



## TO MAKE A DIFFERENCE

OUR COMMITMENT TO OUR REGION NEVER ENDS.



IBTTA Summit on AET, Managed Lanes and Interoperability – July 22, 2013

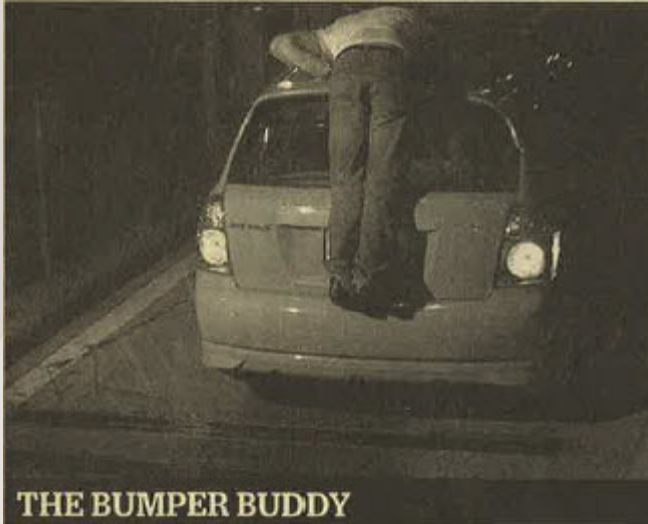
Rafael Hernandez – Toll Operations Manager

## **Accuracy and Efficiency: The Image Review Process**

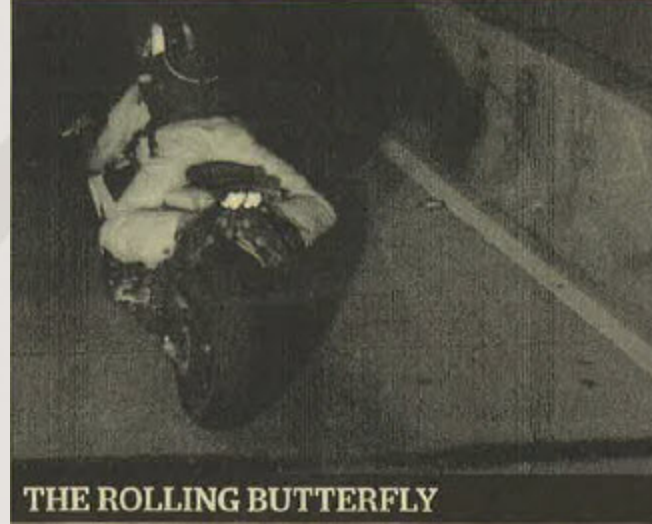
# **Enhanced Image Processing**

# The things some people do to get out of a ticket

## Rolling Violations



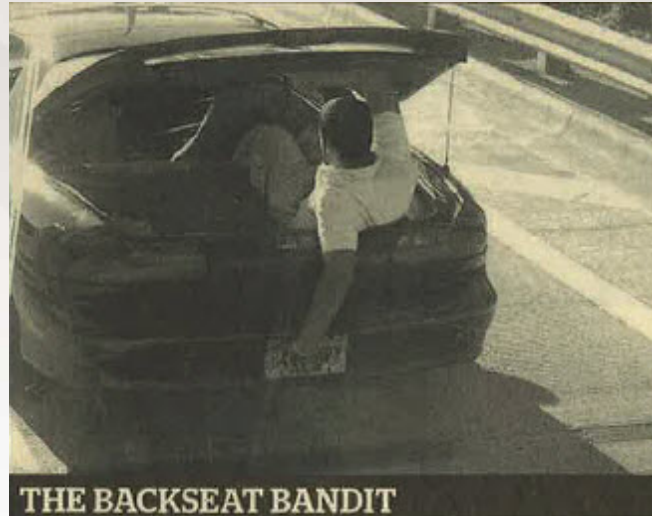
**THE BUMPER BUDDY**



**THE ROLLING BUTTERFLY**



**THE ONE-HAND GRAB**



**THE BACKSEAT BANDIT**

# St. Petersburg Times

TAMPA EDITION

STILL 50¢

Florida's Best Newspaper

tampabay.com

★★ Thursday, June 2, 2011 | 50¢

## DIocese REVEALS THE COST OF SEX ABUSE: \$4.7M

In a letter in church bulletins over Memorial Day weekend, the Roman Catholic Diocese of St. Petersburg acknowledges it has settled dozens of cases in the past 20 years. **Tampa Bay, 1B**

