition into “real time” stream video as well as it is critical to evaluate the various methods of communications and applications before embarking upon the execution of the actual project. WMATA officials confirmed that the development of a plan is advantageous to the process of deploying modern technologies for “real time” video monitoring because the planning and technology evaluation can be incorporated to define the recommendations for operations, cost estimation, funding, and ultimately implementation.

HEP contacted several U.S. companies that provide technologies for stream video monitoring as well as passenger rail operators that use the technologies required by Brazilian operators and these companies demonstrated significant interest in exporting their technologies and services to Brazil. In discussions with WMATA and other passenger rail operators in the U.S., these indicated that the number of companies in the industry is small and only a few companies are dedicated to providing design and consulting services as well as the technologies for the transmission of “real time” video from trains to control centers. The companies contacted include Firetide, Orion Management LLC, Intellect Corporation, Los Alamos Technical Associates (LATA), Tactical Micro, Secure Communications, March Networks, Cisco and others.

One of the leading companies in the world that specializes in wireless technologies for mobility and real time video is Firetide. This company is headquartered in California and has developed a series of wireless mesh network technologies that has revolutionized the industry in recent years. Firetide is one of the leaders behind the development of “next-generation mesh technology” for mobile real time video surveillance. Unlike traditional networks that use Wi-Fi access points to share a limited amount of bandwidth, Firetide's mesh networks form instantaneously and automatically, healing themselves when a link is interrupted or broken providing communications that are immediate and constant. Compatible with any existing equipment, network or software, a Firetide mesh network can handle voice, data and video seamlessly, which is ideal for the demands of the transportation industry.

Firetide technology has been implemented in passenger rail systems in Canada, Korea, India, Europe, and in the United States where the company has been acknowledged as a leader in expanding the benefits and capabilities of mesh networking to today's fast-moving trains, subways, buses, and public safety vehicles. Firetide's patented mesh and mobility technologies would provide solutions capable of supporting high-definition video streams and seamless roaming for the various passenger rail systems in Brazil.

Firetide's real time mesh network technology has even been acquired by Thales in specific projects that required the highest level of reliability for “real time” surveillance systems. Firetide has the ability to compete well with other European companies in Brazil. Additionally, Firetide has already supplied systems in Brazil for law enforcement activities during the 2014 FIFA World Cup.

HEP discussed the Brazilian communications and video surveillance project with Firetide representatives and the company is very interested in the potential export of services and technologies. Firetide representatives indicated that the company would be capable of providing the technical assistance services, act on an advisory role to the operators, and/or supply the technologies required for the projects. HEP estimates that Firetide could be very competitive among other foreign companies in Brazil, as well as with other U.S. companies.

Intellect Corporation and Tactical Micro provided video transfer data technologies and services to the WMATA. Intellect Corporation representatives reported to be interested in supporting an effort to evaluate potential technologies for data transmission and provide a solution for the same. Intellect Corp. is currently involved in several projects, outside of WMATA, where the company is conducting studies involving large data transfer on passenger and high speed trains. Intellect Corp. representatives indicated that they are very familiar with technology offerings from several vendors including Alcatel and Thales and reported that at a high level, many companies offer tailored solutions and leave the end-user with few choices for upgrade and expansion. Intellect's strengths includes providing valuable insights into recommended solutions and viable options to allow flexibility and adaptability which allows scalability, is cost efficient, and help the buyer select a system that is vendor agnostic.

Intellect Corp. representatives indicated that their solutions incorporate the ability to add sensors, analytical packages, and reporting features that are customizable by the client and the company staff has a deep understanding and expertise in the engineering, implementation, and maintenance of technology projects in transit, and the company has always been able to differentiate from others in the quality, solutions, and features of their offerings.

Tactical Micro is a systems engineering company that specializes in digital instrumentation, advanced audio and video broadcasting, telemetry, and custom recording systems designed for use in military and civilian applications. Tactical Micro has a wide range of experience and skills and the company's core expertise is in developing and delivering innovative video/audio/data solutions that support the training, instrumentation, and surveillance requirements of the customers. The company provides front-end-analysis, design, development, field equipment, and system support.

Tactical Micro has worked in the WMATA Phase 1 video security and recording systems. This system includes camera products, recorders, wayside wireless communication and transmission of video back to a central control station. In addition, working with Secure Communications (Tactical Micro's sister company), the companies have been involved in several projects for the heavy rail industry technologies including data down power lines, high speed video, long distance wireless links and other technologies to make U.S. railroads more efficient.

Tactical Micro has years of experience working with U.S. Army training ranges providing wireless input, video monitoring and safety systems for live fire ranges. Several of the technologies developed were used for the WMATA effort. The Advanced Technology group has created opportunities in video wireless transmission for both commercial and Department of Defense applications. The company also provides rugged computers,

displays (including 4K high definition and smaller high definition products) and other rugged hardware that can be used to demonstrate capability.

Tactical Micro representatives expressed significant interest in the Brazilian project from the standpoint of being able to conduct the technical analysis and/or becoming potential suppliers of the technologies that will be required by the Brazilian operators.

Secure Communication Systems designs and manufactures thousands of tactical computer solutions for users throughout the U.S. Department of Defense, which are being used around the world. The company's strategy of integrating commercial off-the-shelf equipment (COTS) into customized, rugged products provides solutions that are reliable and cost effective. Secure Communications is a key development and manufacturing partner on multiple transportation platforms. The company has experience in vehicle electronics that include the development of multiple displays, computers, HD digital video processing, and intra-vehicle communication systems for rail and other vehicle platforms. One of their customers (EMD, a division of Progress Rail/Caterpillar) has a locomotive plant located in Brazil and Secure Communications hardware is installed on most equipment now.

Secure Communications and Tactical Micro presented HEP with a letter of interest in the ANPTrilhos project, which include the companies' capabilities, as well as an outline of the services and technologies that the companies can provide toward the Brazilian applications. The companies are able to provide both the technical services needed for the initial review as well as the technologies that would be required for the various passenger rail systems in Brazil.

HEP contacted Los Alamos Technical Associates Inc. (LATA) and discussed the Brazilian "real time" video project. LATA provides intelligent transportation solutions in many sectors including services and technologies for rail applications. LATA's Transportation Technology Division serves rail and metropolitan transit systems by promoting advanced technology and services that improve transit operations, security, and passenger communications. LATA accurately assesses clients' needs to tailor solutions that are usable by the entire transit team, are cost-effective, and easily adaptable to growing or expanding client needs. LATA does this by integrating a variety of platforms and third party applications and modules to create the best transit technology solutions available. LATA representatives reported that the company's offerings include non-proprietary, distributed and open system architectures, enterprise framework with network capability, extensible and scalable architecture, and virtually unlimited customization and scripting capabilities.

LATA representatives indicated that these components define a philosophy of proactive, on-demand scalability for the transit agency, and allows for optimal utility per capital budget. Additionally, LATA representatives reported that the company's rail and transit solutions lend themselves to centralized command and control over the transit's enterprise network, from security enhancement to passenger information, including effective technology solutions to meet ever-growing demands to improve the way transit organizations serve their ridership and deliver better transportation processes. LATA representatives expressed significant interest in the Brazilian passenger rail real time video surveillance project.

Orion Management is a global provider of technical security, fire and life safety solutions, and electrical and general construction services to government clients throughout the world. Key technical security and safety services include technical security systems, fire detection alarm, telecommunications, electrical and general contractor. Orion has provided services as a contractor to WMATA for communications and video surveillance systems. HEP communicated with Orion Management staff who reported to be extremely interested in the opportunity to export their services and solutions to Brazil. Orion Management indicated that the company is able to meet the requirements with a full turnkey solution to include, technology evaluation, delivery and installation of product, training and maintenance services and that the company has significant expertise in providing surveillance system solutions to passenger rail operators like WMATA in Washington D.C.

In addition, HEP communicated with representatives from CLA Direct that reported the company would be interested in the Brazilian projects. CLA Direct has been involved in providing communication systems for metros via cell phone and Wi-Fi and the company recently provided communication systems for the new metro in Panama City, Panama. Additionally, CLA Direct provided services for the New York Transit Authority in the installation of antennas and Wi-Fi communications, including hardware and software. CLA Direct conducts business in Brazil and as such, the company is very interested in learning more about the opportunities to export CLA Direct's services and products to Brazil.

HEP was in contact with Cambium Networks representatives who indicated that the company does not provide real time video solutions at this time, but rather the company offers radio systems to build the backbones for wireless data in connection with the train control centers in order to support the wireless network that communicates with the trains. The company is interested in the ANPTrilhos project to the extent that wireless backbone networks may be needed for the projects in Brazil.

Additionally, March Networks were the suppliers of similar systems for the Port Authority of Allegheny's Light Rail System. March Networks indicated their interest in supporting any U.S. company in the supply of auxiliary systems that are normally needed for the implementation of stream video for rail transportation such as digital video recording systems.

HEP held communications with representatives from Cisco Systems and the company expressed interest in the Brazilian project. Cisco Systems is a major supplier of communications, software, switches, gateways, and other technologies that are likely to be required for the transmission of "real time" video in Brazil. Cisco has a strong presence in Brazil already and this could further represent advantages for the company.

HEP communicated with other rail system providers in the U.S. such as Wabtec, Ansaldo STS, and Siemens U.S.A. to inquire about their capabilities in the area of stream video transfer technology. Wabtec indicated that while the company does not specifically supply the type of technology required for "real time" video, the company offers other train control systems that could support the video monitoring capabilities for train operators.



Brazilian project as appropriate.

Siemens U.S.A. responded by saying the company provides IP radio products through Ethernet Spread Spectrum Radio or ESSR that are used to communicate in “real time” between rail cars and the ground. However, these systems are used to for pure data transfers and not “real time” video information. Ansaldo STS has not provided communications technology for “real time” video transmission on rail projects, but the company could be interested in supporting other components of the

Other companies that could provide services and/or technologies for the Brazilian project include Utility Inc., Safety Vision LLC, Allied-Barton, ENSCO, Honeywell, IBM, Sierras Wireless Solutions, Tyco, ADT, Stanley Security Solutions, Motorola Rail Solutions, L3 Communications, Raytheon Security, ITS Systems, SQL Stream, Pixim, Pelco, and Xerox. M.C. Dean Inc. is a major U.S. contractor that provides security and communications solutions for commercial and military applications. M.C. Dean Inc. supplied and installed communications and video surveillance systems to MARTA in Atlanta and could be another U.S. company interested in the Brazilian projects.

As far as Pelco is concerned, the company has a presence in Brazil and is one of the major suppliers of surveillance technologies in the Brazilian market. In fact, many of the passenger rail systems in Brazil (including ViaQuatro) already utilize Pelco products for CCTV systems. Additionally, HEP contacted the American Public Transportation Association (APTA) representatives who indicated that the association may be interested in performing the technical assistance through a peer review process and also indicated that several APTA members would be interested in the various aspects of the project. APTA officials requested that when and if the technical assistance is approved, that APTA be notified in order to disseminate the information to their membership.

### **3.0 Summary of U.S. Export Potential Assessment**

Based on the review and discussions with ANPTrihlos and its members about opportunities for importing ITS products into Brazil, it is estimated that the proposed project offers substantial opportunities for U.S. exports. The information obtained as part of the DM indicates that the types of technologies necessary for the Brazil Integrated Communications and Video Surveillance Systems Project must be, in its majority, imported by the Brazilian operators. The proposed project would cover a broad range of communication and “real time” video systems that have been developed and implemented successfully in the United States by U.S. companies.

U.S. companies definitely have the expertise to provide the services and technologies required by the proposed project. In reviewing the potential need for equipment, systems, materials, software and services, it is determined that a number of U.S. companies could adequately supply the required services and equipment for the

proposed project. The technology that is most likely to be required for communications and video surveillance project is currently being utilized in the United States by organizations such as Washington Area Mass Transit Authority (WMATA), MARTA in Atlanta, Pittsburgh's Light Rail, New York City Transit, and Chicago Area Transit to name a few and it is therefore readily available for export to Brazil.

## **F. FOREIGN COMPETITION**

### **1.0 Foreign Competition Key Elements**

An assessment of foreign competition was conducted in connection with Brazil's Integrated Communications and Video Surveillance Systems Project. The foreign competition assessment was performed based on information obtained from various meetings and interviews held in Brazil, from the review of documentation pertaining to proposed project, and from communications with representatives from the U.S. industry. The DM findings indicate that there are seven key elements associated with the foreign competition component related to the procurement of ITS technologies as follows:

- Procurement methods and tendencies for Brazilian passenger rail operators;
- Prime transportation contractors - Equipment selection;
- Use of foreign consulting firms to define specifications and design elements;
- European companies' strong presence in Brazil;
- Transportation equipment pricing;
- Risk factors;
- Market entry issues.

Public sector procurement in Brazil is governed by a legal framework anchored in the Public Procurement Act. Public entities such as Metro Sao Paulo, CPTM, and others have to adhere to the Brazilian procurement laws which require an open tender for most government acquisitions, as well as the selection of the lowest responsible bid/tender price. International tenders are required when public agencies determine that there is not effective competition for procurement unless foreign companies are invited to participate in tenders. Public operators in Brazil are known to announce larger projects as international tenders and specially those financed by multilateral financial institutions such as the IDB and World Bank.

Public passenger rail operators in Brazil often procured ITS equipment through the same process with international tenders for large procurements. However, Brazilian law tries to promote and support local vendors/products by giving preference to products manufactured in the country. As such, many foreign companies introduce their goods as components and assemble the final products in Brazil. Some foreign companies that are not able to import equipment as components (to later be assembled in Brazil) often face a disadvantage in winning tenders.

In other cases passenger rail operators (both public and private) implement ITS systems by way of tenders where local contractors compete for turn-key projects which include the design, acquisition, and installation of ITS systems. There are numerous examples of this type of technology deployment by various operators in Brazil where prime contractors are provided with specifications that have to be met and the selected contractor acquires the product of its choice by negotiating with equipment and system

suppliers. Obviously, prime contractors look for the lowest product pricing as long as specifications are met and this tends to disregard product quality, life-cycle cost, and maintenance issues.

