**IBTTA Request for proposal**

**Assessment and certification services supporting selection of the National Interoperability Protocol**

1. **Summary & Background**

The International Bridge, Tunnel and Turnpike Association (IBTTA) was founded in 1932 and is a worldwide association representing toll facility owners and operators and the businesses they serve. IBTTA has members in more than 20 countries and on six continents. Through advocacy, thought leadership and education, members are implementing state-of-the-art, innovative user-based transportation financing solutions to address the critical infrastructure challenges of the 21st century. IBTTA is headquartered in Washington, D.C.

IBTTA is currently accepting proposals for consulting and technical services that support the testing, certification and selection of the National Interoperability (NIOP) protocol. The tolling protocol technology selected out of this process will facilitate seamless travel by roadway users of tolling facilities across North America.

This project is part of the IBTTA’s focus on achieving nationwide toll interoperability by 2016. IBTTA is currently undertaking efforts to plan and implement technologies and business practices leading to electronic toll collection (ETC) interoperability within North America in a manner that fosters open competition and minimizes legal and financial barriers to anyone wishing to provide products and services to toll agencies and customers.

The IBTTA Board, Interoperability (IOP) Steering Committee and sub-committees have made great progress over the last several years toward the NIOP objective. Selection of a national protocol technology is part of the overall blueprint and implementation strategy for achieving that goal.

Toll operators use a combination of roadside reader technology and in-vehicle transponders or “tags” that communicate with each other. Together, the reader/transponder solution transmits over a given radio frequency range to identify unique customers and to collect toll charges automatically. Currently, the electronic tolling technologies in use by toll operators form a patchwork of incompatible versions of RFID (radio-frequency identification). The IBTTA’s goal and the objective of this project are to identify a universal protocol, or protocols, that can be integrated with existing toll technologies. Toll road operators that do not currently use the NIOP selected protocol(s) could then choose to migrate to the universal standard in the short term by deploying dual/multi-protocol lane technology to read transponders from out-of-region customers. Customers could be given the choice of using the local protocol or using a NIOP transponder for travel to other regions. In the longer term, toll operators could elect to migrate to the NIOP selected protocol(s) as the technology of choice for all their in-region customers.

The IBTTA Board has approved the following **NIOP reference documents relevant to this RFP** that support this effort:

* NIOP Business Rules Document
* NIOP Requirements Document (Electronic Toll Collection Protocol Requirements Document)

These documents can be found at the following link: <http://www.ibtta.org/ibtta-interoperability-committee-iop>

**NOTE: This RFP does not constitute a promise, an offer, or any other commitment legally binding on IBTTA. While IBTTA intends to make a selection and enter into a contract as a result of this RFP, IBTTA reserves the right, in its sole discretion, to: 1) cancel or terminate this RFP; 2) reject any or all proposals received; 3) waive or change any provisions of this RFP, including dates and deadlines; and/or 4) not enter into a contract.**

1. **Purpose**

The purpose of this Request for Proposal (RFP) is to solicit proposals from various candidate organizations, for conducting an evaluation, and selecting the candidate who, in the view of IBTTA, best represents the goals and objectives of the IBTTA’s interoperability mission.

This RFP seeks respondents that offer the appropriate expertise and experience necessary to provide the following:

1. Fully and independently evaluate compliancy of NIOP candidate protocols against a list of approved technical and business standards.
2. Develop and oversee a performance testing program for compliant NIOP candidate protocols that supports the IBTTA’s evaluation and selection process.
3. Supply the IBTTA’s NIOP evaluation committees and Board with in-depth performance data, analyses, reports and consultative expertise to reinforce this effort.
4. **Electronic Tolling Protocol Overview, Nomination and Sponsorship**

There are various radio frequency-based “protocols” operating in common use in North America in the 902-928 MHz spectrum for the purposes of electronic toll collection (ETC). These protocols are deployed in on-board units (“OBUs”) and roadside equipment (“RSEs”) in order to allow a device deployed in a vehicle to communicate with a toll facility, gantry or plaza.

**ETC RFID System**



RSE equipment is available in the market that will allow toll operators to read multiple protocols. These systems typically work by switching between protocols, meaning that particularly in the case of high speed open road toll collection (ORT), the amount of time spent searching for the appropriate protocol to match the in-vehicle device (read performance) is a critical element of the ETC transaction. Therefore testing and certification of performance in a multi-protocol environment is critical to the success of the NIOP endeavor.

To facilitate interoperability and meet long-term technical and performance requirements of toll agencies, the IBTTA Board, Steering Committee and supporting technical sub-committees have elected to create standards based on one or more of the existing protocols.