## Rays lose 3-0 to Texas Rangers

Tampa Bay Rays waste a solid outing by pitcher David Price with feeble swings at the plate before 13,725 at Tropicana Field. **Sports, 1C**

## Best golfer his age in the world?

Treasure Island's Loyal "Bud" Chapman, 88, has shot better than his age 2,151 times. **Sports, 1C**

## Report: Top firms are dodging taxes

Citizens for Tax Justice says 11 companies, with domestic profits of \$62 billion, paid no taxes. **Business, 4B**

## Dow falls 280 on economy jitters

The biggest drop in a nearly a year erases more than a quarter of the stock market's gains in 2011. **Business, 5B**

## For a Pinellas man, scars from Bosnia

A photo of Sead Bekric's bloody face told the world about the war. He now lives in Palm Harbor. **Nation, 3A**

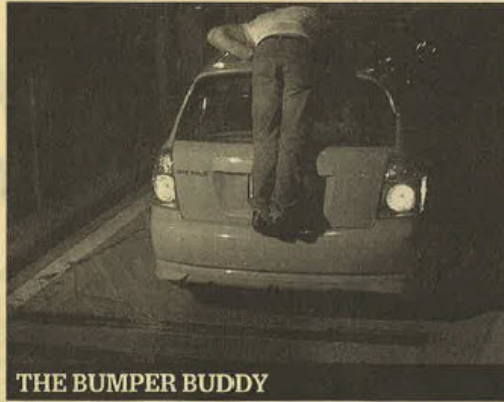
## Mitt Romney to make run official

The presumptive GOP front-runner is expected to enter the 2012 presidential race today. **Nation, 2A**

## Optimism needed for parenting

The things some people do to get out of a ticket ...

# Rolling violations



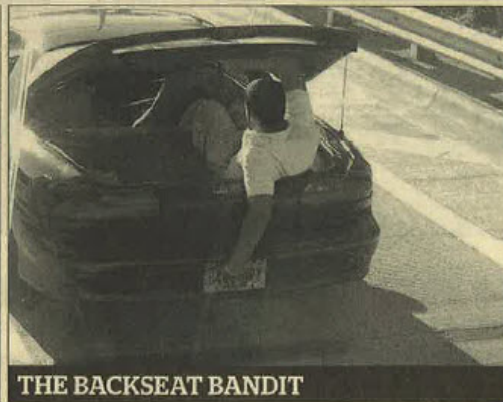
THE BUMPER BUDDY



THE ROLLING BUTTERFLY



THE ONE-HAND GRAB



THE BACKSEAT BANDIT

Florida Department of Transportation

Florida Department of Transportation cameras capture people using various methods to avoid paying tolls and fines.

# Little hope of jobs help

With gridlock in Congress, there doesn't appear to be a plan coming soon.

*New York Times*

WASHINGTON — No American president since Franklin Delano Roosevelt has won a second term in office when the unemployment rate on Election Day topped 7.2 percent.

Seventeen months before the next election, it is increasingly clear that President Barack Obama must defy that trend to keep his job.

Roughly 9 percent of Americans who want to go to work cannot find an employer. Companies are firing fewer people, but hiring remains anemic. And the vast majority of economic forecasters, including the president's own advisers, predict only

**Well, someone is hiring**

# Potential Problems

- Poor image quality produced by field equipment.
- High diversity of license plate types in the US.
- Lack of efficiency and accuracy in image-review processing.
- Ultimately - Incorrect billing.

# Goals

- Minimize incorrect billing.
- Reduce CAPEX by standardizing and harmonizing toll-system operations.
- Reduce OPEX and toll-revenue leakage.
- Establish clear performance-based measurement criteria to ensure healthy operations.