In conversations with Metro Sao Paulo and CPTM officials, the representatives from these organizations indicated that due to the highly sophisticated nature of their rail technologies, their agencies are, in certain circumstances and with proper justifications, able to define the specifications of specific systems that the agencies required in order to narrow the field of suppliers that may bid on certain projects.

Since the issue of providing “real time” stream video in Brazil has been a complicated problem to solve, it is expected that once solutions are found and technologies identified and specified (through the conduct of the technical assistance), that even public operators will be able to justify procurements under the framework and the strategic plan to be developed by the technical assistance.

On the other hand, private operators are not bound by the Brazilian procurement laws and the companies conduct their procurement of ITS systems based on the company’s needs, product quality and reliability, life cycle costs, and preferred technologies that are most suitable in supporting the passenger rail operations. This presents opportunities for U.S. firms to expose their high quality communications and video surveillance products and services to private operators since these companies do not procure equipment on the basis of the lowest bid.

It is important to note that while ITS technologies and services have been well developed and implemented in the United States, other countries in Europe and Asia have also been successful in developing their own ITS technologies. A great majority of the ITS technologies deployed in Brazil today are of European origin. Additionally, Alcatel-Lucent (French) and Thales (French/Netherlands) have proposed potential solutions to members of ANPTrilhos in the last year, seeking to import their technologies into Brazil. Furthermore, Alcatel was the supplier of the system that provides stream video capabilities for Metro’s Line 4 (ViaQuatro) and as such, it was the first system of its kind to be deployed for metro operations in Brazil.

Other companies that could represent competition for U.S. firms in the supply of technologies for stream video transmissions in Brazil include Telvent (Spain), NICE Solutions (Israel), Bosch Security Systems (Germany), Infinova (China), Alcatel-Lucent (France), Teleste (Finland), Moxa (Taiwan), Huawei (China), Wavesight and Indigo Vision (U.K.), Belden (Netherlands), Indra Sistemas (Spain), Bombardier (Canada), Alstom (France), Siemens (Germany), RAD (Israel), Radwin (U.K.), Servision (Israel), and Sony (Japan). Some of these companies have a presence in Brazil, thus representing potential competition to U.S. companies.

As a result, the competitive nature for the design, acquisition, and implementation of integrated communications and video surveillance technologies in Brazil would be considered high. Traditionally, Latin American countries have selected, for the most part, European technologies when it comes to the transportation sector. There is clear evidence of strong European business activity not only in Brazil, but also in other countries such as Argentina, Chile, and others, where the majority of the ITS systems are of European origin. It is expected that Alcatel and Thales (perhaps Indra Systems as well) will continue to pursue future communications and video surveillance projects in

the Brazilian market. However, in conversations with Brazilian passenger rail operators, it was clearly indicated that operators seek an independent analysis and recommendations for the most suitable technologies to be deployed in Brazil and this could offer an opportunity for U.S. firms to step in and provide the required services and technologies that are needed.

There is no question that European firms are very aggressive in the Brazilian transportation market and have created business relationships in the country for quite some time. These well established relationships create for an environment that strengthens the opportunities for European companies to be the primary suppliers of ITS technology in Brazil, as well as other countries in the region. However, it is important to point out that there are U.S. companies that are willing to enter the Brazilian ITS market in pursuit of business and USTDA plays a key role in supporting the U.S. industry in exporting ITS systems to Brazil by funding feasibility studies and technical assistance like the one proposed for ANPTrilhos.

Cultural issues in some cases also play a factor in the foreign competition element since European companies have somewhat more experience in the Latin American markets facing less cultural barriers, and as such, some of those companies enjoy established business relationships with the various governments and the private sector in Brazil.

Pricing is also another factor that plays a role in foreign competition because U.S. technology (due to its high quality and reliability) tends to be more costly in certain cases. Usually U.S. standards and specifications are more stringent and require higher levels of quality control and more reliable/accurate systems that often lead to a higher price.

Risks factors also tend to somewhat scare U.S. firms away from markets like Brazil due to specific tender requirements, procurement laws, methods of payments, repayment periods, different and inconsistent legal requirements and procurement policies, government and private industry corruption, lack of transparency on government contracts, and local bureaucracy.

European suppliers of ITS products are more experienced in working with the governments and also contractors in Brazil in managing contracts and often have good product representation through the use of local distributors. Local distributors or agents are a must in Brazil if U.S. companies are to enter those markets.

The factors identified as part of the foreign competition assessment clearly illustrate and confirm that foreign competition is considered high for U.S. companies in Brazil. However, the conduct of the technical assistance for the Brazil Integrated Communications and Video Surveillance Systems Project could represent a deciding factor that may open the door for potential U.S. exports and may prove to assist U.S. companies in expanding their product line and services into Brazil.

## **2.0 Market Entry Issues**

Competition in the Brazilian market for ITS systems and equipment is sensitive to price and Brazilian law requires that government agencies consider local manufactured products over imports when possible. In the case of the Brazilian passenger rail

operators, competition for the sale of communications and video surveillance products is more sensitive to quality than price and there seems to be a desire from operators to consider U.S. made products.

While price is a decisive buying factor for government tenders in Brazil, U.S. made products are also recognized for their quality and therefore have a potential for finding market acceptance in Brazil. This is especially true in the information technology sector where computer systems and software packages require operating systems by companies like Oracle and Microsoft as the standard. Motorola, Cisco, and IBM products have also been well received in Brazil and are used often in various sectors around the country.

In order for U.S. companies to become successful in penetrating the Brazilian ITS market they must do so with the aid of local representation or through licensing agreements with the private sector. The knowledge of local regulatory and business framework in Brazil is best left for the local companies that have experience and can assist U.S. companies in entering the market. Personal contact is considered a necessity when doing business in Brazil, with both the private and public sectors and when dealing with government sponsored tenders.

## **G. EVALUATION STRATEGY**

The Brazil Integrated Communications and Video Surveillance System Project is being proposed by ANPTrilhos with the purpose to accelerate the introduction of “real time” video monitoring systems for on-board security and safety on the various passenger rail systems in Brazil. The evaluation strategy presented is intended to assess the effectiveness of USTDA’s funding of the ANPTrilhos Technical Assistance (TA) by identifying important elements of the project objectives. The first step in the evaluation process should consist of a review of the outcome and recommendations from the TA report to insure that the recommended communications and “real time” video systems are of the type and standards that are manufactured and supplied by U.S. companies and that the recommended method of communications for “real time” video monitoring are indeed acceptable and likely to be permitted by the Brazilian regulating entities. Subsequently, the evaluation process should consist of a survey or interviews with ANPTrilhos and its passenger rail operating members (Metro Rio, SuperVia, Metro Sao Paulo, CPTM, Metro DF, CBTU, Trensurb, ViaQuatro, and Metro Bahia) to inquire as to the number of operators that intend to follow the TA recommendations for the deployment of “real time” video surveillance systems, the timelines for expected project start-up and execution, and the expected benefits.

The deployment of “real time” video surveillance systems are expected to be developed under the Design-Bid-Build concept for the government supported passenger rail systems and others under private concessions are likely to utilize the Turnkey delivery method. Upon completion of project execution (by the various operators) the evaluation strategy could consist of the review of reports in the areas of passenger security (number of incidents, crime, vandalism, etc.), safety reports covering the areas of smoke and fire incidents in the trains and the actual response times to action, ridership reports, and customer survey results to evaluate the level of customer satisfaction before and after the deployment of “real time” video technologies. These types of reports are usually generated and maintained by each operator. Lastly, a review of the various

technologies deployed as part of the projects should be conducted to determine the level of U.S. exports realized by each project execution.

## **H. DEVELOPMENTAL IMPACT**

This section of the report includes an assessment of the developmental impact associated with the utilization of Intelligent Transportation Systems in connection with the Brazil Integrated Communications and Video Surveillance System Project. The developmental impact section is divided into two sections to cover the aspects of the primary developmental benefits as well as the alternatives to the proposed project.

The increasing demand for travel by roadway, highway, and public transit in Brazil has caused the transportation system in cities to reach the limits of its existing capacity. Additionally, the municipal street networks have continued to see an increase in vehicular traffic requiring cities to seek solutions with the use of passenger rail systems such as metro, commuter rail, light rail, monorail, and bus transportation systems.

### **1.0 Primary Development Impact**

The implementation of ITS systems such as integrated communications and video surveillance systems for passenger rail operations could translate into a safer and more efficient use of the rail infrastructure, positively impacting time spent in the passenger rail systems throughout Brazil. A primary developmental impact would be the increase in security within the various types of passenger rail systems, improved ability for monitoring conditions inside the trains (smoke, fire, crime, etc.), increased efficiency in the operation of video surveillance systems, improved record keeping, and increase passenger security and comfort.

#### **1.1 Infrastructure**

The transportation sector is key to Brazil's economic growth and the country's integration with the rest of the world. The implementation of ITS systems such as integrated communications and video surveillance systems is expected to support and improve the existing passenger rail transportation infrastructure in Brazil and further increasing the efficiency of those transportation facilities. Vehicle travel continues to grow in Brazilian cities as the population increases, particularly in the urbanized areas. Construction of new roadway capacity to accommodate the growth and travel has not kept up with traffic demand in Brazil. The construction of additional passenger rail systems is continuing throughout Brazil with new lines for existing metro systems, brand new metro and light rail systems, and expansion of new commuter lines.

One of the most important factors associated with the success of passenger rail systems in Brazil is directly related to security. As citizens feel more secure from theft and robberies more passengers will ride the systems. The introduction of stream video in "real time" will add another dimension to the overall safety and security component of metros, light rail, and commuter rail operation in the country.

## **1.2 Technology Transfer and Productivity Enhancement**

Technology transfer opportunities could be created by implementing ITS systems for various passenger rail systems in Brazil given that new intelligent transportation systems are comprised of sophisticated technologies that will likely be new applications in Brazil and requiring new training, services, and maintenance capabilities for personnel. The type of technologies needed for the proposed project, would necessitate importing these systems into Brazil. The level of technology transfer is therefore considered high for the application of ITS systems in Brazil.

Productivity enhancements can be mentioned as another factor related to other improvements such as reduced manpower to retrieve data consisting of downloads from cameras on the trains to computers, storage and labeling of a significant amount of data. Additionally, improved monitoring conditions in “real time” by the various operators will make passenger rail operations more efficient as activities throughout the rail networks are carefully monitored.

Often law enforcement and courts require of video data to solve cases that have occurred in the trains and the automated and “real time” system would provide for a more efficient and productive method to retrieve and share the information from various operators, therefore increasing productivity.

## **1.3 Human Capacity Building**

The implementation of new state-of-the-art ITS systems would support existing passenger rail infrastructure that in turn is expected to create new jobs in the construction and ITS/information technology industries in Brazil. The implementation of integrated communications and video surveillance systems throughout the numerous passenger rail systems in Brazil is expected to create new jobs during construction, installation, monitoring, and testing of the systems. Additionally, maintenance services for stream video could generate jobs as maintenance contracts are entered into between maintenance providers and operators.

## **1.4 Other Benefits**

Other primary developmental impact benefits associated with the proposed project are directly related to security, safety, and mobility. An explicit objective for the transportation system is to provide a safe and secured environment for travel while continuing to strive to improve the performance of the system. As stream video in “real time” is provided throughout the Brazilian passenger rail systems, incidents will be identified much quicker which improves response times significantly which in turns translates to a quicker resolution of the incidents to resume normal operations of the rail system.

Another benefit often over-looked in ITS system applications is the issue of customer satisfaction. Given that many ITS system projects and programs are specifically developed to serve the public, it is important to insure that travelers’ expectation are being met or surpassed, especially when it comes to providing a secure environment in the trains. Customer satisfaction measures are characterized by the difference between the user’s expectations and experiences in relation to a service or product. Many passenger rail operators in Brazil place customer satisfaction as one of the company’s

top principle and as operators wish to continue to improve on customer satisfaction, the need for advanced security systems will increase.

## **1.5 Alternatives**

The current alternative to video surveillance in the trains has been the constant recording of images that are then downloaded at the end of the day at the different rail yards and maintenance facilities. Additionally, passenger rail operators have received recommendations from European companies like Alcatel and Thales on different methods to achieve “real time” video transmissions by way of Wi-Fi, stream video on segments, fiber optics, and other means. While there are various alternatives to achieve what the Brazilian operators desire, there is a lack of understanding of which are the best solutions and technologies that are applicable in Brazil. In addition, an independent study or technical assistance is required to evaluate and identify all the alternatives possible.

## **I. IMPACT ON THE ENVIRONMENT**

The application of “real time” stream video technologies for the various passenger rail systems in Brazil is not expected to have an impact on the environment. The communications and video technologies are such that equipment and systems are expected to be installed, for the most part, on or at existing facilities, therefore minimizing any impacts to the environment.

## **J. IMPACT ON U.S. LABOR**

Components of ITS systems that would be required for the ANPTrilhos project in Brazil are being manufactured in the United States by U.S. companies and equipment quantities are such that do not warrant the transfer of equipment fabrication functions from the U.S. to Brazil, therefore minimizing any negative impacts to U.S. labor.

## **K. QUALIFICATIONS**

This section of the report describes the Contractor’s qualifications for the conduct of the technical assistance for Brazil’s Integrated Communications and Video Surveillance Systems Project.

### **1.0 Brazil Integrated Communications and Video Surveillance Systems Project**

The focus of the technical assistance is to identify, quantify, analyze, prioritize and recommend modern communication and video surveillance (stream video – “real time”) systems, equipment, and related information technologies for the purpose of improving surveillance operations (trains and control centers) for the various passenger rail operators in Brazil.

