GREATER NEW ORLEANS EXPRESSWAY COMMISSION

REQUEST FOR PROPOSALS:

ISO 18000-6C Transponders for the Toll Tag System

R.F.P. No. 2019-TT01

Proposal Due Date: April 26, 2019 at 12:00 PM, CST

GREATER NEW ORLEANS EXPRESSWAY COMMISSION
3939 N Causeway Blvd #400, Metairie, LA 70002
(504) 835-3118
www.thecauseway.us

TABLE OF CONTENTS

REQUEST FOR PROPOSALS
TO PROVIDE ISO 18000-6C TRANSPONDERS
TO THE GNOEC

PART I   ADMINISTRATION AND GENERAL INFORMATION

1.1 Purpose

The purpose of this Request for Proposals (RFP) is to obtain competitive proposals for the purchase of ISO 18000-6C Transponders and related programming services for the collection of electronic payments for the toll tag system.

1.2 Goals and Objectives

The GNOEC desires to improve the collection of electronic payments for the toll tag system with ISO 18000-6C Transponders that comport with the RFP Scope contained in Section II.

1.3 Schedule of Events

		Time (CST)
1.	RFP Published	March 20, 2019
2.	Deadline to receive written inquiries	March 27, 2019
3.	Deadline to answer written inquiries	April 3, 2019
4.	Proposal Due Date	April 26, 2019 12:00 PM CST
5.	Selection	TBA, June 2019 GNOEC Commission Meeting
6.	Contract Execution	14 days after selection
7.	Transponders in Place	Pursuant to Contract terms; anticipated implementation date: July 2019.

NOTE: The GNOEC, at its sole discretion, reserves the right to deviate from this schedule.

1.4 Proposal Submittal

All proposals shall be received by the GNOEC no later than 12:00 p.m. (CST) on April 26, 2019.

Important - Clearly mark outside of envelop, box, or package with the following information and format:

- Proposal Name: ISO 18000-6C Transponders
- Proposal No: 2019-TT01
- Proposal Opening Date: April 26, 2019, 12:00 PM CST

Proposals will be received at:

Greater New Orleans Express Commission
3939 North Causeway Blvd., Suite 400
Metairie, LA 70002

Proposer is solely responsible for ensuring that its courier service provider makes inside deliveries to our physical location. GNOEC is not responsible for any delays caused by the Proposer's chosen means of proposal delivery.

Proposer is solely responsible for the timely delivery of its proposal. Failure to meet the proposal opening date and time shall result in rejection of the proposal.

1.5 Proposal Response Format

Proposals submitted for consideration should follow the format and order of presentation described below:

A. <u>Cover Letter:</u> Containing a summary of the Proposer's ability to provide the equipment, and perform the services described in the RFP, and confirms that the Proposer is willing to perform those services and enter into a contract with the GNOEC. The letter shall be signed by a person having authority to commit the Proposer to a contract. If the Proposer is an agency, corporation, partnership or other legal entity, the president, vice-president, **and** satisfactory evidence of the authority of the person signing for the agency, corporation, partnership or other legal entity shall be attached to the proposal.

Proposers should exhibit their understanding and approach to the project and address how each element will be accomplished.

B. <u>Table of Contents:</u> Organized in the order cited in the format contained herein.

C. <u>Proposer Qualifications and Experience:</u> History and background of Proposer, financial strength, and stability, with related services to government entities existing customer satisfaction, demonstrated volume of merchants, etc.

D. <u>Technical Proposal:</u> Illustrating and describing compliance with the RFP requirements.

E. <u>Project Schedule:</u> A detailed schedule of the plan for procuring, programming, and testing (if applicable) through delivery. Proposers must submit a schedule to include actions, timelines, responsible parties, etc.

F. <u>Financial Proposal:</u> Proposer's fees and other costs, if any, shall be submitted. This financial proposal shall include any and all costs the Proposers wish to have considered in the contractual arrangement with the GNOEC. Financial Proposals are to be submitted in a separated sealed envelope, and should include pricing for one-hundred thousand (100,000) Transponders to be purchased over five (5) years.

1.5.1 Number of Response Copies

Each Proposer shall submit one (1) signed original response along with six (6) copies of the proposal and one (1) digital copy. The digital copy shall contain a single printable .pdf file which consists of the entire submitted package.

1.5.2 Legibility/Clarity

Responses to the requirements of this RFP in the formats requested are desirable with all questions answered in as much detail as practicable. The Proposer(s) response is to demonstrate an understanding of the requirements. Proposals prepared simply and economically, providing a straightforward, concise description of the Proposer(s) ability to meet the requirements of the RFP are also desired. Each Proposer is solely responsible for the accuracy and completeness of its proposal.

1.6 Confidentiality

All documents submitted to the GNOEC are subject to the Louisiana Public Records Act, LSA-R.S. 44:1 et seq., and may be released when a public records request is made by news media, competitors, or other interested parties, in accordance with the law.

If a Proposer deems any document submitted under this RFP contains confidential business data, trade secrets, proprietary information, or data not otherwise subject to public disclosure, under La. Const. Art I § 5, LSA-R.S. 44:4 or 4.1, or other provisions of law, the Proposer shall clearly mark the documents as "Confidential" prior to delivering or making them available to the GNOEC.
  (1) If the GNOEC receives a request for the production or disclosure of documents so marked, it will decline disclosure and notify the Proposer of such request;

(2)   Provided, however, that if any action is commenced against the GNOEC under the Louisiana Public Records Act, LSA-R.S. 44:1 et seq., or otherwise seeking to compel production or disclosure of the documents, the Proposer or any other person asserting the confidentiality privilege of such documents shall defend, indemnify and hold the GNOEC, its commissioners, employees, consultants, agents, engineers, and all other representatives harmless from any costs, damages, penalties or other consequences of the GNOEC's refusal to disclose or produce such documents. Failure of the Proposer to immediately intervene in such legal action, will authorize the GNOEC to voluntarily provide the information for disclosure under the supervision of the court;

(3)   The GNOEC assumes no liability for disclosure or use of any document or portion of this RFP that has not been clearly marked as "confidential" or as otherwise constituting information exempt from the Louisiana Public Records Act, and may use or disclose such unmarked documents as public records.

(4)   The Proposer is to mark the cover sheet of the proposal with the following legend, specifying the pages of the proposal which are to be restricted in accordance with the conditions of the legend:

> "The data contained in Pages _____ of the proposal have been submitted in confidence and contain trade secrets and/or privileged or confidential information and such data shall only be disclosed for evaluation purposes, provided that if a contract is awarded to this Proposer as a result of or in connection with the submission of this proposal, the GNOEC shall have the right to use or disclose the data therein to the extent provided in the contract. This restriction does not limit the GNOEC's right to use or disclose data obtained from any source, including the Proposer, without restrictions." Further, to protect such data, each page containing such data shall be specifically identified and marked "**CONFIDENTIAL**."

The Proposer shall not mark the entire proposal "confidential" or as information constituting an exception to Louisiana's Public Records Act. If an entire response, submittal or proposal is so marked, the GNOEC shall not consider the proposal for an award of the contract.

Nothing herein shall prohibit the GNOEC from making any proposal, including confidential business data, trade secrets, and proprietary information contained therein, available to any other agency, person or organization for the sole purpose of assisting the GNOEC in its evaluation of the proposal. The GNOEC shall require said individuals to protect the confidentiality of any specifically identified proprietary information or privileged business information obtained as a result of their participation in these evaluations.

1.7 Proposal Clarifications Prior to Submittal

1.7.1 Inquiry Periods

An initial inquiry period is hereby firmly set for all interested Proposers to perform a detailed review of the RFP documents and to submit any written questions relative thereto. *Without exception*, all questions MUST be in writing and received by the close of business on the Inquiry Deadline date set forth in the Schedule of Events in Section 1.3. Initial inquiries shall not be entertained thereafter.