IBTTA recognizes that many hardware components, software modules, and operational issues are involved in an overall program to implement an Electronic Toll Collection (ETC) system. The technical focus of this initiative, however, deals specifically with the system component that provides the ability to automatically, accurately, and in real-time, communicate and transmit a unique identifier and other data stored from an OBU traveling with a vehicle passing through a toll lane/zone, to readers installed at the toll gantry or plaza.

The Roadside Operations Sub-committee – the technical working group of the IBTTA – has reviewed commonly used protocols and developed a short-list of NIOP candidates that appear to be capable of meeting the technical aspects of the NIOP Requirements Document. To develop the short-list, the committee evaluated protocols against NIOP requirements and gave consideration to candidate protocols that were in common use. The short-listed protocols were accepted by the IBTTA IOP Steering Committee in July 2014. The short-listed candidate protocols are the following:

* ISO 18000 6C (also known as ISO 18000 63, or just 6C)
* SEGO (also known as ISO 18000 6B+)
* TDM (also known as IAG or E-ZPass)



As part of the progress toward NIOP implementation, the next step is the NIOP protocol selection. A Special Panel has been created to verify, through industry input, the acceptance for testing of one or more candidate protocols. Selection of protocols will occur by requesting Toll Operators to nominate one protocol from the short-listed candidates, and toll device suppliers to sponsor one or more of the candidate protocols**.** For a protocol to advance into testing consideration it must have at least one Toll Operator’s nomination and one supplier Sponsor.

Following the Special Panel recommendations being accepted by the IBTTA Board, the testing phase will begin.

Note: The notice to proceed (for any phase of testing) will be contingent on IBTTA Board approval and to be determined sources of funding.

1. **NIOP Timeline**

The feasibility testing services within the scope of this RFP will be overseen and coordinated by the IBTTA Roadside Sub-Committee (ROSC). Evaluation and final recommendation(s) will be reviewed by the IBTTA NIOP Steering Committee and provided to the IBTTA Board of Directors for final selection of the NIOP protocol.

**The services requested by this RFP will support compliance and performance testing of the nominated protocols** which is estimated to occur in the third quarter of 2015 through first quarter of 2016. The key critical milestones to be achieved during this time frame include:

* Develop and approve protocol feasibility test program/plan (Roadside Sub-committee in conjunction with testing service provider)
* Determine testing location(s) and schedules (Roadside Sub-committee in conjunction with testing service provider)
* Conduct feasibility testing in both lab and field environments (testing service provider)
* Review and agree on final test results (Roadside Sub-committee with support of testing services provider)
* Presentation of results and recommendation(s) to IBTTA Board

Certification and accreditation of NIOP protocol providers is expected to take place during the second quarter 2016 with potential implementation and deployment of NIOP protocol technology to toll operators subsequent to certification and accreditation.

The table and chart below show approximate dates for meeting the IBTTA’s NIOP implementation timeline.

|  |  |  |
| --- | --- | --- |
| **Date** | **Progress** | **Comment** |
| **June 1, 2015** | **20%** | **Protocols Selected for Testing** |
| **July 1, 2015** | **25%** | **Testing Service Provider Selected** |
| **September 1, 2015** | **28%** | **Protocol Feasibility Test Plan Accepted** |
| **October 1, 2015** | **30%** | **Testing Location(s} and Schedules Finalized** |
| **January 1, 2016** | **55%** | **Lab and Field Testing Complete** |
| **February 1, 2016** | **56%** | **Test Results Finalized** |
| **March 1, 2016** | **60%** | **NIOP Protocol(s) Selection Accepted by IBTTA Board** |
| **June 1, 2016** | **70%** | **Certification and Accreditation Complete** |
| **October 1, 2016** | **100%** | **NIOP Deployment**  |



1. **Proposal Guidelines**

This Request for Proposal represents the requirements that ensure an open and competitive process.

* 1. **Request for Proposal Timeline**

**Proposals will be accepted until April 10, 2015.** Any proposals received after this date and time will be returned to the sender. All proposals must be signed by an official agent or representative of the company submitting the proposal.

If the organization submitting a proposal must outsource or contract any work to meet the requirements contained herein, this must be clearly stated in the proposal. Additionally, all costs included in proposals must be all-inclusive to include any outsourced or contracted work. Any proposals which call for outsourcing or contracting work must include a name and description of the organizations being contracted.

All costs must be itemized to include an explanation of all fees and costs. All costs associated with responding to this request for proposals will be the responsibility of the proposing firm. IBTTA will not be responsible for such costs.

