Toll Collection Fundamentals

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NTTA

Topics

- Development of All Electronic Tolling
- Toll Collection Fundamentals
- By the numbers – what it takes to make it work

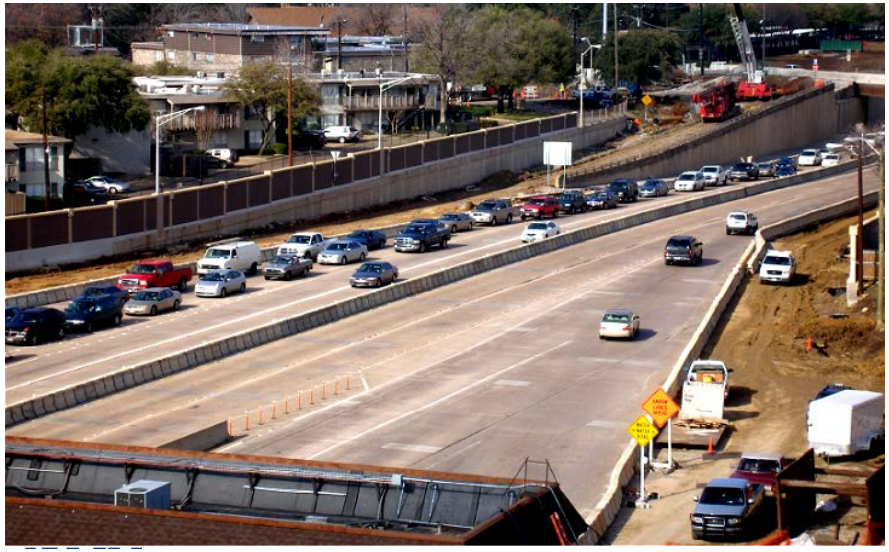
All-ETC

The History

- NTTA has led ETC efforts since late 1980s
  - From gates to gantries
    - TollTags first used on the Dallas North Tollway (DNT) in 1989
    - First time ETC used on a U.S. toll road
  - Innovation
    - Truck hits Main Lane Plaza (MLP) 1 in 2001; express lanes installed
    - Express lanes at all main lane plazas by 2002

Evolution of Toll Collection

Main Lane Plaza 1



All-ETC

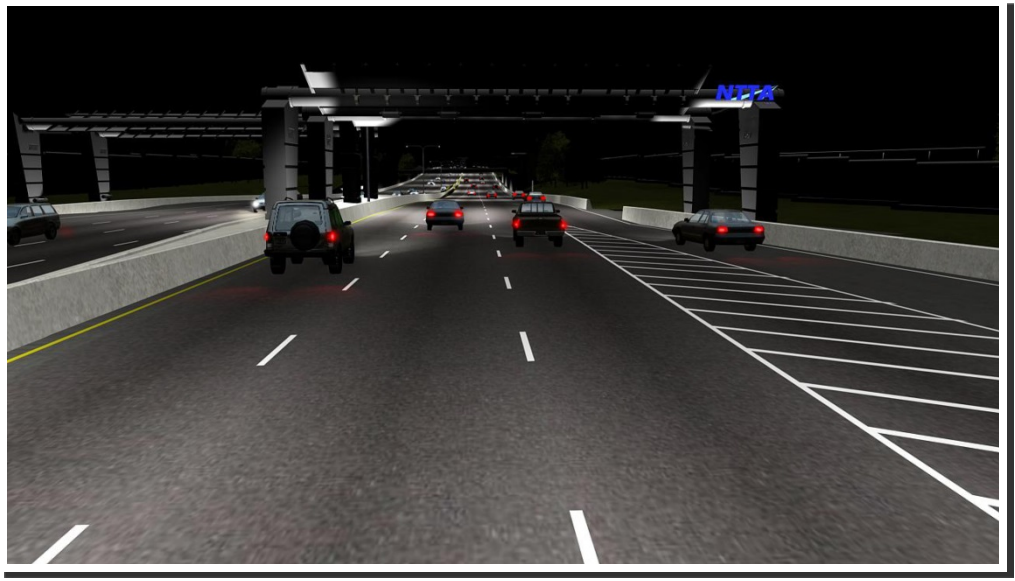
The History

- ZipCash evolution
  - MLP 1 reconstruction (late 2006)
  - Original plan: Two cash lanes and two express lanes
  - Major congestion modification: Three ZipCash lanes (early 2007)

- ZipCash benefits
  - Reduced congestion
  - Appreciative customers
  - Booths, excess pavement, and operations buildings eliminated

All-ETC Comprehensive Project Plan Goals

- Convert existing NTTA facilities to all-ETC by 2010
- Implement an effective staff migration and training plan
- Maintain a positive customer experience
- Ensure that all-ETC implementation does not adversely affect net revenue