The GNOEC shall not and cannot permit an open-ended inquiry period, as this creates an unwarranted delay in the procurement cycle and operations of our agency and departments. The GNOEC reasonably expects and requires responsible and interested Proposers to conduct their in-depth proposal review and submit inquiries in a timely manner.

Further, we realize that additional questions or requests for clarification may be generated from the GNOEC's addendum responses to the inquiries received during the initial inquiry period. Therefore, a final 3-day inquiry period may be granted. Questions relative to the addendum shall be submitted by the close of business three working days from the date the addendum is posted. If necessary, another addendum will be issued to address the final questions received. Thereafter, all proposal documents, including but not limited to the specifications, terms, conditions, plans, etc., will stand as written and/or amended by any addendum issued as a result of the final inquiry period.

No negotiations, decisions, or actions shall be executed as a result of any oral discussions with any GNOEC employee or GNOEC consultant. The GNOEC shall only consider written and timely communications from Proposers.

Inquiries shall be submitted in writing by an authorized representative of the Proposer, clearly cross-referenced to the relevant solicitation section. Only those inquiries received by the established deadline shall be considered by the GNOEC. Answers to questions that change or substantially clarify the solicitation shall be issued by addendum and provided to all prospective Proposers.

Inquiries concerning this solicitation must be in writing and may be delivered by mail, express courier, e-mail, or hand delivery to:

Greater New Orleans Expressway Commission
3939 North Causeway Blvd, Suite 400
Metairie, Louisiana 70002
504-835-3118
melissa@gnoec.org

1.9 Performance Bond – See the Bond and Insurance Requirements in the Appendix herein.

1.10 Changes, Addenda, Withdrawals

If the Proposer needs to submit changes or addenda, such shall be submitted in writing, signed by an authorized representative of the Proposer, cross-referenced clearly to the relevant proposal section, in a sealed envelope, prior to the proposal opening. Such shall meet all requirements for the proposal. If the Proposer chooses to withdraw his proposal response, the withdrawal notice shall be in writing and received prior to proposal opening.

1.11 Cost of Offer Preparation

The Proposer assumes sole responsibility for any and all costs associated with the preparation and reproduction of any offer submitted in response to the RFP and preparation for oral presentations/discussions and other such expenses, and shall not include this cost or any portion thereof in the offered contract price and terms.

1.12 Non-negotiable Contract Terms

Non-negotiable contract terms include, but are not limited to: taxes, assignment of contract, audit of records, EEOC and ADA compliance, record retention, content of contract/order of precedence, contract changes, force majeure, governing law, claims or controversies, and termination based on contingency of appropriation of funds.

1.13 Taxes

Any taxes, if applicable, shall be assumed to be included within the Proposer's cost.

1.14 Proposal Validity

All proposals shall be considered valid for acceptance until such a time an award is made, unless the Proposer provides for a different time and period within its proposal response. However, the GNOEC reserves the right to reject a proposal if the Proposer's response is unacceptable and the Proposer is unwilling to extend the validity of its proposal.

1.15 Prime Contractor Responsibilities

The selected Proposer shall be required to assume responsibility for all items and services offered in his proposal whether or not he produces or provides them. The GNOEC shall consider the selected Proposer to be the sole point of contact with regard to contractual matters, including payment of any and all changes resulting from the contract.

1.16 Written and Oral Discussions/Presentations

Written or oral discussions may be conducted with the Proposer(s) who submit proposals determined to be reasonably susceptible of being selected for an award. Proposals may

be accepted without such discussions and awards made on the basis of the initial offers so proposals should be complete and reflect the most favorable terms available from the Proposer(s).

Any commitments or representations made during these discussions, if conducted, may be formally recorded in the final contract.

1.17 Cancellation of RFP or Rejection of Proposals

GNOEC reserves the right, in its sole discretion, to reject any or all proposals received in response to this RFP, or to cancel this RFP if it is in the best interest of GNOEC to do so.

1.18 Evaluation and Selection

All responses received as a result of this RFP are subject to evaluation by the GNOEC for the purpose of selecting the Proposer with whom the GNOEC shall contract.

A committee whose members have expertise in various areas will evaluate all proposals. This committee will determine which proposals are reasonably susceptible of being selected for award. If required, written or oral discussions may be conducted with any or all of the Proposers to make this determination.

Written recommendations for award shall be made to the GNOEC for the Proposer(s) whose proposal(s), conforming to the RFP, will be the most advantageous to the GNOEC, price and other factors considered.

The committee may reject any or all proposals if none are considered in the best interest of the GNOEC.

1.19 Award

Award shall be made to the Proposer(s) whose proposal, conforming to the RFP, is the most advantageous to the GNOEC, considering price and other factors.

The award may be made on the basis of the initial offer or as noted in Part 1.16.

1.20 Notice of Intent to Award

After selection, the GNOEC will notify all unsuccessful Proposers as to the outcome of the evaluation process.

1.21 Acceptance of Proposal Content

The mandatory RFP requirements shall be contractual obligations if a contract ensues. Failure of the successful Proposer(s) to accept these obligations shall result in the rejection of the proposal.

1.22 Contract Negotiations

If for any reason the Proposer whose proposal is most responsive to the GNOEC's needs, price and other evaluation factors set forth in the RFP considered, does not agree to a contract, that proposal shall be rejected and the GNOEC may negotiate with another responsive Proposer. Negotiation may include revision of non-mandatory terms, conditions, and requirements. The GNOEC must approve the final contract form and issue a purchase order, if applicable, or contract, to complete the process.

1.23 Insurance Requirements

Proposer shall have the coverage(s) required as stated in the Appendix, and shall furnish the GNOEC with certificates of insurance for affecting the required coverage(s).

1.24 Subcontractor Insurance

The Proposer shall include all subcontractors as insured under its policies or shall furnish separate certificates of insurance for each subcontractor. All coverage for subcontractors shall be subject to all of the applicable requirements stated in the Appendix herein for the Proposer.

1.25 Indemnification

Notwithstanding the above, the successful Proposer shall protect, defend, including the payment of attorney's fees and costs, indemnify, save and hold harmless the GNOEC, its commissioners, employees, consultants, agents, engineers, and all other representatives from and against any and all claims, expense and liability, arising out of injury or death to any person or the damage, loss or destruction of any property which may occur or in any way grow out of any act or omission of the successful Proposer, its agents, servants, and employees, and any and all costs, expense and/or attorney's fees incurred by the successful Proposer as a result of any claims, demands, and/or causes of action except those claims, demands, and/or causes of action arising out of the negligence of the GNOEC, its commissioners, employees, consultants, agents, engineers, and all other representatives. The successful Proposer agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, or suits at its sole expense and agrees to bear all other costs and expenses related thereto, even if it is groundless, false, or fraudulent.

1.26 Payment for Services

Contractor shall invoice the GNOEC in accordance with the contracts terms.

1.27 Termination

1.28.1 The GNOEC may terminate this contract for cause based upon the failure of the Contractor to comply with the terms and/or conditions of the contract; provided that the GNOEC shall give the Contractor written notice specifying the Contractor's failure. If within ten (10) days after receipt of such notice, the Contractor shall not have either corrected such failure and thereafter proceeded diligently to complete such correction, then the GNOEC may, at its option, place the Contractor in default and the contract shall terminate on the date specified in such notice. The Contractor may exercise any rights available to it under Louisiana law to terminate for cause upon the failure of the GNOEC to comply with the terms and conditions of this contract; provided that the Contractor shall give the GNOEC written notice specifying the GNOEC's failure.

1.28.2 The GNOEC may terminate any contract entered into as a result of this RFP at any time by giving thirty (30) days written notice to the Contractor. The Contractor shall be entitled to payment for deliverables in progress, to the extent work has been performed satisfactorily.

1.28.3 The continuance of this contract is contingent upon the appropriation of funds to fulfill the requirements of the contract by the GNOEC. If the GNOEC fails to appropriate sufficient monies to provide for the continuation of the contract, or if such appropriation is reduced to prevent total appropriation for the year from exceeding revenues for that year, or for any other lawful purpose, and the effect of such reduction is to provide insufficient monies for the continuation of the contract, the contract shall terminate on the date of the beginning of the first fiscal year for which funds are not appropriated.