Contract terms and conditions will be negotiated upon selection of the winning Respondent for this RFP. All contractual terms and conditions will be subject to review by IBTTA legal department and will include scope, budget, schedule, and other necessary items pertaining to the project. The winning Respondent will be expected to agree to contract provisions protecting IBTTA, including with respect to warranties, indemnification, and limitation of liability.

Evaluation of proposals will be conducted from April 13, 2015 until April 24, 2015. If additional information or discussions are needed with any Respondents during this two week window, the Respondent(s) will be notified.

The selection decision, subject to approval by the IBTTA Board, for the winning Respondent will be made no later than April 30, 2015

Upon notification, the contract negotiation with the winning Respondent will begin immediately. Contract negotiations will be completed by May 31, 2015

Notifications to Respondents who were not selected will be completed by April 30, 2015

* 1. **Project Timeline**

Project initiation phase must be completed by June 1, 2015

Project planning phase must be completed by September 1, 2015. Project planning phase will determine the timeline/schedule for the remaining phases of the project.

* 1. **Submission Process**

Each Respondent must submit five (5) copies, in both hardcopy and electronic forms, of their proposal to the address below by April 10, 2015.

Proposers must separate the technical proposal from the pricing schedule. The pricing schedule must be submitted in a separate sealed envelope. Five copies of both the technical proposal and the pricing proposal must be submitted to:

**Neil Gray, Dir. Of Govt. Affairs**

**International Bridge, Tunnel & Turnpike Association (IBTTA)**

**1146 19th Street NW, Suite 600**

**Washington, DC 20036-3725**

1. **Scope of services**

Respondents to this RFP must provide summary and detailed descriptions addressing each of the required services itemized below.

* 1. **Project Planning and Design**
		1. **Develop IBTTA-approved assessment procedures, checklists and project plan for evaluating nominated NIOP protocols.**

Response should include, but not be limited to, details relating to specific milestones, administrative structure, resource requirements and deliverables that will permit IBTTA to determine the suitability of each protocol for inclusion in the NIOP selection process.

* + 1. **Develop testing process and plan.**

Response should include, but not be limited to, details relating to specific testing objectives, methodology, success criteria and deliverables that will permit IBTTA to determine the performance characteristics of each protocol for inclusion in the NIOP selection process.

* + 1. **Research performance standards of sponsored candidate protocols and current protocols in use by the tolling industry**

Response should include, but not be limited to, details relating to specific research methodology and reporting deliverables that will provide baseline or comparative data for protocol evaluation purposes.

* 1. **Conformance Evaluation of Nominated/Sponsored Protocols (Pre-Testing Phase)**
		1. **Assess conformance of sponsored candidate protocols with NIOP Technical Requirements**

Response should include details and methodology for assessing the compliance of sponsored protocols with published NIOP requirements and specifications.

* + 1. **Identify protocols qualifying for the testing phase**

As noted above, IBTTA NIOP committees have identified a short-list of three protocols believed to meet preliminary compliance with NIOP requirements. The evaluation process at this stage should identify and confirm compliance of the nominated and sponsored protocols with the requirement standards. Respondents should provide details regarding the specific methodology, test plans, conformance criteria and reporting deliverables to be provided. The Respondent should identify potential ways to reduce future testing costs. Based upon feedback and acceptance from IBTTA representatives, the respondent will then recommend protocol(s) for performance testing.

* 1. **Conduct lab and field testing in Plaza and ORT environments**
		1. **Define testing and data accuracy measurement standards and overall evaluation plan**

Respondent should provide extensive details outlining the test plan to assess protocol performance. Response should include, but not be limited to, testing policy and specifications, device selection rules, testing objectives and requirements, methodology and sampling techniques, statistical measurement and validation criteria under both Lab and Field conditions. Protocol checklists, record archiving, reporting and communication should be part of the planning documentation. The resulting evaluation plan, to be approved by IBTTA representatives, should serve as the guiding document for feasibility testing. The plan should address all aspects and criteria outlined in the IBTTA’s NIOP technical requirements including:

* Legal and safety requirements
* Open protocol requirements
* Functional requirements
* Operational requirements
* Performance requirements
* OBU data requirements
* Environmental requirements
	+ 1. **Lab testing; validate Lab testing methodology**

Lab-based testing is expected to significantly reduce the cost and timing of protocol evaluation. Respondent should identify and explain proposed Lab testing procedures that validate protocol performance and compliance with requirement specifications. Lab testing will be used to pre-qualify protocols for Field validation tests. The proposed Lab scenario(s) should simulate conditions for both extreme physical environments (e.g., freezing and high heat/humidity conditions) and for scenarios with traffic moving at slow (30MPH), average (60MPH) and high (100MPH) speeds. Lab tests should evaluate protocols in single and dual-protocol scenarios.