The technical assistance will engage a U.S. Contractor in the identification and recommendations of integrated communication and video surveillance systems that

would be beneficial for Brazilian passenger rail operators in promoting a safer and more secured environment for rail transportation systems in the country. As such, the U.S. Contractor selected for the technical assistance shall have personnel with ample experience in the various technology applications of modern communication systems and video surveillance equipment for applications in the transmission of “real time” video from trains to train control centers. The following qualifications should be required of the U.S. Contractor to be selected for the conduct the technical assistance:

**Technical Experience  
(40 points)**

- The Contractor shall have substantial and direct experience in modern communication and video surveillance technologies specifically utilized for the transmission of video images (in “real time”) from digital cameras installed in trains to train control centers to include a variety of passenger rail operations (metro, underground facilities, commuter rail, light rail, and monorail systems). The Contractor shall have substantial expertise in the application of wireless technologies and digital surveillance systems as well as Information and Communications Technology (ICT) systems to support passenger rail operations, ICT passenger rail infrastructure, rail operations, passenger rail management systems, security and surveillance programs, rail safety, on-board security systems, and development of surveillance system programs for passenger rail operations. Additionally, the Contractor shall have specific experience in the design, installation, operation, and maintenance of modern communications and video surveillance systems and equipment in a passenger rail environment. It is paramount that the Contractor have full knowledge and complete understanding of all concepts and practices in developing recommendations for the application of communications and video surveillance systems for corridor passenger rail operations and management, including experience in the development of system-wide communications and video surveillance integration, development of surveillance system operational plans, and development of communications and video surveillance equipment and system specifications.
- The Contractor shall have substantial and direct experience and actual past involvement in studying, defining, reviewing, and recommending modern communication and video surveillance design plans, technologies, and implementation plans, as well as experience in supervising and guiding the implementation of large communications and video surveillance systems (“real time”) for passenger rail operations. The U.S Contractor shall be knowledgeable in the proper use of communications (including wireless) and video surveillance (“real time”) systems technical standards, regulations, and specifications, with specific knowledge and practicing experience in the utilization and selection of the most appropriate frequencies for data transmission.
- The Contractor shall have substantial experience in the integration of modern communications and video surveillance systems with other train control and train management systems, as well as overall security systems, including substantial knowledge in system inter-operability issues. The Contractor shall have expertise in the implementation of central security systems and communications infrastructure development for passenger rail applications. The Contractor shall have experience in working with national communications agencies or large (private sector) communications service providers involving the identification and

recommendations of the most appropriate frequencies for stream video transmission under passenger rail environments.

- The Contractor shall have experience in the development of technical assistance and feasibility studies for modern communications and video surveillance (“real time”) systems for passenger rail operations capable of improving overall security, operational efficiency, and safety.

**Financial Experience  
(20 points)**

- The Contractor shall have direct experience in conducting economical and financial analysis for the application and implementation of modern communications and video surveillance systems, equipment and related information technologies for passenger rail applications. The Contractor shall have extensive experience in the development of capital investment plans/programs for communications and video surveillance modernization/rehabilitation projects, to include experience in project financing for technology modernization.
- The Contractor shall have experience and prior involvement in identifying eligible financial resources for the acquisition and implementation of communications and video surveillance (“real time”) systems, equipment and related information technologies (with assistance from the private sector and /or multilateral financial institutions), and experience in identifying new strategies and plans for new services.

**Transportation Developmental Impact Experience  
(5 points)**

- The Contractor shall have experience in analyzing and formulating potential developmental impacts as it relates to the application of ITS systems and related information technologies in connection with passenger rail operational efficiency, security, and safety. The Contractor shall have experience in the development and identification of passenger rail related benefits including the areas of infrastructure, market oriented reforms, human capacity building, technology transfer and productivity enhancement, and other developmental benefits.

**International ITS Experience  
(10 points)**

- It is preferred that the Contractor have experience at the international level, preferably with experience in Brazil and/or the Latin America Region.

**Work Plan and Project Methodology  
(25 points)**

- Adequacy of the proposed work plan and proposed technical assistance approach in responding to the specified Terms of Reference for all activities identified in the TOR. Soundness and thoroughness of the technical approach and work plan presented in the technical proposal and the overall quality and succinctness of the technical proposal. The technical proposal shall include the identification of all key staff proposed for the conduct of the technical assistance

with their respective qualifications, availability for the project, and a staffing schedule for each activity.

## **L. JUSTIFICATION**

Based on the overall DM evaluation, HEP has confirmed that ANPTrilhos and its operator members have identified the need to implement state-of-the-art communications and “real time” video surveillance technologies to improve security, safety, and operational efficiency for the various passenger rail systems in Brazil. Passenger rail operators throughout Brazil (whether public or private) have invested millions of dollars in a variety of communications and video surveillance technologies over the years and these same operators now wish to further invest in the modernization of security systems to provide “real time” video monitoring capabilities in their trains.

Brazilian passenger rail operators have enlisted large human and technical resources in order to secure its customers and its employees, to dissuade people from committing criminal acts, to secure rail lines, stations, trains, platforms, and other premises, and to protect their property. Video surveillance systems are one of these technical resources that have been used by certain operators. However, if video surveillance systems have been largely deployed in stations, platforms, and other rail facilities over the years, their deployment on-board trains have started in the past five to six years when the technologies for “real time” video transmission was not fully developed.

Today, on-board video surveillance systems are recording-based systems. Images are recorded on high-capacity hard-disks. These systems allow just a post-analysis of the video-flows coming from the video-cameras installed in the trains. When a security event occurs, an operator has to identify the train, locate it and to go where the train is in order to manually extract the related recordings. With the generalization of on-board video surveillance systems, the number of alarms has increased and this procedure is becoming more and more complicated and expensive. Even if these systems have a dissuasive impact and certainly have reduced the number of thefts and aggressions, from a security and from an operational standpoint, they appear to be quite inefficient. The post treatment of the event does not allow for prevention, neither to reduce its impact on the operation of trains.

ANPTrilhos wishes to conduct a technical study of the current video surveillance situation in Brazil with the purpose to evaluate various alternatives for operational concepts, develop and validate a more intelligent on-board video surveillance system for allowing the “real time” transmission of the video flows coming from on-board cameras towards the control centers. The technical assistance will concentrate mainly on the need for efficient railway communication systems between on-board and wayside (trackside) with a reliable level of service (high quality transmissions) which will be required to transmit “real time” video images delivered by the on-board cameras. Additionally, the technical assistance will review the frequencies at which the transmission of “real time” video could be provided for the Brazilian operators and working together with ANATEL, as well as the identification of intelligent, robust, and efficient video coding techniques, respecting the operational requirements and constraints of the system.

The ANPTrilhos project is expected to develop the functional design and operational concepts for the on-board intelligence and the communications systems needed to deliver an advanced “real time” video surveillance system for passenger rail systems in Brazil. The new technologies and its implementations are expected to provide social benefits to Brazilian end-users, both for passenger's confidence (in terms of security of the transportation system and comfort feeling) and for transportation efficiency, especially during off-peak hours. Additional benefits are expected from “real time” video surveillance systems to provide safe train operation, verification of smoke detectors and fire/smoke incidents inside the train, “real time” monitoring of the passengers in the cabin, ensuring the safety and security of passengers and preventing accidents/crime, as well as supporting the establishment of an integrated wireless network for train operations.

The technical assistance would consider the various communication systems for “real time” video surveillance to include satellite, cellular 3G and 4G, Standard Wi-Fi, standard mobile Wi-Max, mesh networks, and others available in the market at the time of the conduct of the technical assistance. Additionally, other aspects of the communications system review will involve trackside communications, interconnectivity between internal wired, internal wireless, and external wireless systems (e.g. Wi-MAX, others), IP gateway, horizontal and vertical seamless handover issues on external wireless links, coverage and multiple access issues in order to guarantee “end-to-end” delivery of “real time” images to control centers.

The proposed technical assistance seeks to incorporate the “lessons learned” identified in previous urban transportation and passenger rail service projects from the U.S. and abroad. Based on the DM assessment, it is evident that Brazilian operators plan to continue to invest in modern technologies in an attempt to maximize full potential of passenger rail operations, while increasing the quality of services to its customers.

A number of U.S. firms have had an opportunity to create and implement “real time” video surveillance systems for passenger rail in the U.S. and as such, U.S. firms are extremely proficient and capable of engaging in the conduct of the proposed technical assistance, design, and ultimately in the supply and implementation of these technologies.

It is clear that the technical expertise needed to evaluate the potential deployment of modern communications and “real time” video surveillance technologies will have to come from foreign firms. Already European firms have seen an opportunity of the large market for “real time” video surveillance in Brazilian passenger rail systems and these companies have offered solutions to the operators in Brazil. USTDA is now in an excellent position to offer assistance to Brazilian passenger rail operators for the development of various projects that carry a high priority for ANPTrilhos and the Brazilian passenger rail operators.

Based on the overall assessment conducted as part of the DM, it is determined that funding the ANPTrilhos technical assistance by USTDA is justified and meets USTDA grant funding requirements.

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## **N. TECHNICAL ASSISTANCE BUDGET**

This section of the report provides information that includes the estimated resource requirement per task, personnel requirements, personnel costs, and other direct cost for the ANPTrilhos technical assistance.

### **1.0 Personnel Requirements**

#### **Project Manager**

The individual in the capacity of Project Manager will be responsible for directing and managing the technical assistance work in its entirety. The Project Manager will be responsible for establishing the technical assistance's strategies, goals, and objectives together with the Grantee and other stakeholders. The individual in this capacity will be responsible for directing and supervising the work according to the specified terms of reference including schedules, meeting coordination, and quality control of all deliverables. The person in this capacity will have significant experience in the evaluation of institutional, legal, and regulatory issues associated with modern communications system implementation.

The Project Manager shall have extensive experience and direct knowledge of modern communication systems including wireless, satellite, cellular 3G and 4G, Standard Wi-Fi, standard mobile Wi-Max, wireless mesh network systems for "real time" video and others. Additionally, expertise in other aspects of the communications systems to include trackside communications, interconnectivity between internal wired, internal wireless, and external wireless systems (e.g. Wi-MAX, others), IP gateway, horizontal and vertical handover functions on external wireless links, coverage and multiple access functions in order to guarantee "end-to-end" delivery of "real time" images to control centers. The Project Manager will have experience in the application of communication and video surveillance systems with "real time" video expertise for passenger rail systems (metro, commuter rail, light rail, monorail, etc.)

The proposed individual will have at a minimum, 20 years of direct experience in directing and managing communications and video surveillance projects, feasibility studies, and technical assistance with particular emphasis in passenger rail applications, including the development of technical specifications for such systems and equipment.

#### **Communications Engineer**

An individual in the capacity of Communications Engineer will oversee all aspects of the modernization of the communication infrastructure required to provide "real time" stream video transmission from the trains to the train control centers, including the possibility for the integration of existing systems, future systems, as well as the requirements for the ultimate communications infrastructure for the new "real time" video surveillance systems. The individual in this capacity will be responsible for reviewing and developing

the “real time” stream video communications system for those technologies that are ultimately recommended for implementation for the various operators in Brazil.

The individual in this capacity will be responsible for evaluating the communications infrastructure and requirements for the implementation and integration of “real time” stream video systems and equipment, communications systems (WLAN, wireless, VHF, short-range radio communications, Wi-Fi, GPS, satellite, cellular 4G, Standard Wi-Fi, standard mobile Wi-Max, wireless mesh networks, etc), as well as other aspects of communications involving trackside communications, interconnectivity between internal wired, internal wireless, and external wireless systems, IP gateways, switches, routers, horizontal and vertical handover functions on external wireless links, coverage and multiple access functions in order to guarantee “end-to-end” delivery of “real time” images to control centers. Additional expertise with communication systems such as wireless repeaters, transmitters, antennas, and others such as CCTV and security systems, Local Area Network (LAN) systems, ICT hardware and software is desired.

The Communications Engineer will be responsible for determining the needs for upgrading existing communication technologies, identifying and prioritizing the communication systems that the technical assistance ultimately recommends, as well as responsible for the development of technical specifications for the recommended communication systems and defining the most appropriate frequencies for “real time” video surveillance as well as the technical integration needs for communication systems and protocols that may be ultimately used by the Brazilian operators.

The individual in this capacity will be primarily responsible for identifying the needs, proposing solutions and developing the communication systems functional design/infrastructure for the recommended “real time” stream video systems to be implemented by the Brazilian operators. The individual proposed will have at a minimum, 20 years of direct experience in advanced communication systems engineering, wireless and radio communication systems, train tracking radar systems, GPS systems, Wi-Fi communications, WLAN, and passenger rail surveillance systems.

### **Systems Engineer**

The individual in the capacity of Systems Engineer will be responsible for evaluating existing passenger rail train control systems, train surveillance technologies and related hardware and software, determining the needs for future “real time” stream video systems to be incorporated at the respective train control centers for the various operators in Brazil. The Systems Engineer will be responsible for the development of functional design and technical specifications for the recommended “real time” stream video surveillance technologies ultimately recommended by the technical assistance.

The individual in the capacity of Systems Engineer will be responsible for evaluating the technological needs for the implementation of state-of-the-art “real time” stream video surveillance systems for passenger rail applications, as well as assisting the Project Manager in identifying the needs to upgrade, modernize, and identify future systems/equipment and information technologies that may be recommended for implementation.

The individual in this capacity will be primarily responsible for identifying the needs, proposing solutions and developing the functional design and technical specifications for

the various “real time” stream video systems and will have a minimum of 15 years of direct experience in ICT and mobile surveillance systems engineering and applications.

### **Systems/Network Integrator**

An individual in the capacity of Systems/Network Integrator will oversee all aspects of system integration including the possibility of integration for existing systems, future systems, as well as the requirements and integration capabilities for the modernization of the passenger rail (train) video surveillance systems and the integration of these systems with the train control and operations centers. The individual in this capacity will be responsible for reviewing and developing all of the “real time” stream video surveillance system integration aspects for the overall network that are ultimately recommended for implementation.

The individual in this capacity will be responsible for working with the Communications Engineer and the Systems Engineer to ensure that communications systems and ICT systems are adequate for the integration of “real time” stream video surveillance technologies. The Systems/Network Integrator will be responsible for determining the needs for upgrading existing ICT technologies, identifying and prioritizing future ICT integration services that the technical assistance recommends, as well as responsible for the development of technical specifications for the recommended network and defining the ICT technical integration and network needs.