1.29 Assignment

Assignment of any contract, or any payment under a contract, requires the advanced written approval of GNOEC in accordance with the contract terms.

1.30 No Guarantee of Quantities

The GNOEC does not guaranty that the items or amounts listed in this RFP will provide a complete system. The GNOEC, at its sole discretion, reserves the right to amend the items or amounts. Additionally, the Proposer shall provide all materials, labor, and equipment, whether specified or not, to provide a complete working system.

1.31 Audit of Records

The monitoring and auditing of the selected Proposer's records shall be allowed to the GNOEC and any of its employees and/or representatives.

1.32 EEOC and ADA Compliance

The Contractor agrees to abide by the requirements of the following as applicable: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246, the Federal Rehabilitation Act of 1973, as

amended, the Vietnam Era Veterans' Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Discrimination in Employment Act of 1972, and the Contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990, as amended.

The Contractor shall keep informed of and comply with all federal, state, and local laws, ordinances, and regulations, which affect his employees or prospective employees.

Any act of discrimination committed by the Contractor, or failure to comply with these statutory obligations, when applicable, shall be grounds for termination of this contract.

1.33 Record Retention

The Contractor shall maintain all records in relation to the RFP and contract for a period of at least three (3) years following the termination of the contract.

1.34 Record Ownership

All records, reports, documents, or other materials related to any contract resulting from this RFP and/or obtained or prepared by Contractor in connection with the performance of the services described for herein shall become the property of GNOEC, and shall, upon request, be returned to GNOEC, at the Contractor's expense, upon termination or expiration of this contract.

1.35 Content of Contract/Order of Precedence

In the event of a conflict among documents, the order of precedence which shall govern is as follows: 1) the final contract; 2) the Request for Proposals (RFP) and addenda (if any); and 3) the Contractor's proposal.

1.36 Contract Changes

No additional changes, enhancements, or modifications to any contract resulting from this RFP shall be made without the prior approval of the GNOEC.

Changes to the contract include any change in: compensation; beginning/ending date of the contract; scope of work; and/or Contractor change through the Assignment of Contract process. Any such changes, once approved, will result in the issuance of an amendment to the contract.

1.37 Substitution of Personnel

The GNOEC intends to include in any contract resulting from this RFP the following condition:

Substitution of Personnel: If, during the term of the contract, the Contractor or subcontractor cannot provide the personnel as proposed and requests a substitution, that substitution shall meet or exceed the requirements stated herein. A detailed resume of qualifications and justification is to be submitted to the GNOEC for approval prior to any personnel substitution. It shall be acknowledged by the Contractor that every responsible attempt shall be made to assign the personnel listed in the Contractor's proposal.

1.38 Force Majeure

The Contractor or the GNOEC shall be exempted from performance under the contract for any period that the Contractor or the GNOEC is prevented from performing any services in whole or in part as a result of an act of God, strike, war, civil disturbance, epidemic or court order, provided the Contractor or the GNOEC has prudently and promptly acted to take any and all corrective steps that the Contractor or the GNOEC can promptly perform. Subject to this provision, such nonperformance shall not be considered cause or grounds for termination of the contract.

1.39 Governing Law

All activities associated with this RFP process shall be interpreted under Louisiana Law. All proposals and contracts submitted are subject to provisions of the laws of the State of Louisiana; the purchasing rules and regulations when applicable; the GNOEC's Articles of Incorporation and Bylaws; and the standard terms and conditions, including the specifications listed in this RFP.

1.40 Claims or Controversies

Contractor does, by signing a contract pursuant to this RFP with the GNOEC, agree that the contract is made under the laws of the State of Louisiana, and for all purposes shall be interpreted in its entirety in accordance with the laws of said State. The Contractor hereby agrees and consents to the jurisdiction of the courts of the State of Louisiana over its person. The parties hereto agree that the sole and exclusive venue for any suit or proceeding brought pursuant to the contract shall be the 24th Judicial District Court for the Parish of Jefferson, State of Louisiana.

PART II   SCOPE OF WORK/SERVICES

2.1 Compliance with the Specifications and Technical Requirements

The Proposer shall certify and document that the proposal complies with all the specifications and technical requirements detailed herein.

2.2 Toll Lane Configuration

The technology shall enable accurate electronic toll collection in all types of toll lanes including low speed manual lanes as well as high-speed open road tolling lanes. The GNOEC currently operates one (1) toll plaza with five (5) tolled lanes. High performance Radio-Frequency Identification (RFID) ISO 18000 6C Transponders (Transponders) shall be optimized for the GNOEC's antennas deployed in the primary toll point to allow for thirty-degree (30°) angles to cover the travel lane and shoulder.

2.3 Current AVI Technology

The current AVI system uses the 3M IDentity 6204 readers, 3M IDentity Antenna- 024-K overhead mounted external antennas located in the centerline of each lane, and custom lane controller software provided by TRMI Corporation. The readers are currently configured to read one (1) protocol: ATA (ISO10374 protocol in Identity 6204). The system will be updated to include the ISO 18000 6C Transponder's protocol. The ISO 18000 6C Transponders (Transponders) shall be required to meet or exceed the observed operational performance of the current transponders.

2.4 Transponder Testing Certification Compliance

The Transponders must be certified as meeting the standards required for use in high speed tolling. The testing must have been completed by an accredited OmniAir Certification Services laboratory, and the product certified accordingly by OmniAir Certification Services. Certification must be maintained according to OmniAir's requirements. Proposer shall be prepared to show that no changes to the Transponders hardware, software, or protocol has occurred since certification was achieved. All costs relating to OmniAir certification will be borne by the Proposer. Proof of certification shall be provided prior to award.

2.4.1 Prequalification Evaluation

To verify the accuracy of the proposed RFID Transponders, all potential proposers will be required to submit together with their bid packet, twenty (20) Test Transponders to the GNOEC. The sample transponders shall be submitted together with the recommended mounting instructions to be considered for award. GNOEC will conduct controlled testing using a fleet of vehicles in the current production environment, for current lane and technology deployed at GNOEC a minimum of two hundred fifty (250) transactions will be generated to verify transponder read rates. It is expected that there will be no more than 1% failure rate. If the failure rate exceeds this criteria then GNOEC reserves the right to disqualify the proposal.

2.5 Operating Environment

The Transponders shall be designed to operate as expected under extreme or "the worst case" conditions, including the following:

- Vehicles traveling up to 100 mph;
- "Stop and go traffic" with continuous intermittent acceleration and deceleration between 0 and 15 miles per hour;
- Vehicles tailgating;
- Different mixes of all vehicle types encountered on North American roads including but not limited to cars, trucks, tractor-trailers, recreation vehicles, motorcycles, buses, and delivery vans;
- Vehicles arriving simultaneously in the reading zone;
- Vehicles changing and/or straddling lanes; and
- Environmental conditions that may be encountered in North America including, but not limited to:
    - Operating Temperatures ranging from -40⁰ F to +185⁰ F;
    - Storage Temperatures ranging from -40⁰ F to +185⁰ F;
    - Rain : ¼ inch of rain per minute;
    - Fog : 10 feet visibility;
    - Relative Humidity: 40% - 90%;
    - Ice : ¼ inch thickness between the Transponder and the Antennae;
    - All forms of driving precipitation (sleet, hail, blizzard, etc.); and
    - Direct sunlight.

2.6 Security

The Transponders shall minimize the possibility of something or someone compromising and corrupting the security integrity of the supplied technology. The Transponder technology shall incorporate safeguards that would prevent unauthorized access to and recording of, and downloading of, any data both stored and transmitted to and from the Transponder and reader. Instances of the security integrity to be addressed include, but are not limited to:

- Toll payment is avoided;
- Less than the required toll payment is charged;
- Unique Transponder identification number is cloned or spoofed; and
- Unauthorized writing to or reading of Transponders.