Dual-protocol scenarios should measure the degradation levels of primary home protocols in conjunction with proposed NIOP protocols. NIOP protocols that fail to meet desired technical performance thresholds may be eliminated from Field testing. Respondent must provide specific sampling size assumptions and statistical metrics used for testing. Respondent must identify specifically how Lab testing methodology will be validated.

* + 1. **Field testing**

Field testing must include verification of performance under a variety of conditions including but not limited to:

* Conventional Toll Plaza and Open Road Tolling (ORT) lane designs
* Multiple vehicle types
* Multiple vehicle speeds
* Mixed OBU/tag types and mounting locations

Field testing must emulate both a single and a dual-protocol environment, with dual-protocol configuration to be determined in consultation with IBTTA representatives. Respondent should provide detailed testing objectives, methodology and measurement criteria for each scenario. Analysis should include comparison and correlation with Lab test baseline results. Field testing reports must anonymize data for independent assessment by IBTTA NIOP selection representatives.

* 1. **Provide and present report findings that document test results and conformance to NIOP specifications for sponsored protocols**

Respondent must supply written and oral reports analyzing and documenting testing result summaries and details. It is expected that selected respondent will work closely with IBTTA NIOP committees via conference call, web conferences and in person at Board and committee meetings.

* 1. **Provide IBTTA NIOP program with protocol selection support**

It is expected that selected respondent will work closely with IBTTA NIOP committees via conference call, web conferences and in person at Board and committee meetings.

1. **Qualifications and experience**
2. Proposer shall demonstrate experience with testing of electronic tolling technologies on a scale proportionate to the scope requirements of the NIOP process.
3. Proposer shall demonstrate project and program management experience conforming to expected scope of services in this RFP.
4. Proposer shall demonstrate experience with providing technology analytics, reporting and presentation skills appropriate to scope of services requested in this RFP; proposer shall identify key personnel and relevant experience expertise of key personnel to be assigned to project.
5. Proposer must identify any potential conflicts of interest with regard to the technologies to be tested and must affirm independence from manufacturers or tolling RFID products.
6. Proposer must affirm discretion and confidentiality with regard to findings of the testing process.
7. Proposer shall submit two references including brief description of relevant services provided; firm and contact names, addresses, emails and phone numbers. Contact of references shall be at the discretion of the evaluation committee.
8. **Schedule**
9. RFP Release Date: March 26, 2015
10. Q&A period ends: April 3, 2015
11. Proposal submission deadline: April 10, 2015
12. Award date: April 26,2015 (tentative, pending IBTTA Board approval)
13. **Pricing**

All proposals must include proposed costs to complete the tasks described in the project scope. Costs should be stated as one-time or non-recurring costs (NRC) or variable costs with projected units. For testing costs, proposals should indicate pricing based on sample size and confidence level and upon number of protocols to be tested.

The IBTTA Roadside Sub-Committee proposes the following guidelines for determining sample sizes and testing runs. Note below that testing can stop once the desired confidence level has been reached, providing there is an equal number of each of the outlined test scenarios completed). For example if there are no errors after 1,609 runs, it is the same confidence level as 3 errors at 5,514 runs:

1. Confidence level of 80%
2. Lab testing data accuracy of:
	1. 99.9% for tag read accuracy (up to maximum of 5,514 runs per sponsored NIOP protocol with up to 3 errors)
	2. 99.8% for tag write accuracy (up to maximum of 5,514 runs per sponsored NIOP protocol with up to 6 errors)

\*Note that read and write will be tested simultaneously, meaning there will be a maximum of 16,542 runs for all 3 candidate protocols combined)

1. Field testing accuracy in a dual protocol environment (each NIOP protocol candidate tested along with each of the other 2 NIOP candidates as local protocols) of:
	1. 99.9% for tag read accuracy (up to a maximum of 5,514 runs per sponsored NIOP protocol, which allows for up to 3 errors)
	2. 99.8% for tag write accuracy (up to a maximum of 5,514 runs per sponsored NIOP protocol, which allows for up to 3 errors)

\*Note that read and write will be tested simultaneously, meaning there will be a maximum of 16,542 runs for all 3 candidate protocols combined)

1. Field testing with 3 other local protocols (i.e., non-NIOP sponsored)
	1. Local protocols cannot experience performance degradation by more than 60% based on the average number of “handshakes” (100 runs per NIOP candidate and other local protocol combination, giving 900 runs total)