The individual in this capacity will be primarily responsible for identifying the needs, proposing solutions and developing the “real time” stream video surveillance and ICT integration requirements, as well as the functional system design/infrastructure for the recommended network and operational control centers.

The individual proposed will have at a minimum, 15 years of direct experience in wireless communication network design and ICT systems integration services for “real time” stream video surveillance systems.

### **Transportation Security Expert**

An individual in the capacity of Transportation Security Expert will oversee the transportation security aspects of the project to insure that current security methods and standards are followed in conjunction with the application of communication and “real time” video surveillance systems. The Security Expert will be responsible for reviewing and recommending the location of cameras on the train, the lighting requirements for camera operation, the type of technologies to be required by camera equipment, anti-vandalism mechanisms to protect the equipment on-board, and other security aspects for the train. The Security Expert will engage in the initial evaluations of existing systems and determine how these operate in conjunction with on-board cameras as well as responsible for reviewing equipment at the control centers.

The Security Expert will work in close contact with the Project Manager to ensure that security requirements are met prior to decisions being made on placement of equipment and the recommended technologies. The individual in this capacity will be primarily responsible for identifying the needs, proposing solutions and developing the security requirements that must be met by the technologies to be recommended as part of the technical assistance.

The individual proposed will have at a minimum, 15 years of direct experience in transportation security systems and services, with particular expertise in passenger rail transportation applications.

**Economic, Financial, Legal and Environmental Personnel**

The individuals that work in the economic, financial, legal, and environmental aspects of the technical assistance will be responsible for the successful completion of the tasks involving the review, analysis, and recommendations of the economic and financial aspects of the technical assistance, as well as any legal implications and environmental impacts that may result from the implementation of communications and video surveillance systems, equipment, and related information technologies for the ANPTrilhos project. Individuals in the various capacities economic, financial, legal, and environmental) will have (each in his/her individual area of expertise) a minimum of 10 years experience.

**Administrative Staff**

An individual(s) in the capacity of administrative staff will be responsible for all administrative work in connection with the technical assistance including typing of all reports, correspondence, documentation, preparation of presentations, and all other aspects of administrative services needed to support the members of the Contractor's team. The individual(s) in this capacity will have experience in secretarial/administrative services with a strong background in technical report preparation, graphics, tables, etc.

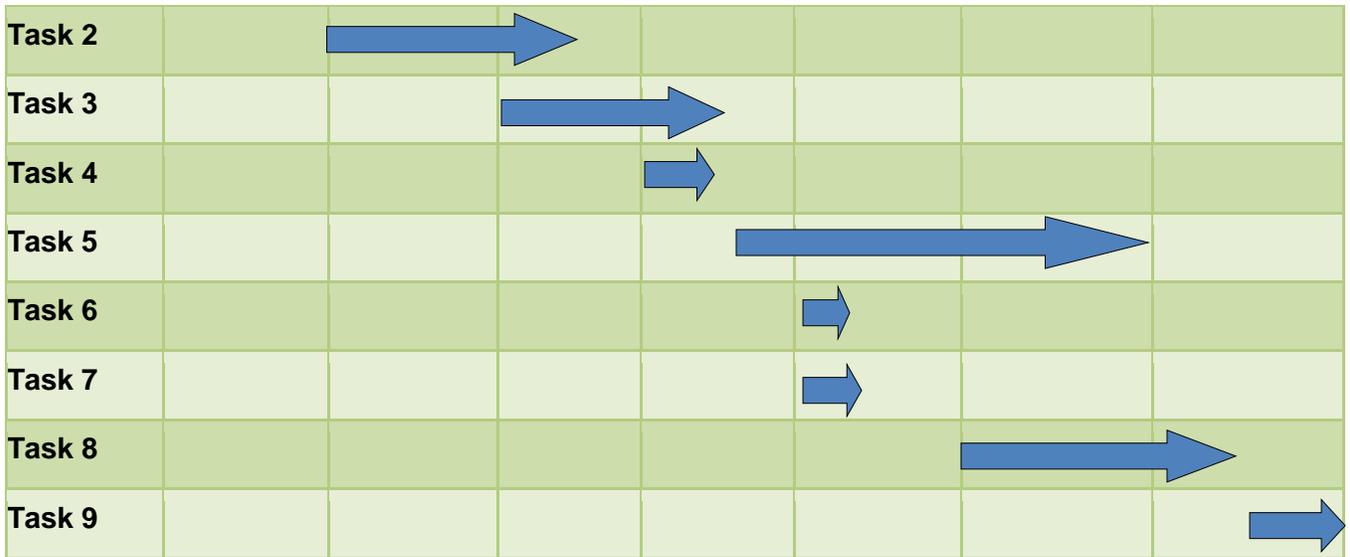
Based on the proposed personnel requirements outlined above, the total personnel cost anticipated for the conduct of the technical assistance is estimated at U.S. \$523,800. The table below provides a breakdown of the various tasks, personnel, and cost associated with the ANPTrilhos technical assistance.

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**3.0 Technical Assistance Schedule**

The technical assistance is expected to take seven months to be completed and the schedule below outlines the different tasks and their expected period for completion.

Table 10 Technical Assistance Schedule							
Task No.	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7
Task 1							



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## **ANNEX 3**



**U.S. TRADE AND DEVELOPMENT AGENCY**  
**Arlington, VA 22209-3901**

**NATIONALITY, SOURCE, AND ORIGIN REQUIREMENTS**  
*[As of January 17, 2014]*

The purpose of USTDA's nationality, source, and origin requirements is to ensure the maximum practicable participation of American contractors, technology, equipment and materials in the prefeasibility, feasibility, and implementation stages of a project.

**USTDA STANDARD RULE (GRANT AGREEMENT STANDARD LANGUAGE):**

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and professional services funded by USTDA under the Grant Agreement:

- (a) the Contractor must be a U.S. firm;
- (b) the Contractor may use U.S. subcontractors without limitation;
- (c) employees of U.S. Contractor or U.S. subcontractor firms shall be U.S. citizens, non-U.S. citizens lawfully admitted for permanent residence in the United States or non-U.S. citizens lawfully admitted to work in the United States, except as provided pursuant to subpart (d) below;
- (d) up to twenty percent (20%) of the USTDA Grant amount may be used to pay for services performed by (i) Host Country subcontractors, and/or (ii) Host Country nationals who are employees of the Contractor;
- (e) a Host Country subcontractor may only be used for specific services from the Terms of Reference identified in the subcontract;
- (f) subcontractors from countries other than the United States or Host Country may not be used;
- (g) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and

(h) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions.

**NATIONALITY:**

1) Application

A U.S. firm that submits a proposal must meet USTDA's nationality requirements as of the date of submission of the proposal and, if selected, must continue to meet such requirements throughout the duration of the USTDA-funded activity. These nationality provisions apply to all portions of the Terms of Reference that are funded with the USTDA grant.

2) Definitions

A "U.S. firm" is a privately owned firm that is incorporated in the U.S., with its principal place of business in the U.S., and which is either (a) more than 50% owned by U.S. citizens and/or non-U.S. citizens lawfully admitted for permanent residence in the United States, or (b) has been incorporated in the U.S. for more than three (3) years prior to the issuance date of the request for proposals; has performed similar services in the U.S. for that three (3) year period; employs U.S. citizens in more than half of its permanent full-time positions in the U.S.; and has the existing capability in the U.S. to perform the work in question.

A partnership that is organized in the U.S., has its principal place of business in the U.S., and is more than 50% owned by U.S. citizens and/or permanent residents, qualifies as a "U.S. firm".

A nonprofit organization, such as an educational institution, foundation, or association, also qualifies as a "U.S. firm" if it is incorporated in the U.S. and managed by a governing body, a majority of whose members are U.S. citizens and/or permanent residents.

**SOURCE AND ORIGIN:**

Definitions

"Source" means the country from which shipment is made.

"Origin" means the place of production, through manufacturing, assembly or otherwise.

*Questions regarding these nationality, source and origin requirements may be addressed to the USTDA Office of General Counsel.*

*Version 01.17.2014*

## **ANNEX 4**

## **GRANT AGREEMENT**

This Grant Agreement is entered into between the Government of the United States of America, acting through the U.S. Trade and Development Agency ("USTDA") and Associação Nacional dos Transportadores de Passageiros sobre Trilhos ("Grantee"). USTDA agrees to provide the Grantee under the terms of this Grant Agreement US\$675,000 ("USTDA Grant") to fund the cost of goods and services required for a Technical Assistance ("Technical Assistance") on the proposed Passenger Rail Real Time Video Monitoring Project ("Project") in Brazil ("Host Country").

### **1. USTDA Funding**

The funding to be provided under this Grant Agreement shall be used to fund the costs of the Technical Assistance in accordance with an agreement of understanding between the Grantee and the U.S. firm selected by the Grantee ("U.S. Firm"), under which the U.S. Firm will perform the Technical Assistance ("Agreement of Understanding"). Payment to the U.S. Firm will be made directly by USTDA on behalf of the Grantee with the USTDA Grant funds provided under this Grant Agreement.

### **2. Terms of Reference**

The Terms of Reference for the Technical Assistance ("Terms of Reference") are attached as Annex I and are hereby made a part of this Grant Agreement. The Technical Assistance will examine the technical, financial, environmental, and other critical aspects of the proposed Project. The Terms of Reference for the Technical Assistance shall also be included in the Agreement of Understanding.

### **3. Standards of Conduct**

USTDA and the Grantee recognize the existence of standards of conduct for public officials and commercial entities in their respective countries. Therefore, USTDA, the Grantee, and the U.S. Firm shall not directly or indirectly provide, offer or promise to provide money or anything of value to any public official in violation of any United States or Host Country laws relating to corruption or bribery.

### **4. Grantee Responsibilities**

The Grantee shall undertake its best efforts to provide reasonable support for the U.S. Firm, such as local transportation, office space, and secretarial support.

## **5. Agreement of Understanding Matters and USTDA's Rights as Financier**

### **(A) Grantee Competitive Selection Procedures**

Selection of the U.S. Firm shall be carried out by the Grantee according to its established procedures for the competitive selection of U.S. firms with advance notice of the procurement published online through *Federal Business Opportunities* ([www.fedbizopps.gov](http://www.fedbizopps.gov)). Upon request, the Grantee will submit these procedures and related documents to USTDA for information and/or approval.

### **(B) USTDA's Right to Approve U.S. Firm Selection**

The Grantee shall notify USTDA at the address of record set forth in Article 16 below upon selection of the U.S. Firm to perform the Technical Assistance. USTDA then shall notify the Grantee whether or not USTDA approves the Grantee's U.S. Firm selection. Upon USTDA approval of the Grantee's U.S. Firm selection, the Grantee shall notify in writing the U.S. firms that submitted unsuccessful proposals to perform the Technical Assistance that they were not selected. The Grantee and the U.S. Firm then shall enter into an Agreement of Understanding for performance of the Technical Assistance.

### **(C) USTDA's Right to Approve Agreement of Understanding Between Grantee and U.S. Firm**

#### **(1) Agreement of Understanding**

The Grantee and the U.S. Firm shall enter into an Agreement of Understanding for performance of the Technical Assistance. The Grantee (or the U.S. Firm on the Grantee's behalf) shall transmit to USTDA, at the address set forth in Article 16 below, a photocopy of an English language version of the signed Agreement of Understanding or a final negotiated draft version of the Agreement of Understanding. USTDA then shall notify the Grantee and the U.S. Firm whether or not USTDA approves the Agreement of Understanding.

#### **(2) Amendments and Assignments**

The Grantee or the U.S. Firm may submit any proposed amendment to the Agreement of Understanding, including any proposed amendment to any annex thereto, or any proposed assignment of the Agreement of Understanding, to USTDA at the address set forth in Article 16 below. USTDA then shall notify the Grantee and the U.S. Firm whether or not USTDA approves the proposed amendment or assignment.

#### **(D) USTDA Not a Party to the Agreement of Understanding**

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of the Agreement of Understanding and any amendments thereto, including assignments, the selection of all U.S. firms, the Terms of Reference, the Final Report, and any and all documents related to any Agreement of Understanding funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of funding the Technical Assistance and shall not be construed as making USTDA a party to the Agreement of Understanding. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the Agreement of Understanding or any sub-contract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Grantee or USTDA from asserting any right they might have against the U.S. Firm, or relieve the U.S. Firm of any liability which the U.S. Firm might otherwise have to the Grantee or USTDA.

#### **(E) Grant Agreement Controlling**

Regardless of USTDA approval, the rights and obligations of any party to the Agreement of Understanding or any sub-contract thereunder must be consistent with this Grant Agreement. In the event of any inconsistency between the Grant Agreement and the Agreement of Understanding or any subcontract funded by the Grant Agreement, the Grant Agreement shall control.

### **6. Disbursement Procedures**

#### **(A) USTDA Approval of Agreement of Understanding Required**

USTDA will make disbursements of USTDA Grant funds directly to the U.S. Firm only after USTDA approves the Grantee's Agreement of Understanding with the U.S. Firm.

#### **(B) U.S. Firm Invoice Requirements**

The Grantee should request disbursement of funds by USTDA to the U.S. Firm for performance of the Technical Assistance by submitting invoices in accordance with the procedures set forth in the USTDA Mandatory Agreement of Understanding Clauses in Annex II.

## **7. Effective Date**

The effective date of this Grant Agreement ("Effective Date") shall be the date of signature by both parties or, if the parties sign on different dates, the date of the last signature.

## **8. Technical Assistance Schedule**

### **(A) Technical Assistance Completion Date**

The completion date for the Technical Assistance, which is November 30, 2016, is the date by which the parties estimate that the Technical Assistance will have been completed.

### **(B) Time Limitation on Disbursement of USTDA Grant Funds**

Except as USTDA may otherwise agree, (i) no USTDA funds may be disbursed under this Grant Agreement for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (ii) no USTDA funds may be disbursed more than four (4) years after the Effective Date of the Grant Agreement.