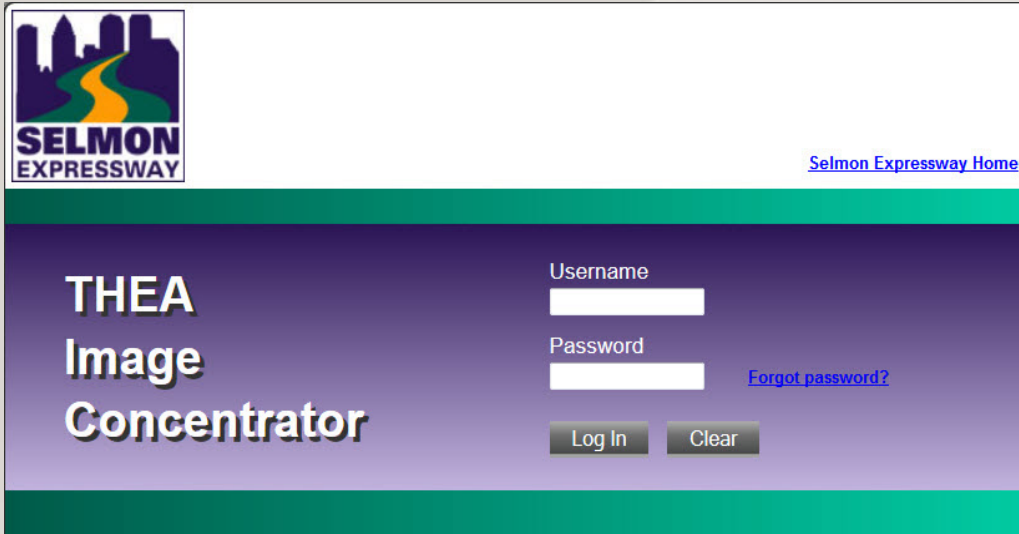
# Biggest Challenges

- Marketplace technological changes.
- Modular system interfaces.
- Increase system automation rates (@ low error) using artificial intelligence with self-learning capabilities.
- Manual image review processing.



# The Solution

*It is Friday yet?*



## Image Concentrator

Transaction & Image Repository  
For real-time image quality monitoring

## Enhanced Image Processing

THEA 3<sup>rd</sup> Generation Image Review  
For enhanced ALPR & manual review



### Sign In

Normal  LDAP

User Name

Password

Remember me

[Forgot your password?](#)




Image Concentrator











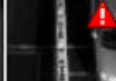
- My Dashboard
- ▼ Favorites
- ▼ Functions
  - [Executive Screen](#)
  - [Indicated Revenue](#)
  - [Traffic Count](#)
  - [File Transfer](#)
  - [Spot Speed](#)
  - [System Health](#)
  - [Camera Monitor](#)
  - [ORI Concentrator](#)
  - [Nagios](#)
- Search and Reports
- Account
- Logout

**Camera Monitor** Legend

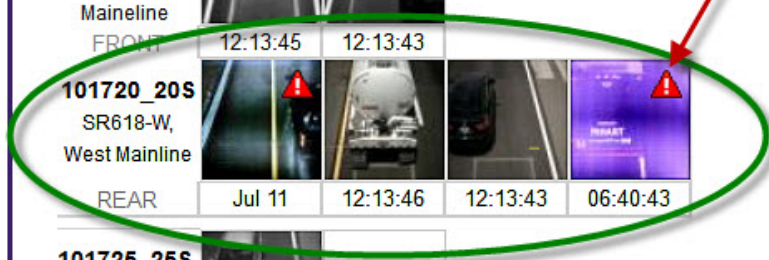
### West Ring

<b>101710_10S</b> SR618-W, Willow Ave (On) FRONT		12:14:03		
<b>101710_10S</b> SR618-W, Willow Ave (On) REAR				
<b>101715_15S</b> SR618-E, Willow Ave (Off) FRONT		12:13:25		
<b>101715_15S</b> SR618-E, Willow Ave (Off) REAR				
<b>101720_20S</b> SR618-W, West Mainline FRONT		12:13:45	12:13:43	
<b>101720_20S</b> SR618-W, West Mainline REAR				
<b>101725_25S</b> SR618-E, West Mainline				

### East Ring

<b>101740_40S</b> SR618-W, 22nd St (On) FRONT		12:15:30
<b>101740_40S</b> SR618-W, 22nd St (On) REAR		
<b>101745_45S</b> SR618-E, 22nd St (Off) FRONT		12:11:09
<b>101745_45S</b> SR618-E, 22nd St (Off) REAR		
<b>101750_50S</b> SR618-W, 50th St (On) FRONT		12:15:32
<b>101750_50S</b> SR618-W, 50th St (On) REAR		
<b>101755_55S</b> SR618-E, 50th St (Off)		