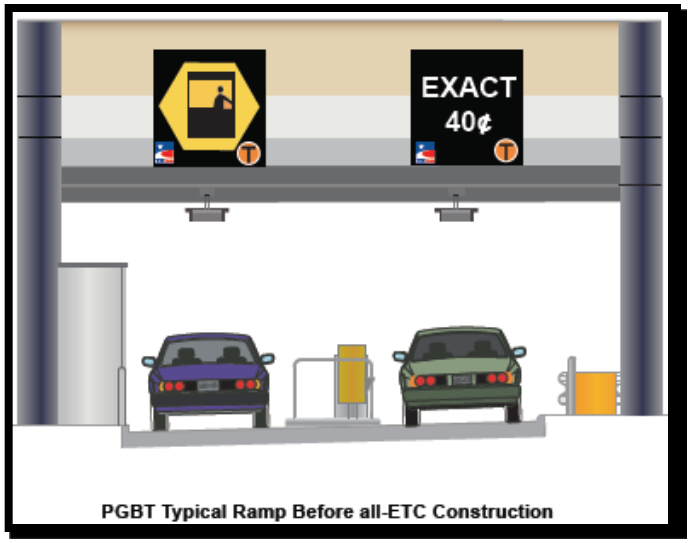
Implementation Schedule for All-ETC

Q1-2009	Q2-2009	Q3-2009	Q4-2009	Q1-2010
Begin gantry installations on DNT ramps south of I-635 Begin gantry installation on AATT & MCLB	**Implement all ETC on PGBT** Begin ramp and main lane modifications on PGBT Begin gantry installations on DNT ramps north of I-635	Begin gantry installations on DNT MLP 2, MLP 3 & MLP 4 Complete main lane and ramp modifications on PGBT for final configuration	Complete the all ETC installation on main lane and ramps on DNT Complete the all ETC installation on AATT & MCLB	**Implement all ETC on DNT, AATT & MCLB** Complete demolition of existing toll plazas on DNT

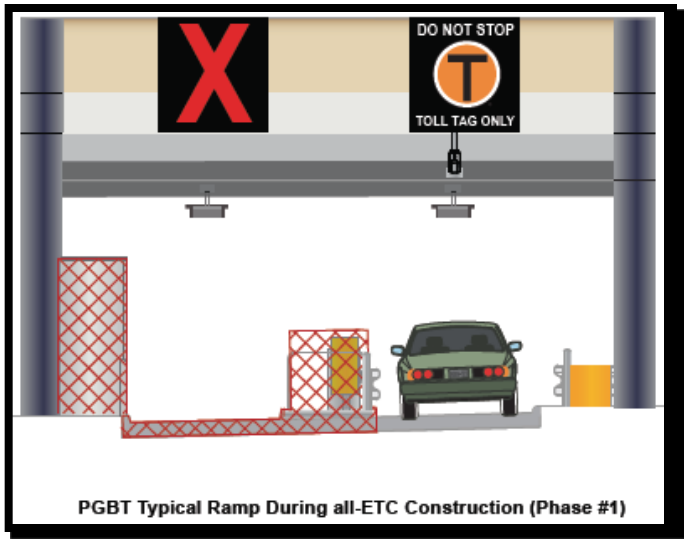
NTTA

All-ETC

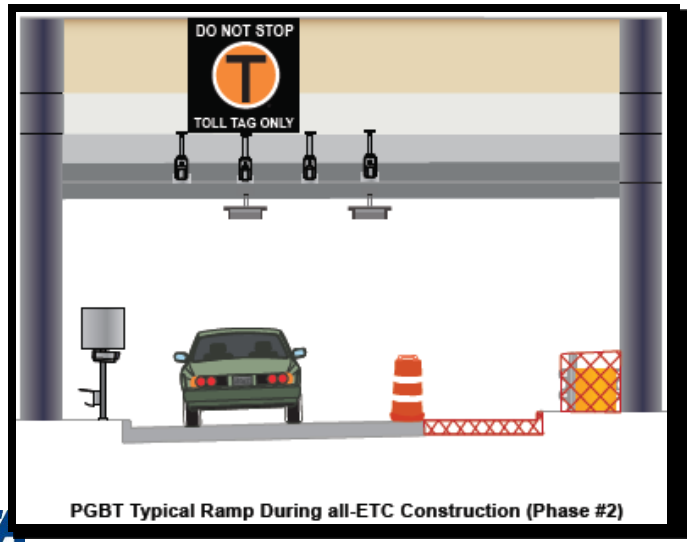
PGBT Phasing



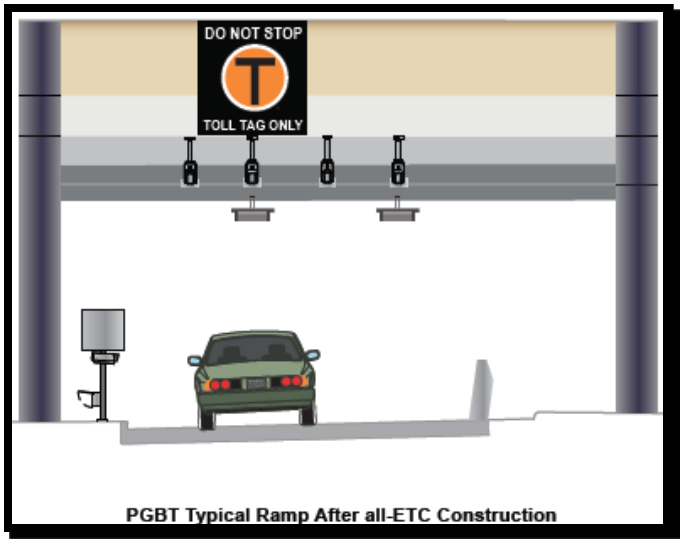
PGBT Typical Ramp Before all-ETC Construction