## **9. USTDA Mandatory Agreement of Understanding Clauses**

All Agreements of Understanding funded under this Grant Agreement shall include the USTDA Mandatory Agreement of Understanding Clauses set forth in Annex II to this Grant Agreement. All subcontracts funded or partially funded with USTDA Grant funds shall include the USTDA Mandatory Agreement of Understanding Clauses, except for clauses B(1), G, H, I, and S.

## **10. Use of U.S. Carriers**

### **(A) Air**

Transportation by air of persons or property funded under this Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

### **(B) Marine**

Transportation by sea of property funded under this Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

## **11. Nationality, Source and Origin**

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and professional services funded by USTDA under this Grant Agreement:

- (a) the U.S. Firm must be a U.S. firm;
- (b) the U.S. Firm may use U.S. subcontractors without limitation;
- (c) employees of U.S. Firm or U.S. subcontractors shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the United States or non-U.S. citizens lawfully admitted to work in the United States, except as provided pursuant to subpart (d) below;
- (d) up to twenty percent (20%) of the USTDA Grant amount may be used to pay for services performed by (i) Host Country subcontractors, and/or (ii) Host Country nationals who are employees of the U.S. Firm;
- (e) a Host Country subcontractor may only be used for specific services from the Terms of Reference identified in the subcontract;
- (f) subcontractors from countries other than the United States or Host Country may not be used;
- (g) goods purchased for performance of the Technical Assistance and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and
- (h) goods and services incidental to Technical Assistance support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions.

USTDA will make available further details concerning these provisions upon request.

## **12. Taxes**

USTDA funds provided under this Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country, except for taxes of a de minimis nature imposed on local lodging, food, transportation, or airport arrivals or departures. Neither the Grantee nor the U.S. Firm will seek reimbursement from USTDA for taxes, tariffs, duties, fees or other levies, except for taxes of a de minimis nature referenced above.

### **13. USTDA Project Evaluation**

The parties will cooperate to assure that the purposes of the Grant Agreement are accomplished. For five (5) years following receipt by USTDA of the Final Report, the Grantee agrees to respond to any reasonable inquiries from USTDA about the status of the Project. Inquiries will include, but not be limited to, whether the Final Report recommendations have been or will be used to implement the Project, anticipated Project implementation timeline, and likely source of financing. In addition, the Grantee agrees to notify USTDA any time the Grantee selects a new primary contact person for this Project during the five-year period referenced above.

### **14. Recordkeeping and Audit**

The Grantee agrees to maintain books, records, and other documents relating to the Technical Assistance and this Grant Agreement adequate to demonstrate implementation of its responsibilities under this Grant Agreement, including the selection of U.S. firms, receipt and approval of Agreement of Understanding deliverables, and approval or disapproval of U.S. Firm invoices for payment by USTDA. Such books, records, and other documents shall be separately maintained for three (3) years after the date of the final disbursement by USTDA. The Grantee shall afford USTDA or its authorized representatives the opportunity at reasonable times to review books, records, and other documents relating to the Technical Assistance and the Grant Agreement.

### **15. Representation of Parties**

For all purposes relevant to this Grant Agreement, the Government of the United States of America will be represented by the U. S. Ambassador to Host Country or USTDA and Grantee will be represented by its President. The parties hereto may, by written notice, designate additional representatives for all purposes under this Grant Agreement.

### **16. Addresses of Record for Parties**

Any notice, request, document, or other communication submitted by either party to the other under the Grant Agreement shall be in writing or through an electronic medium that produces a tangible record of the transmission, such as a facsimile or e-mail message, and will be deemed duly given or sent when delivered to such party at the following:

To: ANPTrilhos  
Roberta Marchesi  
Setor de Autarquias Sul - Quadra 1 - Bloco J - Ed. CNT  
Torre A - 5º andar - Sala 510 - CEP 70.070-010 – Brasília, DF  
Brazil  
+55 (61) 3322-3158  
Email: [roberta.marchesi@anptrilhos.org.br](mailto:roberta.marchesi@anptrilhos.org.br)

To: U.S. Trade and Development Agency  
1000 Wilson Boulevard, Suite 1600  
Arlington, Virginia 22209-3901  
USA

Phone: (703) 875-4357  
Fax: (703) 875-4009  
E-Mail: lac@ustda.gov

All such communications shall be in English, unless the parties otherwise agree in writing. Any communication relating to this Grant Agreement shall include the following fiscal data:

Appropriation No.: 11 15/16 1001  
Activity No.: 2015-51022A  
Reservation No.: 2015200  
Grant No.: GH201551200

### **17. Implementation Letters**

To assist the Grantee in the implementation of the Technical Assistance, USTDA may, from time to time, issue implementation letters that will provide additional information about matters covered by this Grant Agreement. USTDA may also issue implementation letters to (i) extend the estimated completion date set forth in Article 8(A) above, or (ii) change the fiscal data set forth in Article 16 above. The parties may also use jointly agreed upon implementation letters to confirm and record their mutual understanding of matters covered by this Grant Agreement.

### **18. Grant Agreement Amendments**

Either party may submit to the other party at any time a proposed amendment to the Grant Agreement. A Grant Agreement amendment shall be effective only if it has been signed by both parties.

### **19. Termination Clause**

Either party may terminate this Grant Agreement by giving the other party written notice thereof. The termination of the Grant Agreement will end any obligations of the parties to provide financial or other resources for the Technical Assistance, except for payments that may be made pursuant to Clause H of the USTDA Mandatory Agreement of Understanding Clauses set forth in Annex II to this Grant Agreement. This article and Articles 5, 12, 13, 14, and 21 of the Grant Agreement shall survive termination of the Grant Agreement.

## **20. Non-waiver of Rights and Remedies**

No delay in exercising any right or remedy accruing to either party in connection with the Grant Agreement shall be construed as a waiver of such right or remedy.

## **21. U.S. Technology and Equipment**

By funding this Technical Assistance, USTDA seeks to promote the project objectives of the Host Country through the use of U.S. technology, goods, and services. In recognition of this purpose, the Grantee agrees that it will allow U.S. suppliers to compete in the procurement of technology, goods and services needed for Project implementation.

## **22. Governing Law**

This Grant Agreement shall be governed by, and construed in accordance with, the applicable laws of the United States of America. In the absence of federal law, the laws of the State of New York shall apply.

## **23. Counterparts**

This Grant Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement. Counterparts may be delivered via electronic mail or other transmission method and any counterpart so delivered shall be deemed to be valid and effective for all purposes.

**[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]**

**IN WITNESS WHEREOF, the Government of the United States of America and Associação Nacional dos Transportadores de Passageiros sobre Trilhos, each acting through its duly authorized representative, have caused this Grant Agreement to be signed in the English language in their names and delivered as of the day and year written below. In the event that this Grant Agreement is signed in more than one language, the English language version shall govern.**

**For the Government of the  
United States of America**

**For Associação Nacional dos  
Transportadores de Passageiros sobre  
Trilhos**

By: *Nathan Younge*  
Nathan Younge  
USTDA Regional Director, LAC

By: *Roberta Marchesi*  
Roberta Marchesi  
Superintendent

Date: 03/08/2015

Date: 03/08/2015

Witnessed:

Witnessed:

By: *Andrew Bowen*  
Andrew Bowen  
Charge D' Affairs  
U.S. Embassy - Brazil

By: *Fernanda Pinheiro*  
Fernanda Pinheiro  
Foreign Affairs Advisor

**Annex I -- Terms of Reference**

**Annex II -- USTDA Mandatory Agreement of Understanding Clauses**

## Annex II

### **USTDA Mandatory Agreement of Understanding Clauses**

#### **A. USTDA Mandatory Agreement of Understanding Clauses Controlling**

The parties to this Agreement of Understanding acknowledge that this Agreement of Understanding is funded in whole or in part by the U.S. Trade and Development Agency (“USTDA”) under the Grant Agreement between the Government of the United States of America acting through USTDA and Associação Nacional dos Transportadores de Passageiros sobre Trilhos (“Client”), dated \_\_\_\_\_ (“Grant Agreement”). The Client has selected \_\_\_\_\_ (“U.S. Firm”) to perform the Technical Assistance (“Technical Assistance”) for the Passenger Rail Real Time Video Monitoring (“Project”) in Brazil (“Host Country”). The Client and the U.S. Firm are the parties to this Agreement of Understanding, and they hereinafter are referred to collectively as the “Agreement of Understanding Parties.” Notwithstanding any other provisions of this Agreement of Understanding, the following USTDA Mandatory Agreement of Understanding Clauses shall govern. All subcontracts entered into by U.S. Firm funded or partially funded with USTDA Grant funds shall include these USTDA Mandatory Agreement of Understanding Clauses, except for Clauses B(1), G, H, I, and S. In addition, in the event of any inconsistency between the Grant Agreement and the Agreement of Understanding or any subcontract thereunder, the Grant Agreement shall be controlling.

#### **B. USTDA as Financier**

##### **(1) USTDA Approval of Agreement of Understanding**

This Agreement of Understanding, and any amendment thereto, including any amendment to any annex thereto, and any proposed assignment of this Agreement of Understanding, must be approved by USTDA in writing in order to be effective with respect to the expenditure of USTDA Grant funds. USTDA will not authorize the disbursement of USTDA Grant funds until the Agreement of Understanding conforms to modifications required by USTDA during the Agreement of Understanding review process and the Agreement of Understanding has been formally approved by USTDA. To make this review in a timely fashion, USTDA must receive from either the Client or the U.S. Firm an English language version of a final negotiated draft Agreement of Understanding or a signed Agreement of Understanding to the attention of the General Counsel's office at USTDA's address listed in Clause M below.

## **(2) USTDA Not a Party to the Agreement of Understanding**

It is understood by the Agreement of Understanding Parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of this Agreement of Understanding and amendments thereto, including assignments, the selection of all U.S. firms, the Terms of Reference, the Final Report, and any and all documents related to any agreement of understanding funded under the Grant Agreement. The agreement of understanding Parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of financing the Technical Assistance and shall not be construed as making USTDA a party to the Agreement of Understanding. The Agreement of Understanding Parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the Agreement of Understanding Parties or the parties to any subcontract, jointly or separately; and in consideration of USTDA's role as financier, the Agreement of Understanding Parties further agree that USTDA's rights may be exercised without thereby incurring any responsibility or liability, in contract, tort, or otherwise, to the Agreement of Understanding Parties or the parties to any subcontract. Any approval or failure to approve by USTDA shall not bar the Client or USTDA from asserting any right they might have against the U.S. Firm, or relieve the U.S. Firm of any liability which the U.S. Firm might otherwise have to the Client or USTDA.

### **C. Nationality, Source and Origin**

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and professional services funded by USTDA under the Grant Agreement:

- (a) the Contractor must be a U.S. firm;
- (b) the U.S. Firm may use U.S. subcontractors without limitation;
- (c) employees of U.S. Contractor or U.S. subcontractor firms shall be U.S. citizens, non-U.S. citizens lawfully admitted for permanent residence in the United States or non-U.S. citizens lawfully admitted to work in the United States, except as provided pursuant to subpart (d) below;
- (d) up to twenty percent (20%) of the USTDA Grant amount may be used to pay for services performed by (i) Host Country subcontractors, and/or (ii) Host Country nationals who are employees of the U.S. Firm;
- (e) a Host Country subcontractor may only be used for specific services from the Terms of Reference identified in the subcontract;
- (f) subcontractors from countries other than the United States or Host Country may not be used;

(g) goods purchased for performance of the Technical Assistance and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and

(h) goods and services incidental to Technical Assistance support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions.

USTDA will make available further details concerning these provisions upon request.

#### **D. Recordkeeping and Audit**

The U.S. Firm and subcontractors funded under the Grant Agreement shall maintain, in accordance with generally accepted accounting procedures, books, records, and other documents, sufficient to reflect properly all transactions under or in connection with the Agreement of Understanding. These books, records, and other documents shall clearly identify and track the use and expenditure of USTDA funds, separately from other funding sources. Such books, records, and documents shall be maintained during the period of performance of work provided for by this Agreement of Understanding, and for a period of three (3) years after final disbursement by USTDA. The U.S. Firm and subcontractors shall afford USTDA, or its authorized representatives, the opportunity at reasonable times for inspection and audit of such books, records, and other documentation.

#### **E. U.S. Carriers**

##### **(1) Air**

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

##### **(2) Marine**

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

#### **F. Workman's Compensation Insurance**

The U.S. Firm shall provide adequate Workman's Compensation Insurance coverage for work performed under this Agreement of Understanding.

## **G. Disbursement Procedures**

### **(1) USTDA Approval of Agreement of Understanding**

Disbursement of Grant funds will be made only after USTDA approval of this Agreement of Understanding.

### **(2) Payment Schedule Requirements**

A payment schedule for disbursement of Grant funds to the U.S. Firm shall be included in this Agreement of Understanding. Such payment schedule must conform to the following USTDA requirements: (1) up to twenty percent (20%) of the total USTDA Grant amount may be used as a mobilization payment; (2) all other payments, with the exception of the final payment, shall be based upon Agreement of Understanding performance milestones; and (3) the final payment may be no less than fifteen percent (15%) of the total USTDA Grant amount, payable upon approval by USTDA of a Final Report that has been (i) prepared and submitted in accordance with the requirements set forth in Clause I below, and (ii) approved in writing by the Client in the manner provided for by Clause G(3)(b)(iii) below. Invoicing procedures for all payments are described below.

### **(3) U.S. Firm Invoice Requirements**

USTDA will make all disbursements of USTDA Grant funds directly to the U.S. Firm. The U.S. Firm must provide USTDA with an ACH Vendor Enrollment Form (available from USTDA) with the first invoice. The Client shall request disbursement of funds by USTDA to the U.S. Firm for performance of the Agreement of Understanding by submitting the following to USTDA:

#### **(a) U.S. Firm's Invoice**

The U.S. Firm's invoice shall include reference to an item listed in the Agreement of Understanding payment schedule, the requested payment amount, and an appropriate certification by the U.S. Firm, as follows:

##### **(i) For a mobilization payment (if any):**

“As a condition for this mobilization payment, the U.S. Firm certifies that it will perform all work in accordance with the terms of its Agreement of Understanding with the Client. To the extent that the U.S. Firm does not comply with the terms and conditions of the Agreement of Understanding, including the USTDA Mandatory Agreement of Understanding Clauses contained therein, it will, upon USTDA’s request, make an appropriate refund to USTDA.”