(For calculation of sample size please see:

<http://src.alionscience.com/cgi-src/calc.pl?pval=0.0003&nval=&rval=5&clval=80> for sampling size calculations)

Pricing should be listed for each of the following items in accordance with the format below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **Deliverable** | **Unit(s)** | **Cost per Unit** | **Total Costs** |
| a | Project and test plan methodology and schedule documentation |  1 |  $ | $ |
| b | Conformance evaluation and testing of NIOP sponsored protocols (per protocol; assume three for unit calculation) |  3 |  $ | $ |
| c | Lab testing (environment, speed and data accuracy; per run) |  16,542 |  $ | $ |
| c | Field testing (primary NIOP protocol testing, per run) |  16,542 |  $ | $ |
| c | Field testing (Local protocol testing; per run) |  900 |  $ | $ |
| d, e | Support services for NIOP protocol selection |  1 |  $ | $ |
|  | **Total Costs** |  |  | **$** |

NOTE: All costs and fees must be clearly described in each proposal.

1. **RFP Evaluation Process**

IBTTA will evaluate all proposals based on the following criteria. To ensure consideration for this Request for Proposal, your proposal should be complete and include all of the following criteria:

* Overall proposal suitability: proposed solution(s) must meet the scope and needs included herein and be presented in a clear and organized manner (50 maximum points)
* Organizational Experience: Respondents will be evaluated on their experience as it pertains to the scope of this project (50 maximum points)
* Previous work: Respondents will be evaluated on examples of their work pertaining to project management of technology certification and testing programs (25 maximum points)
* Technical expertise and experience: Respondents must provide descriptions and documentation of staff technical expertise and experience(75 maximum points)
* Value and cost: Respondents will be evaluated on the cost of their solution(s) based on the work to be performed in accordance with the scope of this project (100 maximum points). Pricing formula: Lowest Bid Price/Proposer Price\*100 = Proposer’s Price score. (Example: if lowest price is 80 from Proposer A and Proposer B bids 100 then Proposer B’s Price score is 80/100\*100 = 80 points)

Total maximum points: 200 Technical + 100 Price = 300 maximum points

## **APPENDIX**

## **Abbreviations, Definitions and Terminology**

For the purposes of this document, the term “**ETC Protocol**” shall be used to refer to an RF-based identification methodology which uses roadside and vehicle based equipment to communicate certain data elements between those two locations.

The term **Onboard Unit (OBU)** shall be used to refer to the vehicle-based device.

The term **Roadside Equipment (RSE)** shall be used to refer to all of the equipment necessary at the roadside in order to carry out the functions defined herein

Following is a list of other common abbreviations used in tolling:

AVC - Automatic Vehicle Classification

DMV - Department of Motor Vehicles: Not intended to refer to any particular state’s DMV but the corresponding agency in all relevant states or provinces.

ETC - Electronic Toll Collection

FCC - Federal Communications Commission

GPS - Global Positioning System

ID – Identification

IBTTA - International Bridge Tunnel and Turnpike Association

I/O - Input/output

MHz - Megahertz

NEMA - National Electrical Manufacturers Association

NIOP – National Interoperability

NTP – National Toll Protocol (interoperable protocol as specified by IBTTA)

OBU - On-board Unit

ORT - Open Road Tolling

Protocol – A method of communication based on sending and receiving messages

RF - Radio Frequency

ETC Protocol – Radio Frequency Identification Protocol

RSE - Roadside Equipment

ROSC - Roadside Operations Sub-Committee of the IBTTA

TCP/IP – Transmission Control Protocol/Internet Protocol

VES - Violation Enforcement System

Lane types

Open Road Tolling Lanes

An open road tolling lane is a lane where a toll is collected but there are no toll booths or other toll collection equipment beyond that needed for electronic toll collection, allowing the vehicle to continue at highway speeds at any lateral position across the provided lanes or shoulder. An entry open road tolling lane in a closed system is a lane where the entry into the system is identified but there are no toll booths or other toll collection equipment beyond that needed for electronic toll collection, allowing the vehicle to continue at highway speeds at any lateral position across the provided lanes or shoulder.

Traditional Toll Plaza Lanes

A traditional toll lane is part of a toll plaza where tolls may be collected by toll collectors in booths, automatic coin machines, and/or electronically. Lanes dedicated to electronic toll collection in a toll plaza environment are considered toll lanes even if they do not require the vehicle to slow down. An entry lane in a closed system is part of a toll plaza where the entry into the system is identified.