PGBT Typical Ramp During all-ETC Construction (Phase #1)



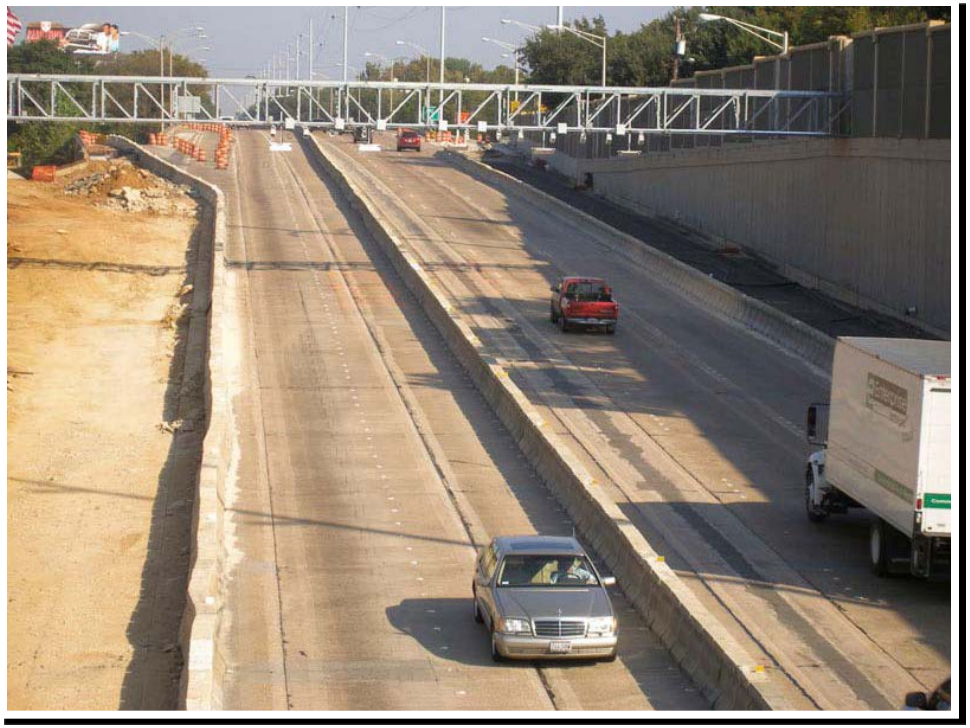
PGBT Typical Ramp During all-ETC Construction (Phase #2)