##### **(ii) For Agreement of Understanding performance milestone payments:**

“The U.S. Firm has performed the work described in this invoice in accordance with the terms of its Agreement of Understanding with the Client and is entitled to payment thereunder. To the extent the U.S. Firm has not complied with the terms and conditions of the Agreement of Understanding, including the USTDA Mandatory Agreement of Understanding Clauses contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA.”

(iii) For final payment:

“The U.S. Firm has performed the work described in this invoice in accordance with the terms of its Agreement of Understanding with the Client and is entitled to payment thereunder. Specifically, the U.S. Firm has submitted the Final Report to the Client, as required by the Agreement of Understanding, and received the Client's approval of the Final Report. To the extent the U.S. Firm has not complied with the terms and conditions of the Agreement of Understanding, including the USTDA Mandatory Agreement of Understanding Clauses contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA.”

**(b) Client's Approval of the U.S. Firm's Invoice**

(i) The invoice for a mobilization payment must be approved in writing by the Client.

(ii) For Agreement of Understanding performance milestone payments, the following certification by the Client must be provided on the invoice or separately:

“The services for which disbursement is requested by the U.S. Firm have been performed satisfactorily, in accordance with applicable Agreement of Understanding provisions and the terms and conditions of the USTDA Grant Agreement.”

(iii) For final payment, the following certification by the Client must be provided on the invoice or separately:

“The services for which disbursement is requested by the U.S. Firm have been performed satisfactorily, in accordance with applicable Agreement of Understanding provisions and the terms and conditions of the USTDA Grant Agreement. The Final Report submitted by the U.S. Firm has been reviewed and approved by the Client.”

**(c) USTDA Address for Disbursement Requests**

Requests for disbursement shall be submitted to the attention of the Finance Department at USTDA's address listed in Clause M below, or by e-mail to [invoices@ustda.gov](mailto:invoices@ustda.gov).

## **H. Termination**

### **(1) Method of Termination**

Either Agreement of Understanding Party may terminate this Agreement of Understanding upon giving written notice to the other party and USTDA. This notice shall be effective after either 30 days, or any other period set forth elsewhere in this Agreement of Understanding. Furthermore, this Agreement of Understanding shall terminate immediately upon notification of USTDA's termination of the Grant Agreement or the term of availability of any funds thereunder.

### **(2) Ramifications of Termination**

In the event that this Agreement of Understanding is terminated prior to completion, the U.S. Firm will be eligible, subject to USTDA approval, for payment for the value of the work performed pursuant to the terms of this Agreement of Understanding. Likewise, in the event of such termination, USTDA is entitled to receive from the U.S. Firm all USTDA Grant funds previously disbursed to the U.S. Firm (including but not limited to mobilization payments) which exceed the value of the work performed pursuant to the terms of this Agreement of Understanding.

### **(3) Survivability**

Clauses B, D, G, H, N and S of the USTDA Mandatory Agreement of Understanding Clauses shall survive the termination of this Agreement of Understanding.

## **I. USTDA Final Report**

### **(1) Definition**

"Final Report" shall mean the Final Report described in the attached Annex I Terms of Reference or, if no such "Final Report" is described therein, "Final Report" shall mean a substantive and comprehensive report of work performed in accordance with the attached Annex I Terms of Reference, including any documents delivered to the Client.

### **(2) Final Report Submission Requirements**

The U.S. Firm shall provide the following to USTDA:

**(a)** One (1) complete hard copy of the Final Report for USTDA's records. This version shall have been approved by the Client in writing and must be in the English language. It is the responsibility of the U.S. Firm to ensure that confidential information, if any, contained in this version be clearly marked. USTDA will maintain the confidentiality of such information in accordance with applicable law.

and

**(b)** One (1) hard copy of the Final Report suitable for public distribution (“Public Version”). The Public Version shall have been approved by the Client in writing and must be in the English language. As this version will be available for public distribution, it must not contain any confidential information. If the report in (a) above contains no confidential information, it may be used as the Public Version. In any event, the Public Version must be informative and contain sufficient Project detail to be useful to prospective equipment and service providers.

and

**(c)** Two (2) CD-ROMs, each containing a complete copy of the Public Version of the Final Report. The electronic files on the CD-ROMs shall be submitted in a commonly accessible read-only format. As these CD-ROMs will be available for public distribution, they must not contain any confidential information. It is the responsibility of the U.S. Firm to ensure that no confidential information is contained on the CD-ROMs.

The U.S. Firm shall also provide one (1) hard copy of the Public Version of the Final Report to the Commercial or Economic Section of the U.S. Embassy in Host Country for informational purposes.

### **(3) Final Report Presentation**

All Final Reports submitted to USTDA must be paginated and include the following:

**(a)** The front cover of every Final Report shall contain the name of the Client, the name of the U.S. Firm who prepared the report, a report title, USTDA's logo, and USTDA's address. If the complete version of the Final Report contains confidential information, the U.S. Firm shall be responsible for labeling the front cover of that version of the Final Report with the term “Confidential Version”. The U.S. Firm shall be responsible for labeling the front cover of the Public Version of the Final Report with the term “Public Version”. The front cover of every Final Report shall also contain the following disclaimer:

“This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U.S. Government. The opinions, findings, conclusions or recommendations expressed in this document are those of the author(s) and do not necessarily represent the official position or policies of USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report.”

**(b)** The inside front cover of every Final Report shall contain USTDA's logo, USTDA's address, and USTDA's mission statement. Camera-ready copy of USTDA Final Report specifications will be available from USTDA upon request.

(c) The U.S. Firm shall affix to the front of the CD-ROM a label identifying the Host Country, USTDA Activity Number, the name of the Client, the name of the U.S. Firm who prepared the report, a report title, and the following language:

“The U.S. Firm certifies that this CD-ROM contains the Public Version of the Final Report and that all contents are suitable for public distribution.”

(d) The U.S. Firm and any subcontractors that perform work pursuant to the Grant Agreement must be clearly identified in the Final Report. Business name, point of contact, address, telephone and fax numbers, and e-mail address shall be included for U.S. Firm and each subcontractor.

(e) The Final Report, while aiming at optimum specifications and characteristics for the Project, shall identify the availability of prospective U.S. sources of supply. Business name, point of contact, address, telephone and fax numbers, and e-mail address shall be included for each commercial source.

(f) The Final Report shall be accompanied by a letter or other notation by the Client which states that the Client approves the Final Report. A certification by the Client to this effect provided on or with the invoice for final payment will meet this requirement.

(g) The Client, USTDA, and the Commercial and/or Economic Section(s) of the U.S. Embassy in Host Country shall have irrevocable, worldwide, royalty-free, non-exclusive rights to use and distribute the Final Report.

## **J. Modifications**

All changes, modifications, assignments or amendments to this Agreement of Understanding, including the appendices, shall be made only by written agreement by the Agreement of Understanding Parties hereto, subject to written USTDA approval.

## **K. Technical Assistance Schedule**

### **(1) Technical Assistance Completion Date**

The completion date for the Technical Assistance, which is November 30, 2016, is the date by which the Agreement of Understanding Parties estimate that the Technical Assistance will have been completed.

### **(2) Time Limitation on Disbursement of USTDA Grant Funds**

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this Agreement of Understanding for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) no USTDA funds may be disbursed more than four (4) years after the Effective Date of the Grant Agreement.

## **L. Business Practices**

The Agreement of Understanding Parties recognize the existence of standards of conduct for public officials and commercial entities in their respective countries. Therefore, the Agreement of Understanding Parties shall fully comply with all United States and Host Country laws relating to corruption or bribery. For example, the U.S. Firm and its subcontractors shall fully comply with the requirements of the Foreign Corrupt Practices Act, as amended (15 U.S.C. §§ 78dd-1 et seq.). Each Agreement of Understanding Party agrees that it shall require that any agent or representative hired to represent it in connection with the Technical Assistance will comply with this paragraph and all laws which apply to activities and obligations of that Agreement of Understanding Party, including, but not limited to, those laws and obligations referenced above.

## **M. USTDA Address and Fiscal Data**

Any communication with USTDA regarding this Agreement of Understanding shall be sent to the following address and include the fiscal data listed below:

U.S. Trade and Development Agency  
1000 Wilson Boulevard, Suite 1600  
Arlington, Virginia 22209-3901  
USA

Phone: (703) 875-4357

Fax: (703) 875-4009

### Fiscal Data:

Appropriation No.: 11 15/16 1001

Activity No.: 2015-51022A

Reservation No.: 2015200

Grant No.: GH201551200

## **N. Taxes**

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country, except for taxes of a de minimis nature imposed on local lodging, food, transportation, or airport arrivals or departures. Neither the Client nor the U.S. Firm will seek reimbursement from USTDA for taxes, tariffs, duties, fees or other levies, except for taxes of a de minimis nature referenced above.

## **O. Export Licensing**

The U.S. Firm and all subcontractors are responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.

## **P. Contact Persons**

The Client designates the following person as the contact person for matters concerning this Agreement of Understanding:

ANPTrilhos  
Roberta Marchesi  
Setor de Autarquias Sul - Quadra 1 - Bloco J - Ed. CNT  
Torre A - 5º andar - Sala 510 - CEP 70.070-010 – Brasília, DF  
Brazil  
+55 (61) 3322-3158  
Email: [roberta.marchesi@anptrilhos.org.br](mailto:roberta.marchesi@anptrilhos.org.br)

The U.S. Firm designates the following person as the contact person for matters concerning this Agreement of Understanding:

Name:  
Title:  
Phone:  
Fax:  
E-Mail:

If anyone designated by an Agreement of Understanding Party as a contact person ceases service as a contact person at any point during the ten-year period following the date of signing of this Agreement of Understanding, the Agreement of Understanding Party that had designated that contact person shall provide USTDA and the other Agreement of Understanding Party with the name and contact information of a replacement contact person.

## **Q. Liability**

This Agreement of Understanding may include a clause that limits the liability of the Agreement of Understanding Parties, provided that such a clause does not (i) disclaim liability for damages that are natural, probable, and reasonably foreseeable as a result of a breach of this Agreement of Understanding, or (ii) limit the total amount of damages recoverable to an amount less than the total amount disbursed to the U.S. Firm pursuant to this Agreement of Understanding. If any clause included by the Agreement of Understanding Parties is inconsistent with either or both of these limitations, it shall be invalid and unenforceable to the extent of the inconsistency.

## **R. Arbitration**

If the Agreement of Understanding Parties submit any dispute arising under this Agreement of Understanding for arbitration, the scope of any such arbitration shall be limited to the Agreement of Understanding Parties' rights and/or obligations under this Agreement of Understanding and may not extend to any right or obligation of USTDA. The arbitrator(s) shall not arbitrate issues directly affecting the rights or obligations of USTDA.

## **S. Reporting Requirements**

The U.S. Firm shall advise USTDA by letter as to the status of the Project on March 1st annually for a period of two (2) years after completion of the Technical Assistance. In addition, if at any time the U.S. Firm receives follow-on work from the Client, the U.S. Firm shall so notify USTDA and designate the U.S. Firm's contact point including name, telephone, fax number, and e-mail address. Since this information may be made publicly available by USTDA, any information which is confidential shall be designated as such by the U.S. Firm and provided separately to USTDA. USTDA will maintain the confidentiality of such information in accordance with applicable law.

## ANNEX 5

## Annex I

### **Terms of Reference**

#### **Objective**

The Grantee for this technical assistance is Associação Nacional dos Transportadores de Passageiros sobre Trilhos (“ANPTrilhos”). The purpose of this technical assistance is to develop an overall functional design and global operational concept for the on-board intelligence and communications systems needed to deliver an advanced real time video monitoring system, as opposed to developing a plan for each operator.

The technical assistance will develop a strategic communications and real time video monitoring implementation plan that will: (a) provide an objective assessment of ANPTrilhos’s technical environment in terms of staff, equipment, infrastructure, architecture, and services; (b) define communications and real time video monitoring technology vision for the overall project; (c) recommend the communications architecture and design guidelines (to address real time video applications, data, technology, networks, integration, and transmission requirements, etc.); (d) recommend policies, standards and procedures for communications and real time video monitoring functions; (e) develop an overall functional design and operational concept for the on-board intelligence and the communications systems; (f) recommend the overall structure for supporting the deployment of new communications and a real time video monitoring program and; (g) develop a comprehensive and overall implementation plan that recommends solutions and technology acquisitions and includes a schedule and budget (the “Project”).

The U.S. Firm shall evaluate ANPTrilhos’s communications and video monitoring infrastructure needs by assessing and analyzing proven, available technologies and applications, and through benchmarking of relevant technologies.

All deliverables for all tasks shall be provided in both English and Portuguese.

#### **Task 1: Current State Assessment and Global Reference Benchmarking**

ANPTrilhos shall identify key personnel and other stakeholders that will participate in the technical assistance to guide its progression and review the study’s goals, parameters, and objectives. The U.S. Firm shall develop a timeline to guide the technical assistance’s completion, including the venue and frequency of meetings to be held in Brazil. The timeline shall be discussed and agreed upon with the ANPTrilhos.

The U.S. Firm shall coordinate all efforts necessary to conduct the initial kick-off meeting in Brazil. The purpose of the kick-off meeting is to familiarize ANPTrilhos and the U.S. Firm’s staff involved in the technical assistance with its goals, as well as a review of ANPTrilhos and the U.S. Firm’s responsibilities. The U.S. Firm shall conduct meetings with ANPTrilhos to gather information on ANPTrilhos’ rail communications systems, including:

- materials;
- documentation;

- previous technical studies;
- communication design documents; and
- other relevant information.