Warning



**SELMON EXPRESSWAY** Image Concentrator

Tampa Hillsborough Expressway Authority

- My Dashboard
- ▶ Favorites
- ▶ Functions
- ▼ Search and Reports
  - [UFM Reports](#)
  - [Image Quality Search](#)
  - [ORT Reports](#)
  - [DLCH Reports](#)
  - [Search Transactions](#)
  - [Search by Weight](#)
  - [Search by Flag](#)
- ▶ Account
- Logout

Averages

## Image Quality Search

Camera Group  Time Period  Date

Location	Camera	Weight	Contrast	Satur.	Clip	Bright	Focus	Proc Tm	Size
Site 60, Lane 02	Left Shoulder	1	66	111	0	132	370	0.935	124
Site 20, Lane 02	Left Shoulder	3	66	0	3	119	379	0.87	123
Site 60, Lane 01	Left Shoulder	4	44	0	17	84	432	0.975	125
Site 65, Lane 02	Left Shoulder	5	52	0	0	102	414	1.107	125
Site 20, Lane 01	Left Shoulder	6	69	43	0	125	298	0.924	123
Site 65, Lane 01	Left Shoulder	7	62	0	0	122	395	0.963	119
Site 40, Lane 01	Lane 1	10	58	0	0	112	338	0.971	126
Site 50, Lane 01	Lane 1	12	60	0	0	120	389	1.04	128
Site 45, Lane 01	Lane 1	13	50	0	0	104	419	0.994	129
Site 55, Lane 01	Left Shoulder	14	87	37	0	163	370	1.155	127
Site 10, Lane 01	Lane 1	15	55	0	0	100	383	0.997	124
Site 30, Lane 01	Lane 1	16	67	13	0	140	384	0.965	121
Site 15, Lane 01	Lane 1	17	77	0	8	150	363	0.782	125
Site 35, Lane 01	Lane 1	18	55	0	0	120	439	0.902	132

Threshold Triggers for Automated Alerts

## Dashboard Information

### Queue Priority

#### Jurisdiction Novice

Transactions ready for Review: 12588  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Jurisdiction Novice](#)

#### Jurisdiction Advance

Transactions ready for Review: 4033  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Jurisdiction Advance](#)

#### Registration Novice

Transactions ready for Review: 3662  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Registration Novice](#)

#### Registration Advance

Transactions ready for Review: 2311  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Registration Advance](#)

#### Plate Find Review

Transactions ready for Review: 1970  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Plate Find Review](#)

#### UnRead Review

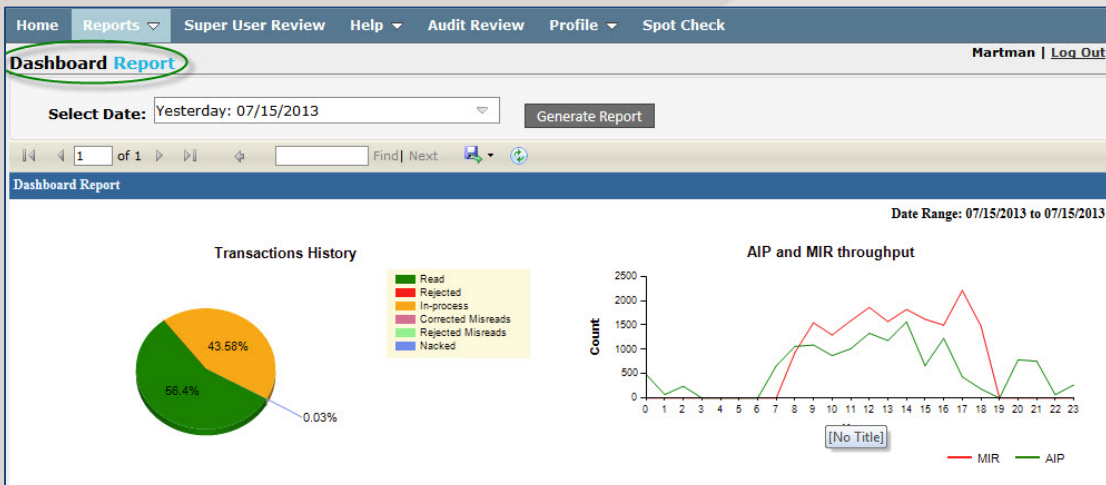
Transactions ready for Review: 10509  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [UnRead Review](#)