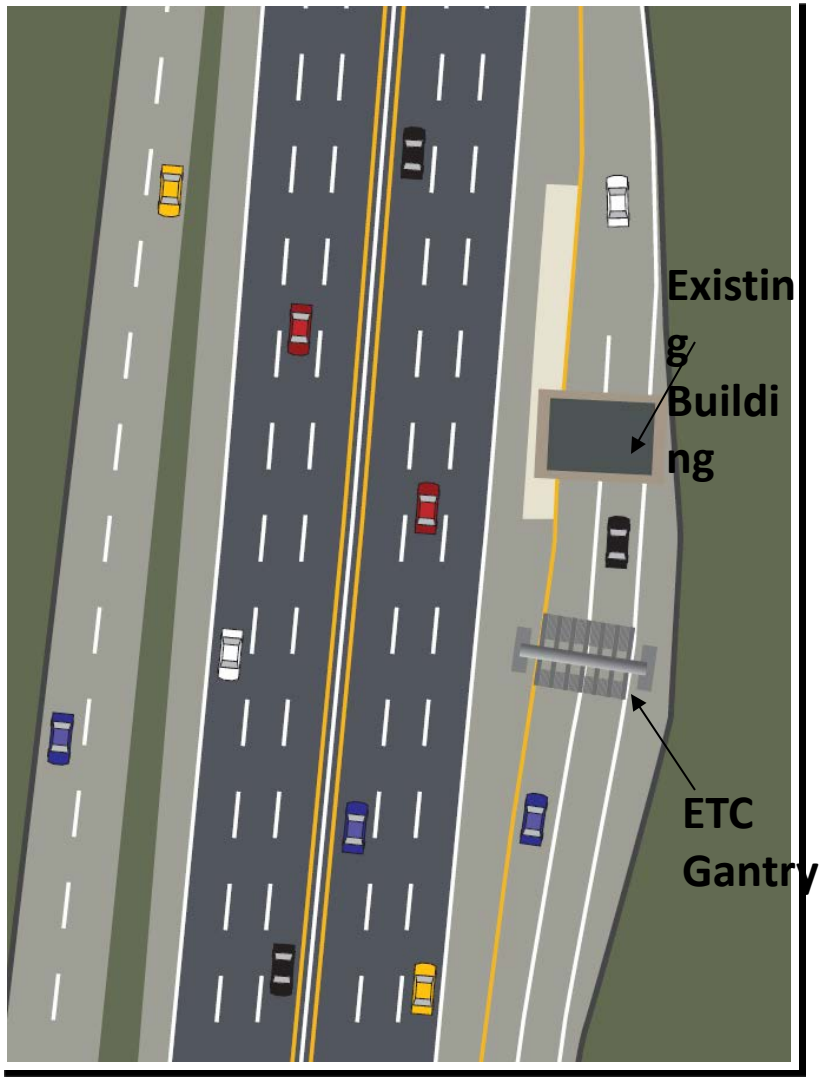


PGBT Typical Ramp After all-ETC Construction

All-ETC

DNT Installations