The Vendor shall document their security scheme and present options, if available.

2.7 Resistance to Interference

The Transponders shall be resistant to electromagnetic interference or noise, electrical interference, and mechanical interference that may typically be found in an Open Road Tolling environment from sources including, but not limited to:

- Wireless data and voice services;

- Satellite radio signals;
- GPS devices;
- Vehicle electronics;
- Ignition systems;
- Electrical appliances;
- Lightning (except for direct hits);
- Power tools;
- Power lines;
- Power transformers;
- Mobile and portable communications radios;
- Video Enforcement and Automatic Vehicle Classification equipment, including inductive loops and lasers;
- Security systems;
- Lighting;
- Speed radar sources and detectors;
- Air conditioning units;
- Windshield wipers;
- Detuned engines;
- Defrosters; and
- Any other interference that would reasonably be found in an open road tolling environment.

2.8 Sunlight Protection

The Transponders will be exposed to direct sunlight, which has been known to cause issues with some Transponders, including failing to respond to reader requests and /or providing incorrect reads. Although some windshields have screening technology, sunlight screening shall be built into the Transponders themselves to ensure that performance is consistent under conditions of direct sunlight.

2.9 Transponder Programming and Memory Mapping

2.9.1 Programming Standard

The Transponders shall conform to the defined 'ISO 18000 6C Tolling AVI Transponder Programming Standard' in the 6C Toll Operators Coalition Requirements and Guidance Document Version 3.1, Revision 1. The GNOEC has already been assigned agency code of 451 for 6C transponders. Refer to the Appendix for more details.

2.9.2 Transponder Memory Map

The Transponders memory mapping shall conform to the AVI Programming Standard. Refer to the Appendix for more details.

2.9.3 Bar Code and Serialization

Each Transponder shall include a unique bar code/serial number. The Transponder bar code information shall match the Transponder identification number. Bar codes shall be an integral part of the Transponder manufacturing, i.e. no separate stickers.

Transponders shall be serialized to fit in with, and not conflict with, the Transponders already procured by GNOEC. Specific details shall be provided later to the successful Proposer prior to manufacturing.

2.9.4 Transponder Size

The interior mounted Transponders shall fit behind the rear-view mirror and shall not obstruct the driver's field of vision. The Transponder shall have a minimum height of 1 inch and maximum height of 1.25 inches, and shall have a minimum width of 2.5 inches and maximum width of 4.25 inches. Please see the Appendix herein for the GNOEC 6C Tag Designs.

2.9.5 Transponder Branding

All Transponders delivered under this Contract shall be branded in accordance with the GNOEC 6C Tag Designs or any other branding that the GNOEC may require in the future. The Transponders shall not carry any visible manufacturer or vendor brand names. The GNOEC will provide all required and appropriate logos and artwork.

2.9.6 Shipping

All Transponders shall comply with any and all current U.S. and international safety standards to permit unrestricted shipment by mail and commercial carriers with the appropriate documentation and in the recommended packaging.

2.10 Radio Frequencies

The Transponders shall utilize the Federal Communications Commission's (FCC) allocated radio frequencies appropriate for this application. The Transponders shall operate in the 902 MHz to 928 MHz radio frequency band.

2.11 Power

The Transponder shall be a passive design that will not require the use of an internal or external battery. All power shall be obtained via communications from the readers installed on the toll gantry.

2.12 Product Requirements

2.12.1 Artwork and Design Approval of the GNOEC

The Transponders shall be manufactured in accordance with the artwork designed and approved by the GNOEC. The windshield mounted Transponder shall be an RFID Transponder that is packaged as a flexible self-adhesive decal. Once the Transponder is mounted to the windshield, any attempt to remove the Transponder from its mounting location will result in it becoming permanently unusable. The Transponder must be designed in such a manner that will not cause damage to the windshield and/or surface to which it is attached.

2.13 Manufacturing Readiness and Lead Time

All the proposed Transponder technology shall have already been designed, developed, tested, and tooled for immediate manufacture and delivery. The manufacturing lead time, including delivery, shall not exceed four (4) weeks from the time of order.

2.14 Regulatory Compliance

The Transponders shall comply with applicable federal, provincial, and local licensing and regulations for Transponder technology. The Proposer shall document all related licensing and regulations associated with its equipment, and shall provide proof of compliance upon request. All costs related to obtaining compliance and/or proof of compliance will be borne by the Proposer.

2.15 Safety Requirements

The Transponders shall meet all applicable safety and environmental requirements related to the technology and its applications in addition to any requirements of this document. The Transponders and readers shall not pose either a short-term safety risk or a long-term health risk to drivers, toll collector, technicians, or any other people who may be in the vicinity of the Transponder technology.

2.16 Testing

2.16.1 Transponder Batch Testing

After a Proposer is selected and an award is made, the selected Proposer's Transponders will be tested using the GNOEC's reader from each batch delivered to ensure that they meet the defined requirements for performance. Any batches that fail testing shall be replaced at the Proposer's expense. It is expected that there will be no more than one (1) Transponder error per 200 tested (99.5%).

2.16.2 Transponder Operational Testing

The GNOEC may regularly, or from time to time, test the Transponders in an operational environment to ensure the performance of the Transponders meets the requirements contained herein. This may be done using test vehicles or via regular customer usage. If the Transponders do not meet the required level of performance, the GNOEC reserves

the right to have known bad Transponders replaced by the Contractor at no additional cost to the GNOEC.

2.17 Period of Agreement

The anticipated term of the contract is five (5) years. The term of any contract shall be provided within the contract agreement by negotiation of the parties.

2.18 Price Schedule

Proposer shall provide a price schedule for 100,000 Transponders to be ordered over five (5) years, and all items necessary to program and provide the Transponders. Prices submitted shall be firm for the term of the contract.

2.19 Deliverables

Every Proposer should describe what hardware/software will be provided per its proposal, and how the proposed deliverables will be provided.

2.20 Location

The ISO 18000 6C Transponders will be delivered to the facilities and property of the GNOEC as necessary.

2.21 Proposal Elements

2.21.1 Financial

The financial proposal should be provided in a separate sealed envelope, and include pricing for 100,000 Transponders over five (5) years. Describe any potential charges for the proposed equipment and programing services associated with the ISO 18000 6C Transponders that you wish the GNOEC to consider.

2.21.2 Technical

Each Proposer should address how he will meet all of the requirements of this RFP, with particular attention to:

- Plans and/or schedule for procuring, programming, delivering, etc. (whichever is relevant to the RFP requirements).
- Information demonstrating the Proposer's financial stability (financial statements, annual reports, or similar data for the last three years).
- Information demonstrating the Proposer's understanding of the nature and scope of this project.
- Any other information deemed pertinent by the Proposer including terms and conditions which the Proposer wishes the GNOEC to consider.

PART III   EVALUATION

The proposal will be evaluated in light of the material and the substantiating evidence presented to the GNOEC, not on the basis of what may be inferred. The following criteria will be evaluated when reviewing the proposals:

3.1 Financial Proposal

The Proposer must submit an itemized list of all costs, expenses, and fees that are expected to be paid by the GNOEC in completion of the scope of services that are being offered by the Proposer. It is important to note which items are to be provided by the GNOEC and which are to be provided by the Proposer as described in the scope of work/services.

The financial proposal, including the pricing for 100,000 Transponders to be ordered over five (5) years, should be provided in a separate sealed envelope.

3.2 Technical Proposal

The following criteria are of importance and relevance to the evaluation of this RFP. Such factors, listed in order of importance, may include, but are not limited to:

1. TECHNICAL APPROACH

    a. Scope of Services;
    b. Innovative Concepts; and
    c. Project Schedule.

2. FINANCIAL PROPOSAL

3. QUALIFICATIONS AND EXPERIENCE

    a. Specific experience – similar or larger scope of services currently being provided;
    b. Personnel – experience of management staff, experience in similar projects, etc.; and
    c. Financial profile of the Proposer.