The U.S. Firm shall review previous feasibility studies and analysis of documents, provided by ANPTrilhos, for each of the passenger rail systems operated by members of ANPTrilhos, including:

- existing and planned passenger rail systems;
- passenger traffic forecasts;
- rail communications system infrastructure and design plans developed by passenger rail operators (public and private);
- communication system investment plans;
- and other relevant documents.

The U.S. Firm shall use the information gathered in this review to recommend communication technologies and video monitoring applications and systems that are viable for ANPTrilhos' implementation.

The U.S. Firm shall analyze international market trends for rail communication systems specific to the transmission of video images from rail cars to control centers and other associated technologies used in the transmission of video images for the same purpose, as well as other existing conditions that are relevant to the project, such as plans and contracts in place for the development of new passenger rail systems (public and private) in Brazil.

The U.S. Firm shall analyze the ANPTrilhos' technical and administrative capabilities in the communications field, in terms of staff, equipment, infrastructure, architecture, and services. The U.S. Firm shall review ANPTrilhos' vision for the Project and identify the communication systems development requirements. The U.S. Firm shall review ANPTrilhos' current implementation concept plan for communications systems directly related to the transmission of video images from rail cars to control centers and define core values and directions for ANPTrilhos, as well as define the new communications system service criteria.

The U.S. Firm shall engage in substantive discussions with ANATEL (Brazil's National Telecommunications Agency) throughout the technical assistance process to ensure that any recommendations for the new communication systems would meet, comply with, and be acceptable to ANATEL. The U.S. Firm shall then conduct a global benchmarking process through a case study of the most advanced passenger rail systems in developed countries and review of advanced communication systems specifically for the transmission of video in real time from rail cars to control centers. This will include the review of best practices at the international level on the use of the most advanced technologies for real time video monitoring systems, as well as the future trends for the same technologies.

The U.S. Firm shall discuss and define the goals and objectives that are sought by the ANPTrilhos by developing a practical plan to identify short and medium-term milestones for the acquisition and implementation of various communication and real time video monitoring

systems that in turn are expected to increase security and operational efficiency for the control and management of the various passenger rail systems in Brazil.

## **Task 2: Analysis of Communications Infrastructure and Related Video Technologies**

The U.S. Firm shall analyze the communications infrastructure and existing related technologies for all passenger rail systems under ANPTrilhos membership as well as those systems under development by different operators to include a review of their specific communications requirements to define a global conceptual design for the transmission of video from rail cars to control centers. The U.S. Firm shall visit all of ANPTrilhos' member operated passenger rail systems and associated control centers with the purpose to conduct a communication system analysis for the application of real time video monitoring systems for all the operators that will assist the U.S. Firm in developing the global implementation plan.

The U.S. Firm shall develop various alternatives (on a global scale) for ANPTrilhos with the purpose to find solutions for the transmission of video and how the new communication technologies could be integrated into the overall train control systems for ANPTrilhos.

The U.S. Firm shall evaluate ANPTrilhos' communications infrastructure needs for passenger rail systems and control centers as well as the technical aspects of their communications architectures by assessing and analyzing proven, available communications technologies, applications, and through international benchmarking of the relevant technology. The U.S. Firm shall define the communications and real time video monitoring technology vision for the overall project.

The U.S. Firm shall then conduct a technical analysis of existing and proposed communication systems infrastructure currently in use (or being designed) for the various ANPTrilhos passenger rail systems with the purpose to identify and recommend an integrated communication system architecture and infrastructure to provide ANPTrilhos with the overall solutions for transmitting real time video from the rail cars to control centers. In addition, The U.S. Firm shall review the communication systems currently being utilized by ANPTrilhos to include the following capabilities:

- Live data communications, such as live voice data to and from trains;
- Geographic Positioning System (GPS) coordinates for automatic train location;
- Text messaging to and from the train, emergency alarms; and
- Live stream video and other.

The U.S. Firm shall consider the various communication systems for real time video monitoring to include:

- satellite;
- cellular 3G/4G;
- LTE wireless;
- standard Wi-Fi;
- standard mobile Wi-Max;
- Wireless Local Area Network (WLAN);
- short-range radio communications;

- mesh networks; and
- others available in the market at the time of the technical assistance.

Additionally, other aspects of the communications system review will involve:

- trackside communications;
- interconnectivity between internal wired;
- internal wireless and external wireless systems;
- intra-train and internal on-board networks;
- IP gateway;
- on-board data storage networks;
- horizontal and vertical seamless handover issues on external wireless links; and
- coverage and multiple access issues in order to guarantee “end-to-end” delivery of real time images to control centers.

The U.S. Firm shall perform an overall technical analysis of the following:

- Feasibility of applying automatic rail monitoring technology to monitor the conditions inside the passenger rail cars in real-time through the use of communication devices for improved in-car video monitoring systems, improved passenger rail car operational safety, improved quality of service, and improved security;
- Information & Communications Technologies (ICT) and systems to be utilized by ANPTrilhos in connection with real time video monitoring systems and their integration requirements with other passenger rail ICT systems such as automatic train location systems (GPS) and passenger information systems;
- Methods to manage the entire passenger rail system's in-car video monitoring system from the control centers through the implementation of an integrated real time video transmission system (the transmission of video in real time from passenger rail cars to control centers);
- Need to integrate information from existing passenger rail monitoring systems (stations, platforms, tracks, etc.) with new solutions for in-car real time video transmission systems. This evaluation shall include the review of requirements to integrate the passenger rail security systems with other ICT technologies that may be planned by ANPTrilhos;
- Requirements to develop a maintenance management system for the new real time video transmission system and equipment to detect and record malfunctions of the in-car video monitoring system. The U.S. Firm shall review the requirements to integrate the real time video transmission maintenance management system with other ICT technologies.

While the U.S. Firm shall evaluate the various video monitoring systems being utilized by ANPTrilhos in Brazil, the intent is to develop a global operational and functional concept

that could be used by ANPTrilhos for the deployment of real time video monitoring systems, as opposed to developing a specific implementation plan for each operator.

Based on the above analysis, the U.S. Firm shall define a global functional communications architecture for ANPTrilhos, including:

- design guidelines (to address real time video applications, data, technology, networks, integration, and transmission requirements);
- the overall recommended policies, standards and procedures for communications and real time video monitoring functions; and
- a global operational model for the new video monitoring system.

In defining the communications architecture and model, the U.S. Firm shall:

- screen and validate the requirements for architecture and model definition;
- review its reference model with service directions for ANPTrilhos; and
- prioritize the overall technical requirements.

The U.S. Firm shall define the global communications concept for the real time video monitoring system service catalogue, which would detail the services that the system could provide and delineate those services that are mandatory versus optional. The U.S. Firm shall define the overall design guidelines as well as the communications infrastructure guidelines for the new real time video monitoring system. These guidelines shall address:

- hardware;
- software;
- communications;
- procedures; and
- include development of all applicable communication standards for the recommended concept of the passenger rail video monitoring system.

The U.S. Firm shall address the technical challenges associated with establishing the new real time video monitoring system, such as overcoming barriers associated with interoperability and/or “proprietary” issues.

**Deliverable #1:** Based on findings from Tasks 1 and 2, the U.S. Firm shall submit an interim report that includes all work performed under Tasks 1 and 2 including a technical analysis of, and recommendations for, a global communications architecture and infrastructure for the new passenger rail video monitoring system.

### **Task 3: Financial Analysis**

The U.S. Firm shall investigate potential sources for financing the acquisition of the communications technologies and related passenger rail video monitoring system such as:

- the U.S. Export-Import Bank;
- U.S. Overseas Private Investment Corporation;
- the International Finance Corporation;
- multilateral development banks such as the World Bank and the Inter-American Development Bank;

- the Brazilian National Development Bank (BNDES); and
- private and commercial sources.

The U.S. Firm's financial analysis shall review the life-cycle costs associated with the recommended communication technologies and related passenger rail video monitoring system, the method to procure the new technologies, and costs to:

- Procure each of the recommended technologies;
- Operate and maintain the new communications and video monitoring system;
- Train and certify the new video monitoring system's staff and;
- Acquire the required approvals and permits from ANATEL and other regulators in Brazil.

The U.S. Firm's financial analysis shall identify the global operational cost savings to ANPTrilhos that could be achieved by implementing the recommended communication technologies and associated video monitoring system, as well as to the system's users (i.e. passengers) in terms of improved security and safety. The U.S. Firm shall review ANPTrilhos' procurement methods and identify any issues that may affect the acquisition and implementation of the recommended communications technologies and associated video monitoring system. Based on the financial analysis results, the U.S. Firm shall formulate a global financial plan for ANPTrilhos to guide the acquisition and implementation of the communications technologies and associated video monitoring system.

#### **Task 4: Institutional, Legal, and Regulatory Review**

The U.S. Firm shall review international communication standards and Brazil's local, state, federal laws applicable to the use of communication systems and associated frequencies that may be required to implement the new real time video monitoring system. In addition, the U.S. Firm shall review the public transportation regulations and standards that could impact the application of the recommended technologies.

The U.S. Firm shall review Brazil's institutional, legal, and regulatory provisions pertaining to the implementation of communication technologies for passenger rail applications to determine if there are any significant issues that could affect the implementation of new communication technologies for real time video monitoring systems.

The U.S. Firm shall engage in substantive discussions with ANATEL throughout the development of the technical assistance with the purpose to present ANATEL with the objectives of the project, receive input from ANATEL related to the various technologies that would be and not be acceptable or compatible in Brazil, work diligently with ANATEL and ANPTrilhos on the selection of communication frequencies that may be dedicated specifically for passenger rail communications (in particular real time video information), and to obtain ANATEL's input and concurrence on the communication solutions and technologies that are ultimately recommended for the project.

**Deliverable #2:** Based on the findings from Task 3 and 4, the U.S. Firm shall submit an interim report that includes all work performed under Task 3 and 4 including a regulatory

analysis and review of the feasibility for ANPTrilhos to use a specific method of communication for the project.

### **Task 5: Development of Solutions and Specifications/Recommendations for an Integrated Communications and Video Monitoring System**

The U.S. Firm shall develop the functional and technical specifications for the recommended communication technologies and associated video monitoring system, as well as the global functional design for the new passenger rail video monitoring system along with the overall communications infrastructure and central control requirements.

The U.S. Firm shall develop technical specifications for any other component or supplementary system/equipment that the recommended communication technologies require. The U.S. Firm shall develop a comprehensive list of U.S. manufacturers and suppliers of the recommended communication technologies and real time video monitoring systems. This list shall include a description of each manufacturer or supplier and a point of contact.

The U.S. Firm shall identify (in overall terms) any interoperability and integration issues between the recommended technologies and other passenger rail systems. If applicable, the U.S. Firm shall recommend suitable solutions to overcome interoperability issues to enable ANPTrilhos to successfully implement the recommended communication technologies and associated video monitoring system. In developing its recommended functional design, guidelines and overall implementation plan for the new video monitoring system, the U.S. Firm shall consider standards, guidelines, and regulations from international communication organizations that are applicable to the project's implementation.

For each of the recommended communication technologies and associated video monitoring systems, the U.S. Firm shall assess (in general terms) the anticipated effect on ANPTrilhos' passenger rail operations and management, explore implementation and installation considerations that would have to be addressed, and identify the likely risks, and mitigation strategies if any, involved.

The U.S. Firm shall conclude the real time video monitoring system concept analysis by completing the overall design concept and passenger rail video monitoring system vision for ANPTrilhos. The U.S. Firm shall define the following for ANPTrilhos:

- Core services, including all communications, video monitoring, and other services as applicable;
- Communications and video monitoring applications and priorities;
- Future communications and real time video monitoring governance and processes;
- Organizational structure and communications service delivery recommendations; and
- Video monitoring system operational model, including the communications infrastructure and operational model that includes information on integration and organization.

The U.S. Firm shall develop the overall functional design and operational concepts for the on-board intelligence and the communications systems, as well as the recommended structure

for supporting the deployment of the modern communications and video monitoring program.

The U.S. Firm shall evaluate various alternatives for operational concepts as well as develop and validate a more intelligent on-board video monitoring system for allowing the "real-time" transmission of the video coming from on-board cameras to the control centers. The U.S. Firm shall concentrate mainly on the need for efficient and modern communication systems between on-board (train) and wayside (track) with a reliable level of service (high quality transmissions) which will be required to transmit "real-time" video images delivered by the on-board cameras. The U.S. Firm shall engage in the identification of intelligent, robust, and efficient video techniques while respecting the operational requirements and constraints that other systems may present.

#### **Task 6: Preliminary Environmental Assessment**

The U.S. Firm shall conduct a preliminary review of the video monitoring project's environmental impact with reference to local requirements and those of Brazilian environmental regulations. This review shall identify potential positive and negative impacts and shall discuss the extent to which negative impacts can be avoided or mitigated. The U.S. Firm shall identify any necessary environmental approvals required for project implementation.

#### **Task 7: Developmental Impact Assessment**

The U.S. Firm shall analyze the developmental impacts for implementing the recommended communication technologies and video monitoring systems. This analysis shall assess the impacts on infrastructure, market oriented reforms, human capacity building, technology transfer and productivity enhancements, and other developmental impacts that are likely to result from the implementation of the new real time video monitoring system in Brazil:

*Infrastructure:* The U.S. firm shall analyze the new passenger rail video monitoring's development impacts and submit a report that describes how the implementation of the recommended technologies and applications would supplement the passenger rail infrastructure in Brazil.

*Market-Oriented Reforms:* The U.S. firm shall describe any recommended regulations, laws, or institutional changes that would result from the implementation of the recommended communications and video monitoring technologies.

*Human Capacity Building:* The U.S. firm shall assess the number and type of local positions that would be required to implement, operate, and maintain the recommended communications and video monitoring systems, as well as any specialized training requirements.

*Technology Transfer and Productivity Enhancement:* The U.S. firm shall describe the advanced communications and video monitoring technologies and applications that would be employed in ANPTrilhos' passenger rail systems, including operational

efficiencies. Specifically, the U.S. firm shall analyze and identify the technologies' impact on the overall passenger rail system's security, safety and operational efficiencies. The U.S. firm shall develop specific measures to forecast these impacts such as improved video monitoring reliability and accuracy, savings in operating costs, and improved safety and security functions.