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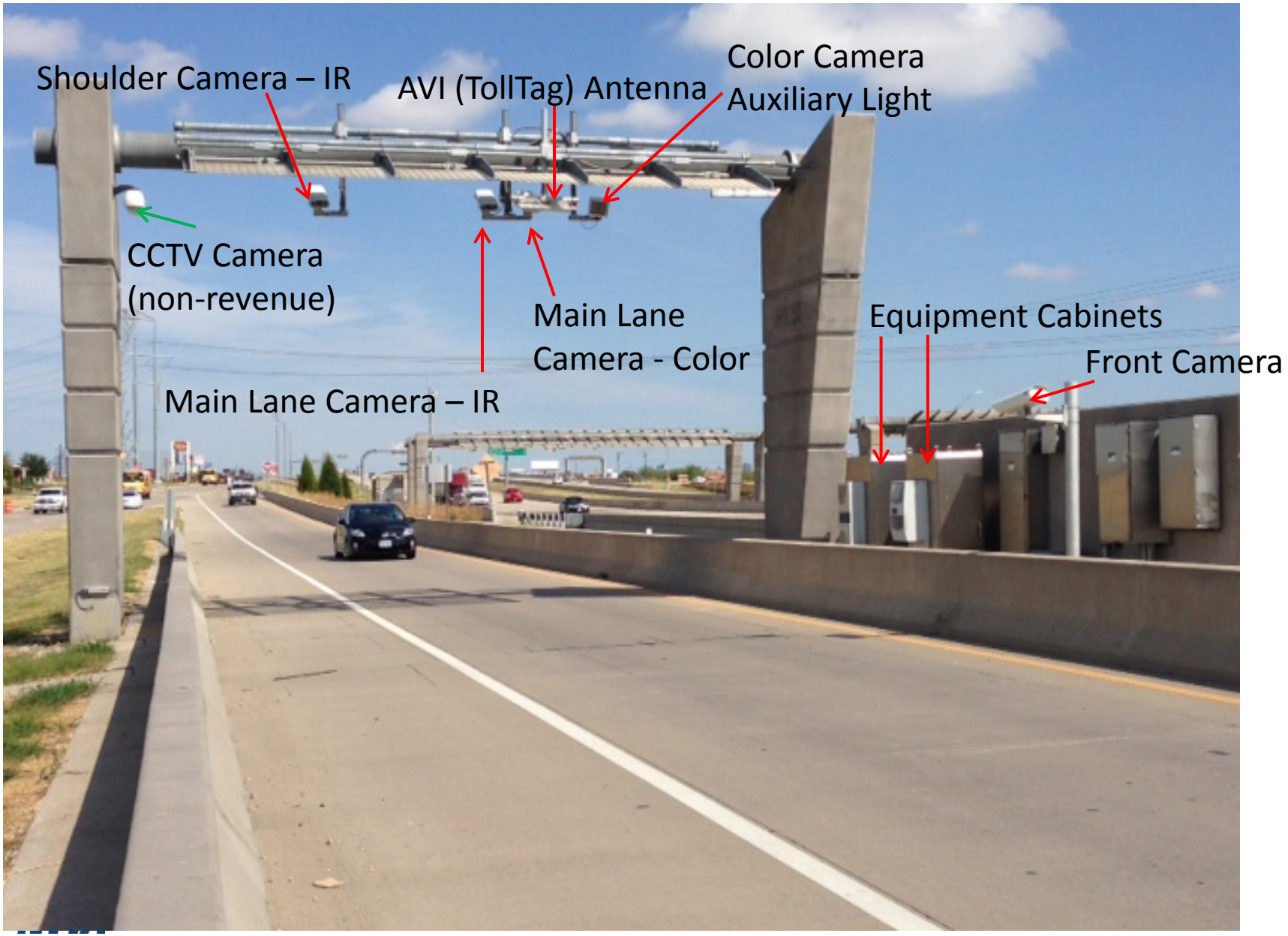
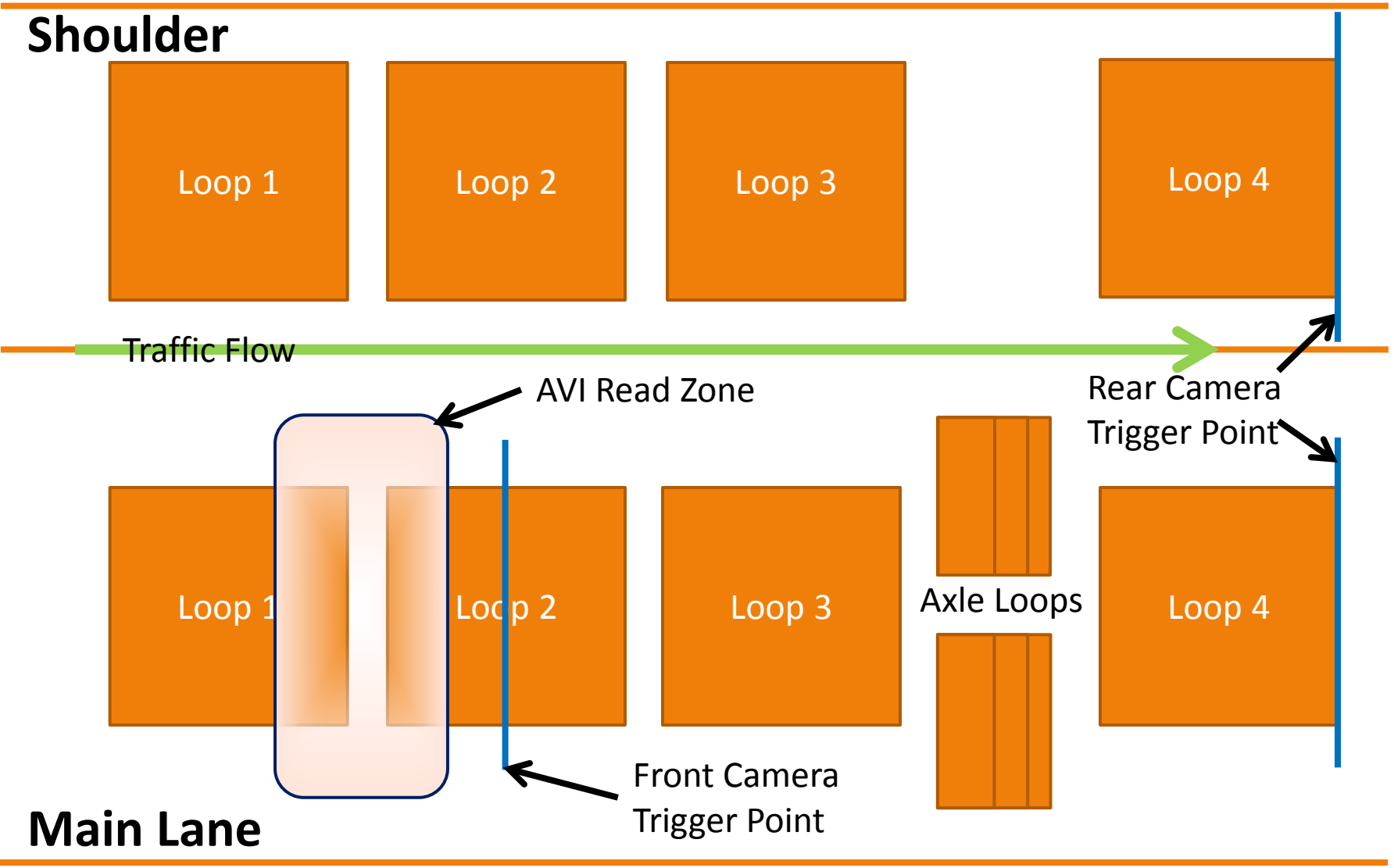
Ramp Equipment