APPENDIX

Table of Contents

Publication
Jefferson, Louisiana

PUBLIC NOTICE

The Greater New Orleans Expressway Commission (GNOEC) is requesting competitive proposals for the purchase of ISO 18000-6C Transponders and the related programming services to improve the collection of electronic payments for the toll tag system.

The proposal selected will meet the specifications and technical requirements established in the Request for Proposals (RFP), and be in the best interest of and the most advantageous to the GNOEC.

The Request for Proposals (RFP) may be examined without charge at the administrative offices of the GNOEC. Copies of the RFP may be obtained from the GNOEC at 3939 N. Causeway Blvd, Ste. 400, Metairie, Louisiana 70002, or electronically from the GNOEC's website (thecauseway.us). Any questions related to the RFP should be submitted in writing to Melissa Phillpott at melissa@gnoec.org.

All proposals shall be received by the GNOEC no later than 12:00 p.m. (CST) on April 26, 2019.

Proposals will be received at:

Greater New Orleans Expressway Commission
ATTN: Melissa Phillpott
3939 N Causeway Blvd #400
Metairie, LA 70002

BOND AND INSURANCE REQUIREMENTS

The following requirements are mandatory and non-compliance may result in rejection of a proposal or refusal to award a Contract at the sole discretion of GNOEC.

A.   QUALIFICATIONS OF SURETIES AND INSURERS.

All required bonds and insurance policies shall be written with Sureties and Insurance Companies that are authorized to conduct business in the State of Louisiana; and shall be placed through and countersigned by an Insurance Agent duly licensed in the State of Louisiana. Such Insurance Companies and Sureties shall have an A.M. Best rating of not less than A-VI.

B.   BONDS

Type:	Amount:
Performance Bond:	Total Contract Price

C.   BASIC INSURANCE SPECIFICATIONS:

1. Minimum Types and Limits of Insurance Required:

   a. Commercial General Liability covering bodily injury and property damage, personal and advertising injury, and products and completed operations with minimum limits of $1,000,000 per occurrence and $2,000,000 in the aggregate.
   b. Automobile Liability covering "Any Auto" or "All Owned, Non-owned, or Hired Autos" with a minimum combined single limit of $1,000,000.
   c. Workers' Compensation with Statutory limits and meeting Louisiana statutory requirements; with Employer's Liability limits of $1,000,000 per accident/disease/employee.

2. Deductible and/or Self Insured Retentions, Any and all deductibles and/or self-insured retentions in the required insurance policies shall be assumed by and be at the sole risk of the Contractor; and subject to approval by the GNOEC and its legal counsel.

3. "Claims Made" policies are not acceptable except with respect to Professional Liability and Cyber Liability.

4. Notice of Cancellation: Thirty (30) day prior written Notice of Cancellation, non-renewal or adverse material change must be provided to GNOEC, except ten (10) day notice for non-payment of premium.

5. Additional Insured: Commercial General Liability and Auto Liability policies shall name GNOEC, its Commissioners, employees, consultants, agents and engineers as Additional Insured, which said insurance shall be primary and non-contributory. Coverage for "Completed Operations" must extend to all Additional Insureds. The Contractor acknowledges that the cost of this insurance shall be included in their proposed Contract Price.

6. Waiver of Subrogation: Workers' Compensation and Employer's Liability must provide a Waiver of Subrogation to cover both oral and written contracts in favor of GNOEC, its Commissioners, employees, consultants, agents and engineers.

7. Certificate of Insurance: The Contractor shall deliver to GNOEC within ten (10) days after award notification of the contract Certificates of Insurance (COI) evidencing insurance as required by this Contract. A Notice to Proceed will not be issued and/or no work under the contract may be performed until after the COI has been provided, reviewed, and accepted by GNOEC and its legal counsel. The Additional Insured and Waiver of Subrogation requirements shall be demonstrated on the COI, or evidenced by providing copies of Endorsements or other applicable forms or documentation.

AFFIDAVIT OF NO SOLICITATION

STATE OF LOUISIANA
PARISH OF _____

       Before the Undersigned Notary Public, came and appeared:

_____
(Name of Affiant)

who, after having been duly sworn by the Undersigned Notary Public, did depose and say that:
I.
    I   am   the   _____(title   or   office)   of
_____(name of the Proposer), and I am
authorized by the Proposer to make this Affidavit on its behalf:

II.
       The Proposer employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the Contract with the GNOEC for this RFP for Transponders other than persons regularly employed by the Proposer whose services in connection with this RFP or in securing the Contract were in the regular course of their duties for Proposer;
III.
       No part of the Contract Price received by Proposer was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the Contract, other than the payment of their normal compensation to persons regularly employed by the Proposer whose services in connection with the RFP and/or Transponders were in the regular course of their duties for Proposer;

IV.
       Under penalty of perjury, the foregoing is true and to the best of my, and the Proposer's knowledge, information and belief.

                                          _____
SWORN & SUBSCRIBED BEFORE ME   Affiant
ON THE _____DAY OF _____2019.

_____
      NOTARY PUBLIC SIGNATURE

_____
        PRINTED NAME

_____   _____
BAR ROLL NO. OR LICENSE NO.   MY COMMISSION EXPIRES

6C TOLL OPERATORS COALITION
AVI STANDARD

DOCUMENT CONTROL

Originator:	6C Toll Operators Coalition
Report Title:	6C Toll Operators Coalition
	AVI STANDARD (formerly the "AVI Transponder Programming Standard")
History:	V 0.1 - Initial Draft Release

	V 0.2 – Updates to "State" portion of EPC field
	    Hash Key changed from 16 to 32 bytes
	    Version Code added to Transponder Serial Number Field

	V 0.3 – Existing System Compatibility section added
	V 0.4 – Transponder and Reader Technical Requirements section added
	V 0.5 – Move Technical Requirements Section
	V 0.6 – Update to Barcode format and EPC/Password validation calculation examples
	V 0.7 – Update to User Memory Password validation calculation example and addition of comment regarding HOT declaration in EPC field
6/5/12	V 1.0 – Updated Agency Codes (E-470 changed from 1 to 2); Made the Barcode format optional; Prohibited Read protection of User Data Memory; Allowed optional Write protection of User Data Memory; Updated references to the TID length to allow use of all fully serialized ISO 18000-6C standard tags
11/20/14	V 2.0 – Updated the name of the document; redesigned memory map; convert from EPC Global format to ISO format; security update; changes to permit declarable transponders; updated Barcode format
10/26/15	V 3.0 - Fixed encoding details according to ISO requirements, giving more detail as needed. Combined State and Agency fields to be single Agency field and added Agency ID appendix. Clarified UII validation calculation.
1/28/16	V 3.0 Revision 2 – Added logo to cover page; clarified barcode format; corrected sample calculation of UII Validation hashing value.
3/15/16	V 3.0 Revision 3 – Added DSFID (0x3E) to be programmed as initial 2 bytes of UII.
7/22/16	V 3.0 Revision 4 – Added additional Agency codes to Appendix A. Corrected first bullet of 4.2 to reference new DSFID field in UII.
2/9/17	V 3.1 – Document title changed. Revised language in Section 1.1 to address backward compatibility. Deleted reference to backward compatibility in Section 1.2. Inserted Section 1.3 to clarify certification. Created a new Section 3 "Transponder Requirements" by combining previous barcode format and transponder manifest and adding transponder characteristics and environmental requirements. Previous Section 4 "Data Security" has been renumbered as Section 5 and has been edited to clarify Lock Status and Passwords. New Section 4 "Reader Requirements" has been created to clarify optional ISO Reader commands. Section 6 regarding backward compatibility and programming versions used by toll operators has been removed. Appendix A, code for TCA consolidated.