#### Super User

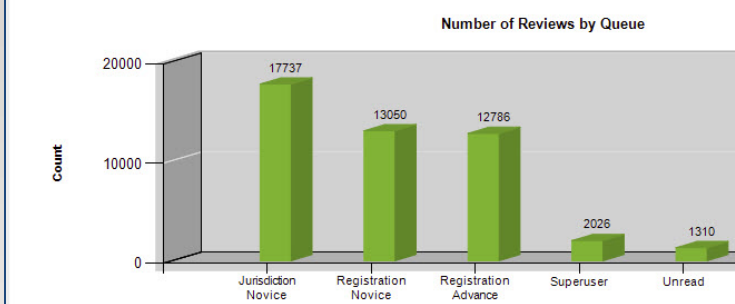
Transactions ready for Review: 6843  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Super User](#)

#### Super Backlog

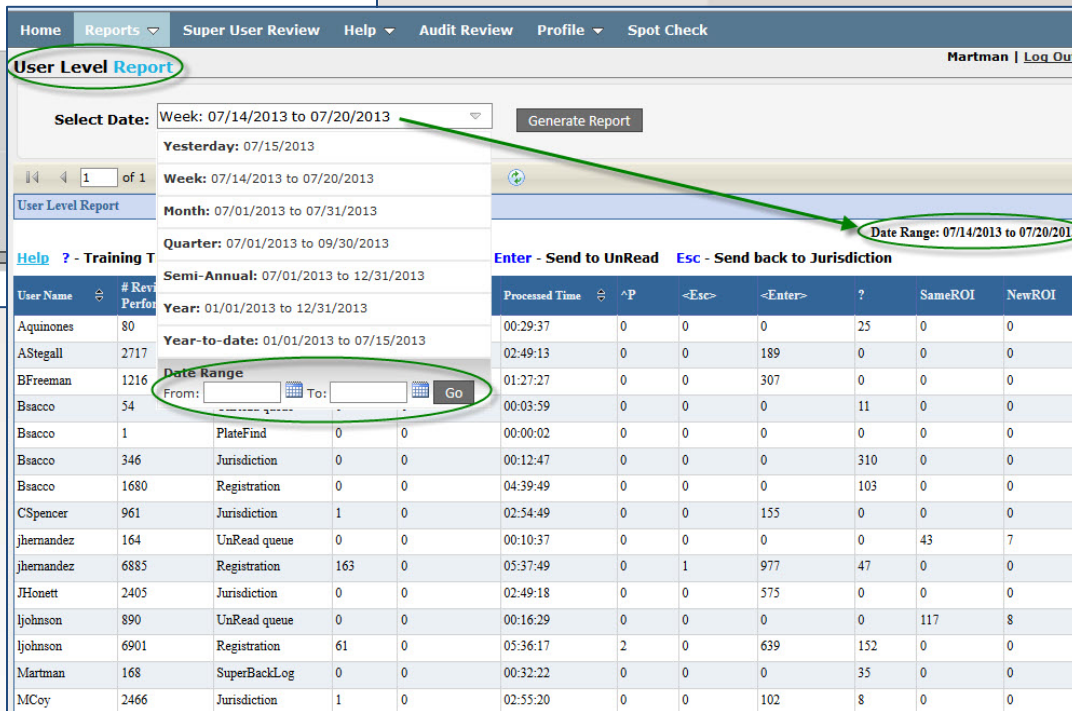
Transactions ready for Review: 35  
 Oldest Trxn Received Date: 07/06/2013  
 Oldest Lane Trxn Date: 07/05/2013  
 Queue: [Super Backlog](#)