Loop Configuration



If a vehicle is present, the transaction is completed and pictures are taken.

Monitoring Tools - VES

DNT PGBT PGBW SRT AATT LLTB MCLB CTP Help

Camera MLP3SR4 on controller dnt-mlp3-1aa

Images for Camera MLP3SR4

10/06/14 09:58:21 BT4N275 [942]

10/06/14 09:58:56 CPG5871 [922]

10/06/14 09:59:00 BBV3653 [927]

10/06/14 09:59:29 BH1K090 [934]

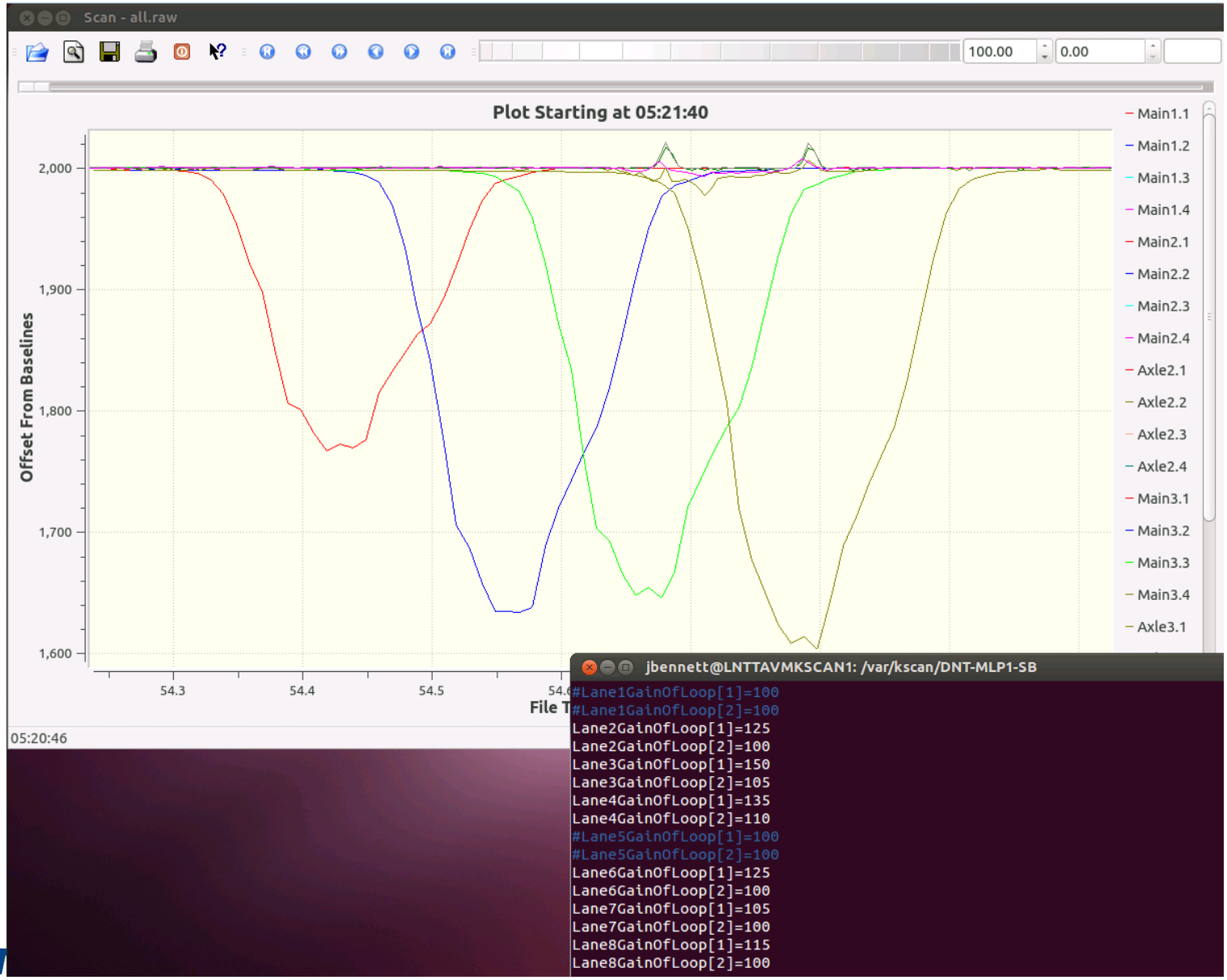
10/06/14 09:59:39 Y52VLY [998]

10/06/14 10:00:02 No OCR

Maintenance Messages for Camera MLP3SR4 In Last 24 Hours

Date/Time	Error Code	Message
No messages in last 24 hours		

Monitoring Tools - KScan



Monitoring Tools - KScan

Behind the Scenes

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Lane Level Toll Collection

- 286 Tolled Lanes
- 197 Tolling Points/Gantries
- 1,980 Inductive Loops
- 290 TollTag Readers
- 500 Lane & Image Controllers
- 1,050 Tolling Cameras

- Inductive Loops – ***3M***
- TollTags – ***TransCore***
- TollTag Readers – ***TransCore***
- Lane Controllers – ***ETCC, IMI***
- Image Controllers – ***IMI***
- Tolling Cameras & External Lighting – ***JAI***
- Wrong Way Driver Detection – ***IMI***
- Climate Controlled Environment – ***Hoffman***

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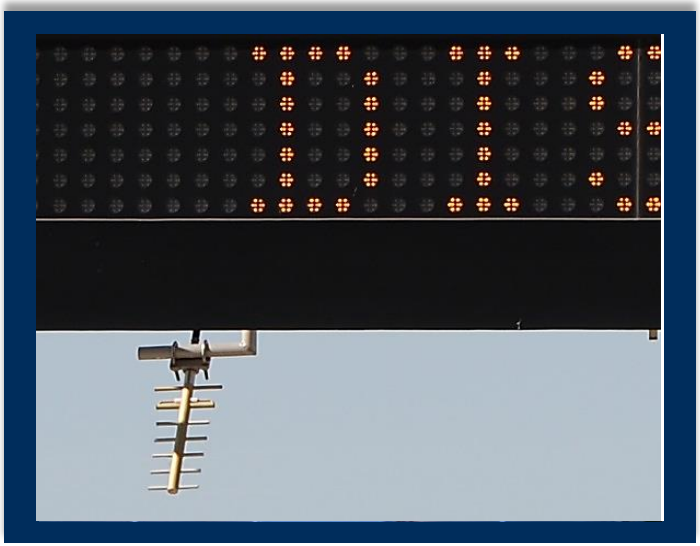
Intelligent Transportation System



- 26 Dynamic Message Signs
- 42 Travel Time Sensors
- 1,825 CCTV Cameras
- 62 Video Analytics Servers
- 8 Weather Sensor Sites

- Dynamic Message Signs – ***Skyline***
- Travel Time Sensors – ***TransCore, IMI***
- CCTV Cameras (Axis) – ***Securadyne***
- Video Analytics (ONSSI) – ***Securadyne***
- Pavement Weather Sensors – ***Vaisala***