5/11/17	V 3.1 Revision 1 – Edited 3.1 to indicate method for calculating read distances of tag parameters. Added clarification language to 3.1.1 and 3.1.2. Changed values and units for polarization and pointing loss in 3.1.3. Updated Agency ID list in Appendix A. Edits list of optional reader commands in 4.1

TABLE OF CONTENTS

1.   INTRODUCTION

1.1   Purpose

The purpose of this document is to create and maintain a standard based on the 2010 and subsequent version of the ISO/IEC 18000-63 (known as 6C) communication protocol for tolling applications that use automatic vehicle identification (AVI). The guidance is intended for tag and reader manufacturers, toll lane vendors, system integrators, back-office providers, and other members of the RFID industry. This AVI standard meets the interoperability requirements developed by IBTTA's Roadside Interoperability Group. The current standard's programming requirements are backward compatible to all previous versions of the standard deployed. A few toll operators have deployed 6C transponders prior to the adoption of Version 1.0 and will continue to use their legacy systems. More information on 6C versions used by toll operators can be found on the 6C TOC website.

1.2   Scope

This document addresses the following areas of interest:

- Memory Mapping
- Transponder Requirements
- Reader Requirements
- Security and Data Integrity Validation

1.3   Certification

6C CTOC has approved the following 6C certification organization:

1. OmniAir Certification Services based on "RFID Based Toll System Equipment: Interoperability Requirements and Certification Framework, Date: July 30, 2012, Version 1.0.7"

1.4   Definitions, Acronyms, and Abbreviations

AFI	Application Family Identifier
CRC	Cyclic Redundancy Check
DSFID	Data Storage Format Identifier
EPC	Electronic Product Code
HOV	High Occupancy Vehicle
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
NAK	Negative Acknowledgement
PC	Protocol Control
RFID	Radio Frequency Identification
TID	Transponder Identification Gen2 transponder memory bank 10
TSN	Transponder Serial Number
UM	User Memory Gen2 transponder memory bank 11
UII	Unique Item Identifier, ISO/IEC 18000-63 (formerly '6C'), transponder memory bank 01
XPC	Extended protocol control

2.   MEMORY MAPPING

The ISO/IEC 18000-63 transponder memory is separated into four memory banks:

Bank 00	Reserved
Bank 10	TID
Bank 01	CRC, PC, UII
Bank 11	User Memory

2.1   Reserved Memory Specification

The Reserved memory shall be programmed by the tag provider and contents shared with the issuing agency.

2.2   TID Memory Specification

The Transponder Identification (**TID**) memory shall contain a minimum of 64 bits (8 byte) unalterable unique chip ID programmed by the chip manufacturer. This field will not be specified to be any particular value, but it is assumed to be unique for all -63 chips, per the ISO 18000-63 standard.

2.3   Memory Bank 01 Specification

There are three memory areas contained with Memory Bank 01.

- Stored CRC – This 16 bit long area is stored at memory location 00h - 0Fh and is calculated by the transponder.

- Stored PC - This area is 16 bits long and is stored at memory location 10h – 1Fh. The PC word contains the Application Family Identifier (AFI) – an 8 bit identifier (the value being 0xB0) assigned to the 6C Toll Operators Coalition. This number has been assigned for tolling by ISO, along with the Data Storage Format Identifier (DSFID, value of 0x3E) and explicitly describes a tag belonging to the 6C Toll Operators Coalition.

  This number can be used to filter the responses of tags to ensure that only toll tags are being read.

  The PC word is encoded during chip initialization and is dependent on the type of chip being encoded, not on an individual tag's data.

- Unique Item Identifier (UII) – This area is at least 96 bits long and is stored beginning at memory location 20h. Any memory in excess of 96 bits is undefined and may be used by the issuing agency; however, the additional memory shall not interfere with any of the functionality contained in this document. The UII shall provide read-only access to users. The issuing agency may lock write access permanently or may allow write access by a password maintained by the issuing agency.

2.3.1 MEMORY MAP

Area	#	Memory Address	Section	Description	Values
Stored CRC	1-16	00h-0Fh (16 bits)	Calculated	Area is calculated based on other transponder memory values per ISO 18000-63 specification.	Varies
Stored PC	1-5	10h-14h (5 bits)	Length	Number of 16 bit words in the UII	00110 = 6 words (indicates 96 bit UII) – will vary based on UII length
	6	15h (1 bit)	User Memory	Indicates status of the User Memory	0 = no user memory 1 = user memory available
	7	16h (1 bit)	XPC	Indicates status of extended tag features	0 = no XPC 1 = XPC available
	8	17h (1 bit)	Numbering System Indicator	Indicates if the tag is coded as an EPC or ISO tag.	0 = EPC 1 = ISO (correct value for 6C TOC applications)
	9-16	18h-1Fh (8 bits)	AFI	Application Family Identifier for 6C TOC – 0xB0	1011 0000 = 6C TOC AFI (B0)
UII	1-8	20h-27h (8 bits)	DSFID	Data Storage Format Identifier for 6C TOC – 0x3E	0011 1110 = 6C TOC DSFID (3E)
	9-21	28h–34h (13 bits)	Agency Use	Individual agencies may add agency specific information here.	Assigned by agency
	22-33	35h-40h	Classification	Classification is taken directly from EZPass Inter-Customer Service Center Interface File and Reporting Specifications, Appendix C and includes:	
		(1 bit)	Class	The first bit indicates if the tag has been assigned a classification value. If 0 is selected, the following 11 bits shall be ignored.	0 = no class value assigned (default) 1 = class value assigned
		(5 bits)	Vehicle Type	This field indicates the type of vehicle.	00000 = undefined (default) 00001 = automobile 00010 = motorcycle 00011 = pickup truck 00100 = van (seats 1-9) 00101 = minibus (seats 10-15) 00110 = bus (seats 16+) 00111 = recreational vehicle 01000 = truck 01001 = auto transporter (≤ 65') 01010 = auto transporter (>65') 01011 = tractor & trailer (≤48') 01100 = tractor & trailer (>48') 01101 = tractor & dual trailers each (≤28.5') 01110 = tractor & dual trailers each (>28.5') 01111 = tractor & dual trailers each (one ≤28.5' other >28.5') 10000 = undefined

Area	#	Memory Address	Section	Description	Values
		(4 bits)	Vehicle Axles	This field indicates the number of axles.	10001 = tractor/mobile home combination 10010-11111 = undefined 0000 = undefined (default) 0001 = undefined 0010 = 2 axles 0011 = 3 axles 0100 = 4 axles 0101 = 5 axles 0110 = 6 axles 0111 = 7 axles 1000 = 8 axles 1001 = 9 axles 1010 = 10 axles 1011 = 11 axles 1100 = 12 axles 1101 = 13 axles 1110 = 14 axles 1111 = 15 axles
		(1bit)	Vehicle Weight	This field indicates the weight of vehicle.	0 = ≤ 7,000 lbs (default) 1 = > 7,000 lbs
		(1 bit)	Vehicle Rear Tires	This field indicates the number of rear tires.	0 = Single rear tires (default) 1 = Dual rear tires
	34-36	41h-43h (3 bits)	HOV Declaration	These three bits indicate the declaration status of the tag. All single mode transponders shall be assigned the default value – 000, unless they are carpool specific tags.	000 = single mode (default) 001 = SOV (non-carpool) 010 = HOV 2+ 011 = HOV 3+ 100 = Carpool (as defined by roadway) 101 = reserved for future use 110 = reserved for future use 111 = reserved for future use
	37-40	44h-47h (4 bits)	Version	There are 16 possible values to indicate the version of programming standard used on the tag.	0000 = unassigned 0001 = Ver. 1.0 0010 = Ver. 2.0 0011 = Ver. 3.0
	41-52	48h-53h (12 bits)	Agency	The Agency Code allows for up to 4,096 agencies. The known agencies are included in the values column. See Appendix A for details.	See Appendix A – Table of Agencies
	53-80	54h-6Fh (28 bits)	Transponder Serial Number	This identifies the particular tag within the agency. There are 268,435,456 values accommodated in this space. The values in this field will be assigned by each agency.	Assigned by agency
	81-96	70h-7Fh (16 bits)	UII Validation (Hash Value)	This is calculated using the first 80 UII bits and 32 byte key. Example is provided in Section 5.	Assigned at the time of transponder manufacturer. Calculated as per Section 5.