*Other Issues:* The U.S. firm shall identify other developmental impacts and/or benefits that are likely to result from the modern communications and video monitoring system implementations.

### **Task 8: Implementation Plan - Integrated Communications and Video Monitoring System**

The U.S. Firm shall evaluate the most effective and efficient approach to implement the communications technologies and related video monitoring systems and then develop a timeline, execution schedule, and process outline for ANPTrilhos to complete its acquisition and implementation of the recommended technologies, either as a turn-key project or in project phases. The U.S. Firm shall develop a systematic action plan for the acquisition and implementation of the communications and video monitoring technologies that identifies short and medium-term implementations in accordance with the technical assistance's objectives as well as the complete integrated communications solution.

The global Implementation Plan shall include the necessary steps and actions to be taken in connection with the institutional, legal, financial, and technical aspects as it relates to the modern passenger rail video monitoring system. The Implementation Plan shall specify, step by step the actions required by ANPTrilhos in the acquisition and implementation of the recommended technologies.

The U.S. Firm shall provide a list of local, Brazilian companies, which includes a point of contact and company background that could potentially partner with U.S. firms to facilitate U.S. exports for the Project. The U.S. Firm shall focus its technical assessment and analysis on proven technologies and communications and monitoring system applications that are available in the international market at the time of the technical assistance and after conducting the appropriate international benchmarking process. The U.S. Firm shall identify locations where the recommended technologies have been successfully deployed and currently in operation.

The U.S. Firm shall prepare a set of guidelines for communications and video monitoring technology selection taking into account operational and life-cycle costs elements, maintenance, as well as equipment warranties and open architectures for the implementation of the recommended technologies.

The U.S. Firm shall prepare an interim report that summarizes the technical assistance findings and recommendations. The interim report shall identify the potential cumulative benefits expected from the modern communications and video monitoring technologies as it directly relates to the Grantee's operational and management enhancements.

**Deliverable #3:** Based on findings from Tasks 5, 6, 7, and 8, the U.S. Firm shall submit the third interim report at the end of Task 8. This report shall include all work performed under Tasks 5, 6, 7, and 8. The U.S. Firm shall obtain ANPTrilhos' approval prior to completing the final report.

### **Task 9: Final Report**

The U.S. Firm shall prepare and deliver to ANPTrilhos and USTDA a substantive and comprehensive final report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the above tasks and shall include all deliverables and documents that have been provided to ANPTrilhos. The U.S. Firm shall provide one copy of the Final Report in Portuguese to ANPTrilhos. The Final Report shall be prepared and delivered to USTDA, in English, in accordance with Clause I of Annex II of the Grant Agreement.

Notes:

1. The U.S. Firm is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.
2. ANPTrilhos and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work products that are developed under these Terms of Reference.
3. Confidential information relative to the technical assistance shall be presented under a separate report and labeled "Confidential Information Report".

## ANNEX 6



## USTDA-Funded Feasibility Study, Technical Assistance, or Training Grant

### U.S. Firm Information Form

This form is designed to enable the U.S. Trade and Development Agency ("USTDA") to obtain information about entities and individuals proposed for participation in USTDA-funded activities. Information in this form is used to conduct screening of entities and individuals to ensure compliance with legislative and executive branch prohibitions on providing support or resources to, or engaging in transactions with, certain individuals or entities with which USTDA must comply.

USTDA Activity Number [ <i>To be completed by USTDA</i> ]							
Activity Type [ <i>To be completed by USTDA</i> ]		Feasibility Study		Technical Assistance		Other (specify)	
Activity Title [ <i>To be completed by USTDA</i> ]							
Full Legal Name of U.S. Firm							
Business Address (street address only)							
Telephone		Fax		Website			
Year Established (include any predecessor company(s) and year(s) established, if appropriate). Please attach additional pages as necessary.							
Type of Ownership		Publicly Traded Company					
		Private Company					
		Other (please specify)					
Please provide a list of directors and principal officers as detailed in Attachment A. Attached? (Not Applicable for U.S. Publicly Traded Company)						Yes	
If Private Company or Other (if applicable), provide a list of shareholders and the percentage of their ownership. In addition, for each shareholder that owns 15% or more shares in U.S. Firm, please complete Attachment B.							
Is the U.S. Firm a wholly-owned or partially owned subsidiary?		Yes					
		No					
If so, please provide the name of the U.S. Firm's parent company(ies). In addition, for any parent identified, please complete Attachment B.							
Is the U.S. Firm proposing to subcontract some of the proposed work to another firm?		Yes					
		No					
If yes, U.S. Firm shall complete Attachment C for each subcontractor. Attached?		Yes					
		Not applicable					
<b>Project Manager</b>							
Name		Surname					
		Given Name					
Address							
Telephone							
Fax							
Email							
<b>Negotiation Prerequisites</b>							
Discuss any current or anticipated commitments which may impact the ability of the U.S. Firm or its subcontractors to complete the Activity as proposed and reflect such impact within the project schedule.							
Identify any specific information which is needed from the Grantee before commencing negotiations.							

*U.S. Firm may attach additional sheets, as necessary.*

**U.S. Firm's Representations**

U.S. Firm shall certify to the following (or provide an explanation as to why any representation cannot be made):

1. U.S. Firm is a [check one]  Corporation  LLC  Partnership  Sole Proprietor  Other: 

duly organized, validly existing and in good standing under the laws of the State of:  .

The U.S. Firm has all the requisite corporate power and authority to conduct its business as presently conducted, to submit this proposal, and if selected, to execute and deliver a contract to the Grantee for the performance of the USTDA Activity. The U.S. Firm is not debarred, suspended, or to the best of its knowledge or belief, proposed for debarment or ineligible for the award of contracts by any federal or state governmental agency or authority.
2. The U.S. Firm has included herewith, a copy of its Articles of Incorporation (or equivalent charter or document issued by a designated authority in accordance with applicable laws that provides information and authentication regarding the legal status of an entity) and a Certificate of Good Standing (or equivalent document) issued within 1 month of the date of signature below by the State of:  .

The U.S. Firm commits to notify USTDA and the Grantee if it becomes aware of any change in its status in the state in which it is incorporated. USTDA retains the right to request an updated certificate of good standing. **(U.S. publicly traded companies need not include Articles of Incorporation or Good Standing Certificate)**
3. Neither the U.S. Firm nor any of its directors and principal officers have, within the ten-year period preceding the submission of this proposal, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a federal, state or local government contract or subcontract; violation of federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating federal or state criminal tax laws, or receiving stolen property.
4. Neither the U.S. Firm, nor any of its directors and principal officers, is presently indicted for, or otherwise criminally or civilly charged with, commission of any of the offenses enumerated in paragraph 3 above.
5. There are no federal or state tax liens pending against the assets, property or business of the U.S. Firm. The U.S. Firm, has not, within the three-year period preceding the submission of this proposal, been notified of any delinquent federal or state taxes in an amount that exceeds US\$3,000 for which the liability remains unsatisfied. Taxes are considered delinquent if (a) the tax liability has been fully determined, with no pending administrative or judicial appeals; and (b) a taxpayer has failed to pay the tax liability when full payment is due and required.
6. The U.S. Firm has not commenced a voluntary case or other proceeding seeking liquidation, reorganization or other relief with respect to itself of its debts under any bankruptcy, insolvency or other similar law. The U.S. Firm has not had filed against it an involuntary petition under any bankruptcy, insolvency or similar law.
7. The U.S. Firm certifies that it complies with USTDA Nationality, Source, and Origin Requirements and shall continue to comply with such requirements throughout the duration of the USTDA-funded activity. The U.S. Firm commits to notify USTDA and the Grantee if it becomes aware of any change which might affect U.S. Firm's ability to meet the USTDA Nationality, Source, and Origin Requirements.

*The U.S. Firm shall notify USTDA if any of the representations are no longer true and correct.*

U.S. Firm certifies that the information provided in this form is true and correct. U.S. Firm understands and agrees that the U.S. Government may rely on the accuracy of this information in processing a request to participate in a USTDA-funded activity. If at any time USTDA has reason to believe that any person or entity has willfully and knowingly provided incorrect information or made false statements, USTDA may take action under applicable law. The undersigned represents and warrants that he/she has the requisite power and authority to sign on behalf of the U.S. Firm.

Name		Signature	
Title			
Full Legal Name of U.S. Firm		Date	





**ATTACHMENT B**

**USTDA-Funded Feasibility Study, Technical Assistance, or Training Grant**

**U.S. Firm Information Form – Shareholder(s) and Parent Company(ies)**

If applicable, U.S. Firm provided a list of shareholders and the percentage of their ownership. This form shall be completed for each shareholder that owns 15% or more shares in U.S. Firm, as well as any parent corporation of the U.S. Firm (“Shareholder”). In addition, this form shall be completed for each shareholder identified in Attachment B that owns 15% or more shares in any Shareholder, as well as any parent identified in Attachment B.

USTDA Activity Number [To be completed by USTDA]	
--	--

Activity Title [To be completed by USTDA]	
---	--

Full Legal Name of U.S. Firm	
------------------------------	--

Full Legal Name of Shareholder	
--------------------------------	--

Business Address of Shareholder (street address only)	
---	--

Telephone number		Fax Number	
------------------	--	------------	--

Year Established (include any predecessor company(s) and year(s) established, if appropriate). Please attach additional pages as necessary.	
---	--

Country of Shareholder’s Principal Place of Business	
--	--

Please provide a list of directors and principal officers as detailed in Attachment A. Attached?	Yes
--	-----

Type of Ownership	Publicly Traded Company
	Private Company
	Other

If applicable, provide a list of shareholders and the percentage of their ownership. In addition, for each shareholder that owns 15% or more shares in Shareholder, please complete Attachment B.	
---	--

Is the Shareholder a wholly-owned or partially owned subsidiary?	Yes
	No

If so, please provide the name of the Shareholder’s parent(s). In addition, for any parent identified, please complete Attachment B.	
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*Shareholder may attach additional sheets, as necessary.*



**ATTACHMENT C**

**USTDA-Funded Feasibility Study, Technical Assistance, or Training Grant**

**Subcontractor Information Form**

This form is designed to enable the U.S. Trade and Development Agency ("USTDA") to obtain information about entities and individuals proposed for participation in USTDA-funded activities. Information in this form is used to conduct screening of entities and individuals to ensure compliance with legislative and executive branch prohibitions on providing support or resources to, or engaging in transactions with, certain individuals or entities with which USTDA must comply.

USTDA Activity Number [*To be completed by USTDA*]

Activity Title [*To be completed by USTDA*]

Full Legal Name of Prime Contractor U.S. Firm ("U.S. Firm")

Full Legal Name of Subcontractor

Business Address of Subcontractor (street address only)

Telephone Number

Fax Number

Year Established (include any predecessor company(s) and year(s) established, if appropriate). Please attach additional pages as necessary.

**Subcontractor Point of Contact**

Name	Surname	
	Given Name	

Address

Telephone

Fax

Email

**Subcontractor's Representations**

Subcontractor shall provide the following (or any explanation as to why any representation cannot be made), made as of the date of the proposal:

1. Subcontractor is a <i>[check one]</i>	<input type="checkbox"/> Corporation	<input type="checkbox"/> LLC	<input type="checkbox"/> Partnership	<input type="checkbox"/> Sole Proprietor	<input type="checkbox"/> Other
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duly organized, validly existing and in good standing under the laws of:  .

2. The subcontractor has all the requisite corporate power and authority to conduct its business as presently conducted, to participate in this proposal, and if the U.S. Firm is selected, to execute and deliver a subcontract to the U.S. Firm for the performance of the USTDA Activity and to perform the USTDA Activity. The subcontractor is not debarred, suspended, or to the best of its knowledge or belief, proposed for debarment or ineligible for the award of contracts by any federal or state governmental agency or authority.
3. Neither the subcontractor nor any of its directors and principal officers have, within the ten-year period preceding the submission of the Offeror's proposal, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a federal, state or local government contract or subcontract; violation of federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating federal or state criminal tax laws, or receiving stolen property.
4. Neither the subcontractor, nor any of its directors and principal officers, is presently indicted for, or otherwise criminally or civilly charged with, commission of any of the offenses enumerated in paragraph 2 above.
5. There are no federal or state tax liens pending against the assets, property or business of the subcontractor. The subcontractor, has not, within the three-year period preceding this RFP, been notified of any delinquent federal or state taxes in an amount that exceeds \$3,000 for which the liability remains unsatisfied. Taxes are considered delinquent if (a) the tax liability has been fully determined, with no pending administrative or judicial appeals; and (b) a taxpayer has failed to pay the tax liability when full payment is due and required.
6. The subcontractor has not commenced a voluntary case or other proceeding seeking liquidation, reorganization or other relief with respect to itself or its debts under any bankruptcy, insolvency or other similar law. The subcontractor has not had filed against it an involuntary petition under any bankruptcy, insolvency or similar law.
7. The Subcontractor certifies that it complies with the USTDA Nationality, Source, and Origin Requirements and shall continue to comply with such requirements throughout the duration of the USTDA-funded activity. The Subcontractor commits to notify USTDA, the Contractor, and the Grantee if it becomes aware of any change which might affect U.S. Firm's ability to meet the USTDA Nationality, Source, and Origin Requirements.

*The selected Subcontractor shall notify the U.S. Firm, Grantee and USTDA if any of the representations included in its proposal are no longer true and correct.*

Subcontractor certifies that the information provided in this form is true and correct. Subcontractor understands and agrees that the U.S. Government may rely on the accuracy of this information in processing a request to participate in a USTDA-funded activity. If at any time USTDA has reason to believe that any person or entity has willfully and knowingly provided incorrect information or made false statements, USTDA may take action under applicable law. The undersigned represents and warrants that he/she has the requisite power and authority to sign on behalf of the Subcontractor.

Name	<input type="text"/>	Signature	<input type="text"/>
Title	<input type="text"/>		
Full Legal Name of Subcontractor	<input type="text"/>	Date	<input type="text"/>