Dedicated Fiber Network

- 140 Miles of Fiber
- 500 Power Supplies
- 900 Network Switches
- 13 Radio Sites

Fiber Maintenance – ***AT&T***

Uninterruptable Power Supplies – ***Falcon***

Network Infrastructure – ***Cisco***

Radio Communications – ***Link America***

NTTA

Data Center

- 450 Physical Servers
- 50 Network Devices
- 137 Databases
- 2,500 Terabytes of Data
- (7) 23-Ton A/C Units
- (2) 100MB Internet

5 Layers of Security Protection

Servers/Network – ***Dell, Cisco***

Server Operating System – ***Linux, Microsoft***

Databases – ***Oracle, Microsoft SQL Server***

Storage Attached Network (SAN) – ***EMC***

Backup Solution – ***EMC, Spectralogic***

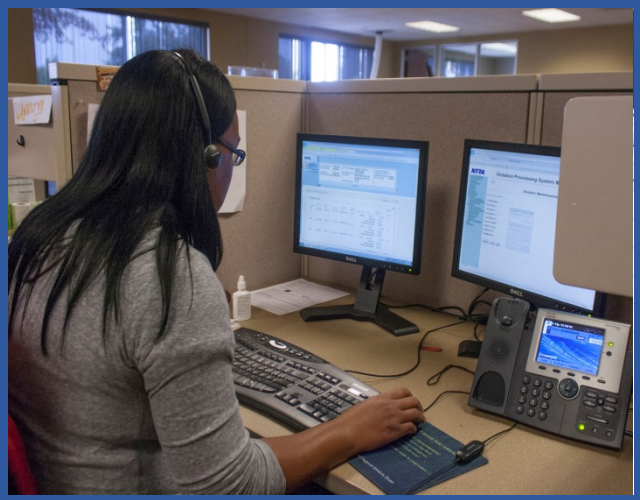
Backup Power– ***Galaxy UPS, 1mw Generator***

Air Conditioning – ***Liebert, Tech Plan***

Fire Suppression – ***Tyco SimplexGrinnell***

Internet Bandwidth – ***AT&T***

Call Center



- 238 Incoming CSC Phone Lines
- 92 Phone Lines for Business
- 277 Software Licenses

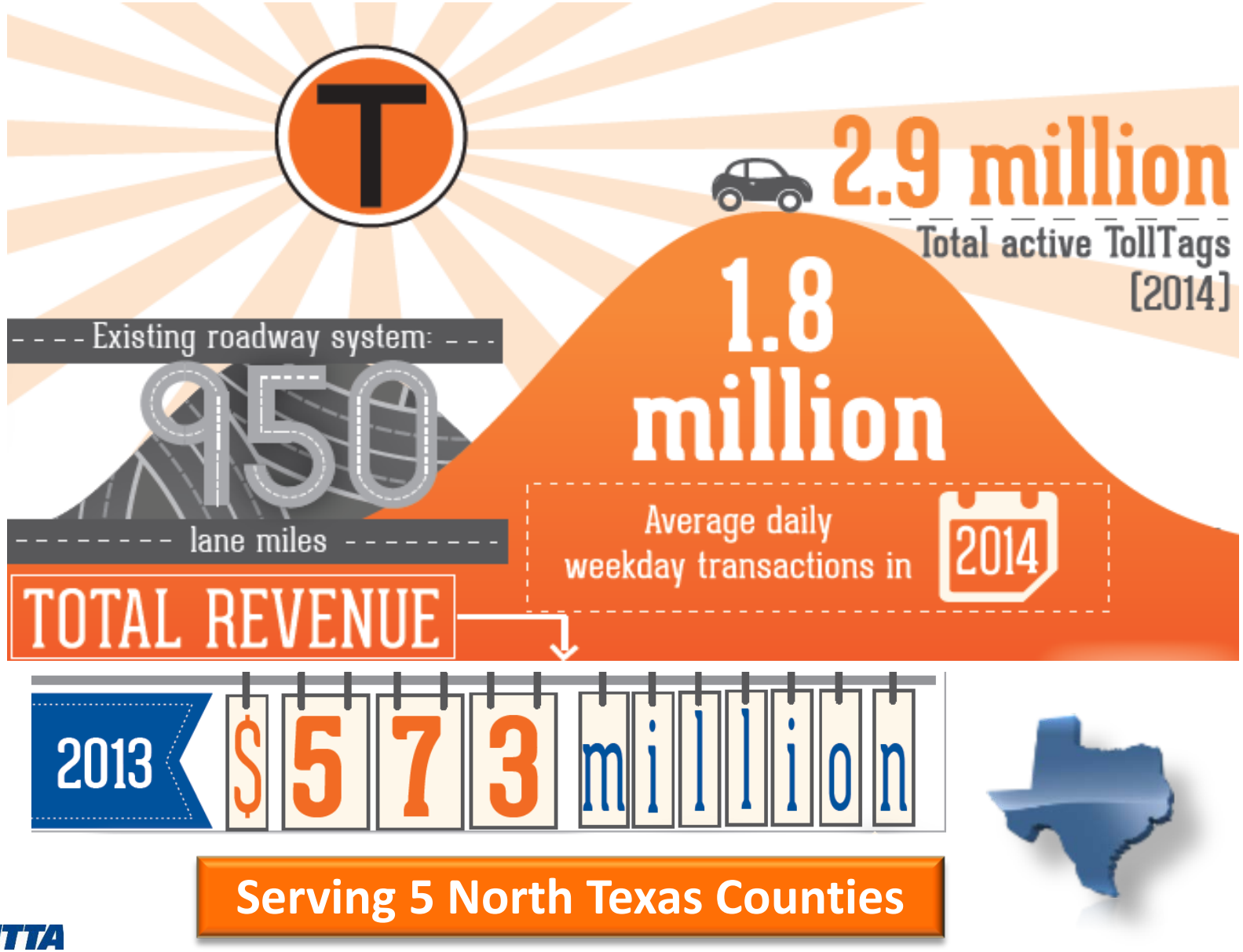
- Telephone Lines – ***AT&T***
- Interactive Voice Response - ***Cisco***
- Contact Center Reporting – ***Cisco***
- Outbound Dialer – ***Cisco, Presidio***
- Quality Monitoring – ***Verint Impact 360***
- Workforce Management– ***Verint Impact 360***
- Email Interaction Manager – ***Cisco***