Table 1: UII Memory Mapping

2.4 User Memory Specification

As of the publication date of this version, none of the current members of the 6C Toll Operators Coalition write to their tags, nor do any of them read the User memory. It is anticipated that this memory bank may be required to accommodate future group members or affiliates. The following general specifications shall apply.

The User memory shall have at least 512 bits (64 bytes).

The User memory bank shall be designated as a temporary data field, where facilities may read and write whatever information is necessary, recognizing that the data may be overwritten at any time. For example, an agency operating a closed ticket type of system may choose to use this bank and write trip start date, time, location, and price as the trip begins and read this information at the conclusion of the trip. This could be used to compute the correct toll.

Any agency-specific use of User memory outside the specifications in this document should be closely coordinated to reduce the risk of future conflicts.

DSFID – Data Storage Format Identifier

The DSFID declares the data format for the data in User Memory. It is a value set by ISO as part of the AFI process. ISO has assigned the value 0x3E, which means the data is defined by the 6C Toll Operators Coalition. The User Memory portion of the tag shall have the following format:

#	Memory Address	Section	Description	Values
1-8	00h-07h (8 bits)	DSFID	• Data Storage Format Identifier	0011 1110 = 6C TOC DSFID (3E)
9-20	08h-23h (12 bits)	Agency	• 12 bit **Agency Code**. As assigned in the previous section.	Section 2.3.1
21-27	24h-1Ah (7 bits)	Plaza ID	• 7 bit **Plaza ID**. Each operator may choose.	To be defined by agencies using this field.
28-32	1Bh-1Fh (5 bits)	Lane ID	• 5 bit **Lane ID**. Each operator may choose.	To be defined by agencies using this field.
33-57	20h-38h (25 bits)	Day/Time	• 25 bit **Day**. Each operator may choose. (seconds since Jan 01 00:00:00)	To be defined by agencies using this field.
58—60	39h-3Bh (3 bits)	Occupancy Setting	• 3 bit **Occupancy**. Each operator may choose.	To be defined by agencies using this field.
61+	3Ch -	Undefined	• The remaining bits may be defined as individual agency needs arise.	

Table 2: User Memory Mapping

3.   TRANSPONDER REQUIREMENTS

3.1 Transponder Characteristics

All values are measured per the EPC Global Tag Performance Parameters and Test Methods Version 1.1.3 test protocol, limited to the 902 – 928 MHz frequency range and modified as follows:

- Use a horizontally, linearly polarized test antenna;
- With tags mounted on material applicable for the intended location on the vehicle; and
- As described in Section 3.1.3.

3.1.1 MINIMUM ACTIVATION ENERGY

Tags shall have a minimum activation energy (forward link range) resulting in a certification test read range between 7 m and 12 m.

3.1.2 RETURN SIGNAL STRENGTH (BACKSCATTER RANGE)

Tags shall have a return signal strength (reverse link range) resulting in a certification test read at a minimum of 14 m.

3.1.3 ANTENNA POLARIZATION AND POINTING LOSS

Tags shall be horizontally polarized.

When tilted +/- 15 degree horizontally (see Figure 1) from the installation reference angle defined by the transponder manufacturer, tags shall have a minimum activation energy (forward link range) resulting in a certification test read range, between 5 m and 12 m. For example, when a tag is not installed horizontally level ("crooked").

Tilt from horizontal reference plane = α

Front View
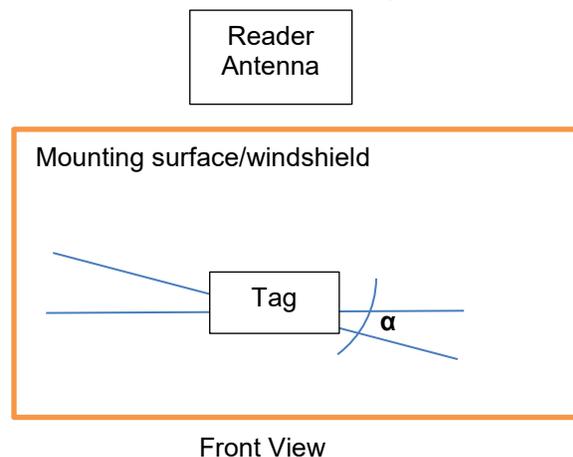
Figure 1. Diagram schematically depicting tilt from horizontal angle between tag placement and reader antenna.

When tilted +/- 45 degrees vertically (see Figure 2) from the installation reference angle defined by the transponder manufacturer, tags shall have a minimum activation energy (forward link range) resulting in a certification test read range between 5 m and 12 m. For example, this addresses windshield angles between steeply sloped windshields (sports car) and near vertical windshields (semi-tractor trailers).

Tilt from vertical reference plane = Φ
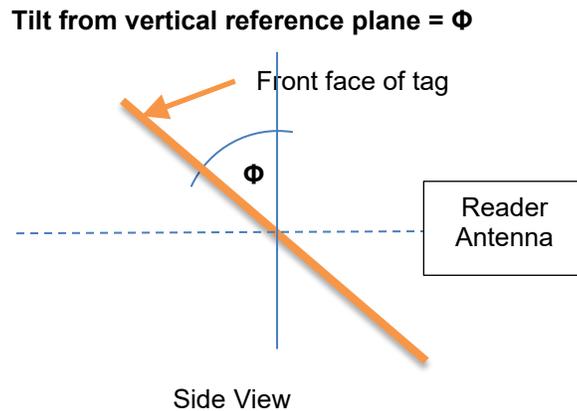
Figure 2. Diagram schematically depicting tilt from vertical angle between tag placement and reader antenna.

When rotated +/- 18 degrees from the horizontal plane (see Figure 3) from the installation reference angle defined by the transponder manufacturer, tags shall have a minimum activation energy (forward link range) resulting in a certification test read range between 5 m and 12 m. For example, this addresses transponder mounting locations on flat windshields versus curved windshields and headlights.

Rotation from horizontal reference plane = Ө
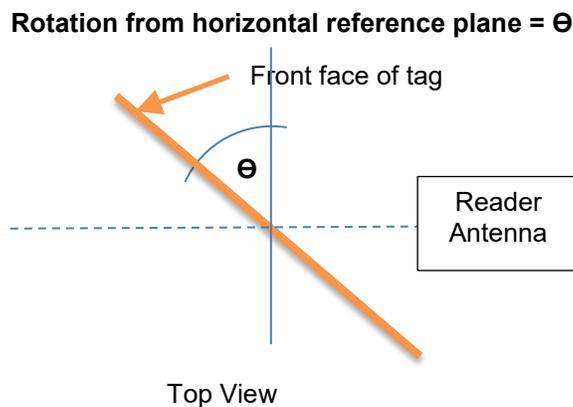

Figure 3. Diagram schematically depicting rotation from horizontal plane angle between tag placement and reader antenna.

3.2 Tag Environmental Conditions

Transponders shall be able to perform under the following environmental conditions:

1. All interior transponders shall be able to be subjected to and operated in 95% humidity, non-condensing environments.

2. All exterior transponders shall operate in 100% humidity, condensing environments.

3. Tags shall be able to operate at temperatures between - 40º F and +185º F.

4. Sunlight screening shall be built into both the internal and external transponders to ensure they perform as well under conditions of direct sunlight as in overcast conditions.

3.3 Barcode Format

3.3.1 BARCODE FORMAT

The transponder barcode includes only the Agency Code and the Transponder Serial Number along with a check digit. The barcode shall be printed using EPC Code 128 and the code data digits shall be in decimal format AAAATTTTTTTTTTL where AAAA is the Agency Code as a 4-digit number with leading zeros, TTTTTTTTTT is the Transponder Serial Number (TSN) as a 10-digit number with leading zeros and L is the Luhn check digit computed using only the last 2 digits of the Agency Code and all 10 digits of the TSN.

Below the barcode the Agency Code, the TSN and the check digit shall be displayed in the following decimal format <AA>AA TTTTTTTTTT L. The printed Agency Code shall NOT contain leading zeros and shall be separated from the TSN by a double space., where <AA>AA is the Agency code excluding leading zeros. The TSN shall include the leading zeros (to fill all 10 digits) and shall be separated from the check digit number L by a double space.

<AA>AA   TTTTTTTTTT   L

Where:

<AA>AA = 4 digit Agency Code (leading zeroes not printed)

TTTTTTTTTT = 10 digit Transponder Serial Number (leading zeroes printed)

L = Check digit Luhn (mod10) coded – calculated based upon **<AA>AA** (third and fourth digits only) and **TTTTTTTTTT** (all ten digits)

For example, a transponder with serial number 12 for agency 77 would return 007700000000123 as the barcode content and the printed information below the barcode would be
77 0000000012 3.

Similarly for agency 449 a transponder with serial number 12 would return 044900000000122 as the barcode content and the printed information below the barcode would be
449 0000000012 2.

3.4 Transponder Ordering and Delivery (Manifest information)

To facilitate loading of data in back office transponder inventory on transponder delivery, manufacturers should provide a file with comma separated UII memory and TID. Each transponder entry should be on a new line:

12_Byte_UII_Memory,TID (length varies)

0101CE00010000000101CE8C,E2003412012EC0FFEE041392[1]

---

[1] Note: Values shown are for illustrative purposes only and are not actual/valid EPC or TID values. A 12 byte TID is used for example purposes.

4. READER REQUIREMENTS

4.1 ISO Commands

The following ISO reader commands are optional:

1. NAK
2. Kill
3. Lock

5. SECURITY AND DATA INTEGRITY VALIDATION

5.1 Overview

Transponder security is critical to the toll industry. It is anticipated that as more security features become available they will be evaluated and deployed, as appropriate. The following security measures are currently employed.

5.2 Memory Bank Security

5.2.1 RESERVED MEMORY BANK

1. The Access Password shall have a Lock Status of locked with an Access Password known to and secured by the transponder issuing agency.

2. The Kill Password and its Lock Status shall be configurable by the transponder issuing agency. It is recommended that the transponder issuing agency configure tags to permanently disable the ability to kill their tags.

5.2.2 TID MEMORY BANK

The transponder identification number shall be uniquely assigned by the manufacturer. It shall be readable without a password, cannot be altered and must be unique.

5.2.3 UII MEMORY BANK

1. The transponder issuing agency shall be the only entity authorized to change the encoded bits on the transponder. UII memory bank shall have a Lock Status of locked.

2. UII Authentication/Validation – The UII memory data should be authenticated with two hashed validation bytes. The UII Validation bytes can be used for transponder data verification and can also provide some level of transponder authentication. Further details are contained in Section 5.3.

5.2.4 USER MEMORY BANK

1. Password – The User memory shall be writable without a password. The User memory bank shall have a Lock Status of unlock.

2. Authentication/Validation – Authentication and validation shall not be used.

5.2.5 ENCRYPTION

Under development.

5.3 UII Validation

Below is example of how the UII validation bytes shall be calculated using:

1. The first 10 bytes of the UII (starting with the "DSFID" field)

2.   The 32 byte key (determined by the tag issuing agency)

3.   The bytes of the transponder TID[2] (length varies - see footnote)

For ensuring interagency interoperability and consistency between transponders manufactured by different vendors the open standard SHA1 hashing algorithm shall be used. The hashing sequence shall be:

a.   Concatenate the 10 UII memory bytes, the 32 byte key and the TID bytes to form a single byte sequence

b.   Determine the SHA1 hash of this byte sequence above

c.   For UII Validation the first 2 bytes from the 40 byte hash result shall be used.

UII Validation Reference Calculation is provided below:

UII 10 byte: 0x**FFFFFFFFFFFFFFFFFFFF**

Key 32 byte:
0x**ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABAB**

TID (12 byte example):   0x**000000000000000000000000**

Result 20 byte hash value: 0x**167F9C5B3933148B68AAD51EE3C4B5F858166451**

UII Validation bytes: 0x**167F**

The 12 UII bytes shall be encoded as: 0x**FFFFFFFFFFFFFFFFFFFF167F**

Tags which are not fully serialized (that is, have at least a 48 bit unique serial number) will not conform to this standards document and should not be used for interoperable 6C tolling deployments.

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[2] The TID length can vary per the ISO 18000-63 specification. For fully serialized tags, the complete header and serialized portion of the TID (which can be anywhere from 96 - 192 bits, given the allowable serial number length of 48 - 144 bits) will be used for the indicated calculations. Per the standard, the length of a transponder's TID serial number is indicated on each transponder, in bits 20h - 22h of the TID.

6. APPENDICES

6.1 Appendix A – Table of Agencies

Agency	Acronym	State	Status	Decimal	Hex	Binary
Reserved	N/A	N/A	Reserved	0	0	0000 0000 0000
North Carolina Turnpike Authority	NCTA	NC	Assigned	33	21	0000 0010 0001
Washington State Department of Transportation	WSDOT	WA	Assigned	77	4D	0000 0100 1101
Bay Area Toll Authority	BATA	CA	Assigned	101	65	0000 0110 0101
California Department of Transportation	CalTrans	CA	Assigned	102	66	0000 0110 0110
Transportation Corridor Agency	TCA	CA	Assigned	103	67	0000 0110 0111
			Unassigned	104	68	0000 0110 1000
Golden Gate Bridge, Highway and Tunnel District	GGBHTD	CA	Assigned	105	69	0000 0110 1001
Los Angeles County Metropolitan Transportation Authority	LACMTA	CA	Assigned	106	6A	0000 0110 1010
Orange County Transportation Authority	OCTA	CA	Assigned	107	6B	0000 0110 1011
Riverside County Transportation Commission	RCTC	CA	Assigned	108	6C	0000 0110 1100
San Diego Association of Governments	SANDAG	CA	Assigned	109	6D	0000 0110 1101
Santa Clara Valley Transportation Authority	VTA	CA	Assigned	110	6E	0000 0110 1110
South Bay Expressway, LLC	SBX	CA	Assigned	111	6F	0000 0110 1111
Sunol SMART Carpool Lanes Joint Powers Authority	Sunol JPA	CA	Assigned	112	70	0000 0111 0000
San Francisco County Transportation Authority	SFCTA	CA	Assigned	113	71	0000 0111 0001
San Bernardino Associated Governments	SANBAG	CA	Assigned	114	72	0000 0111 0010
Concession A25 sec	A25	QC	Assigned	115	73	0000 0111 0011
Port of Hood River	POHR	OR	Assigned	116	74	0000 0111 0100
McAllen-Hidalgo & Anzalduas Bridges	MHAB	TX	Assigned	118	76	0000 0111 0110
E-470	E-470	CO	Assigned	194	C2	0000 1100 0010
State Road & Toll Way Authority	SRTA	GA	Assigned	321	141	0001 0100 0001
Puerto Rico Highway and Transportation Authority	PRHTA	PR	Assigned	448	1C0	0001 1100 0000
Louisville-Southern Indiana Ohio River Bridges	LSIORB	KY	Assigned	449	1C1	0001 1100 0001
Louisiana Department of Transportation and Development	LADOTD	LA	Assigned	450	1C2	0001 1100 0010
Utah Department of Transportation	UDOT	UT	Reserved	1409	581	0101 1000 0001
Washington State Department of Transportation	WSDOT	WA	Reserved	1505	5E1	0101 1110 0001
Transportation Investment Corporation	TI Corp	BC	Assigned	2305	901	1001 0000 0001
Blue Water Bridge Authority	BWBA	ON	Assigned	2529	9E1	1001 1110 0001

Agency	Acronym	State	Status	Decimal	Hex	Binary
Reserved for Testing	TEST	N/A	Reserved	4080 - 4095	FF0- FFF	1111 1111 0000- 1111 1111 1111

Table A-1: Agency IDs. For most current list, please visit the 6C TOC website: http://6c-toc.com/