Back Office Toll Collection

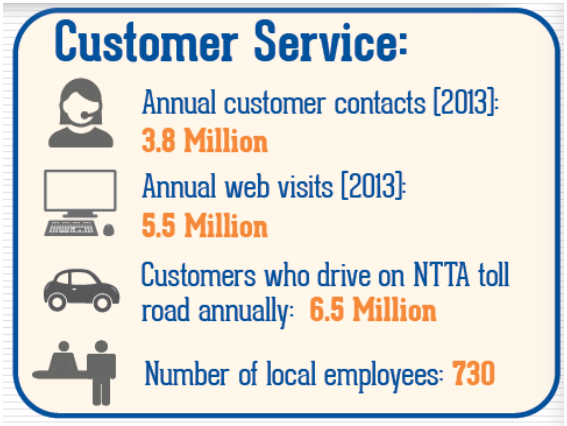
- 55M Transactions per Month
- 111K IOP Transactions on NTTA Roads per Month
- 75% ZipCash Images Reviewed with OCR Only
- 210K TollMate Downloads
- 50% of DFW Transactions Paid by TollTag

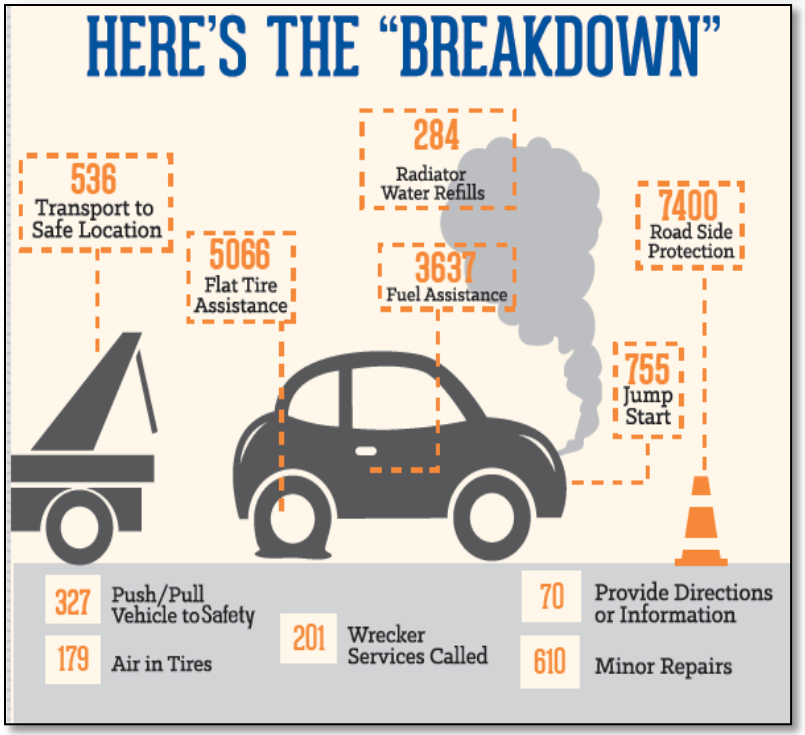
- Toll System – ***ETCC, Oracle, MBI, Zenisys***
- Interoperability – ***All TX Agencies,OTA,ETCC***
- SCIP & User Admin Support – ***Zenisys***
- Optical Character Recognition – ***Dacolian***
- DMV Lookup – ***TX DMV, OTC, La DOTD***
- Tollmate – ***iDiggApp***
- Parking – ***DAL and DFW, ETCC, IMI***

NTTA by the Numbers



Customer Service Metrics





NTTA

North Texas Tollway Authority

Our Mission

❖ **Provide** a safe and reliable toll road system ❖ **Increase** value and mobility options for customers ❖ **Operate** the Authority in a businesslike manner ❖ **Protect** our bondholders ❖ **Partner** to meet our region's growing need for transportation infrastructure