Dashboard Report



User Level Report



**User Level Report**

Select Date: Week: 07/14/2013 to 07/20/2013

Yesterday: 07/15/2013

Week: 07/14/2013 to 07/20/2013

Month: 07/01/2013 to 07/31/2013

Quarter: 07/01/2013 to 09/30/2013

Semi-Annual: 07/01/2013 to 12/31/2013

Year: 01/01/2013 to 12/31/2013

Year-to-date: 01/01/2013 to 07/15/2013

Date Range: From: [ ] To: [ ] Go

Enter - Send to UnRead Esc - Send back to Jurisdiction

User Name	# Revs	Perf	Processed Time	^P	<Esc>	<Enter>	?	SameROI	NewROI
Aquinones	80		00:29:37	0	0	0	25	0	0
AStegall	2717		02:49:13	0	0	189	0	0	0
BFreeman	1216		01:27:27	0	0	307	0	0	0
Bsacco	54		00:03:59	0	0	0	11	0	0
Bsacco	1	PlateFind	00:00:02	0	0	0	0	0	0
Bsacco	346	Jurisdiction	00:12:47	0	0	0	310	0	0
Bsacco	1680	Registration	04:39:49	0	0	0	103	0	0
CSpencer	961	Jurisdiction	02:54:49	0	0	155	0	0	0
jbermandez	164	UnRead queue	00:10:37	0	0	0	0	43	7
jbermandez	6885	Registration	05:37:49	0	1	977	47	0	0
JHonett	2405	Jurisdiction	02:49:18	0	0	575	0	0	0
ljohnson	890	UnRead queue	00:16:29	0	0	0	0	117	8
ljohnson	6901	Registration	05:36:17	2	0	639	152	0	0
Martman	168	SuperBackLog	00:32:22	0	0	0	35	0	0
MCoy	2466	Jurisdiction	02:55:20	0	0	102	8	0	0

Home Reports Super User Review Help Audit Review Profile Spot Check

Martman | Log Out

**Summary Report**

Select Date: Date Range: 06/19/2013 to 06/19/2013 Generate Report

Summary Report Date Range: 06/19/2013 to 06/19/2013

Transactions Processed

Total Transactions Received:	44044	Transactions Processed (MIR):	10528
Transactions Processed (AIP):	34407	MIR Labor:	1493.12 Mins

Automation Rate

Automation Rate: 81.7%

Human Error Rate

Human Error Rate: 0.15% (62 of 42453)

ALPR Error Rate

ALPR Error Rate: 0.02% (8 of 44935)

Rejects

No of Automatically Coded Rejects (NACKed): 3

Unread Sub Codes Overhead

Total Unread Sub Codes: 0

Probe Transactions Overhead

Probe Transactions Reviewed: 0

Transactions In-Process

Waiting For Manual Image Processing: 45374

Summary Report  
High-level Overview

Transaction Reconciliation Report

Home Reports Super User Review Help Audit Review Profile Spot Check

Martman | Log Out

**Transactions Reconciliation Report**

Select Date: Date Range: 07/15/2013 to 07/15/2013 Generate Report

Transaction Reconciliation Report Date Range: 07/15/2013 to 07/15/2013

Input Transactions

Transactions Pulled From IC:	25307	Transactions NACKed:	0.03% (7 of 25307)
Transactions ACKed:	99.97% (25300 of 25307)		

Transaction Processing Summary

No of Transactions Processed:	15560	Single-Human Reviewed:	63.46% (811 of 1278)
Transactions Fully Automated:	91.79% (14282 of 15560)	Double-Human Reviewed:	29.5% (377 of 1278)
Transactions Manually Reviewed:	8.21% (1278 of 15560)	Triple or More Reviewed:	7.04% (90 of 1278)

Transactions In-Process

Transactions in AIP:	0	Jurisdiction Review:	31.94% (3111 of 9740)
Transactions Waiting For MIR:	9740	Super User Review:	0.18% (18 of 9740)
UnRead Review:	0.41% (40 of 9740)	Find-Plate Review:	21.15% (2060 of 9740)
Super-User Backlog Review:	0% (0 of 9740)	Registration Review:	46.31% (4511 of 9740)

UnRead Transactions Summary

No of UnRead Transactions:	9	Camera Imaging Problem:	55.56% (5 of 9)
Recurrent Plate-Visibility Problem:	22.22% (2 of 9)	Transaction Problem:	0% (0 of 9)
Ephemeral Plate-Visibility Problem:	22.22% (2 of 9)	Undefined:	0% (0 of 9)

## EIP Architecture

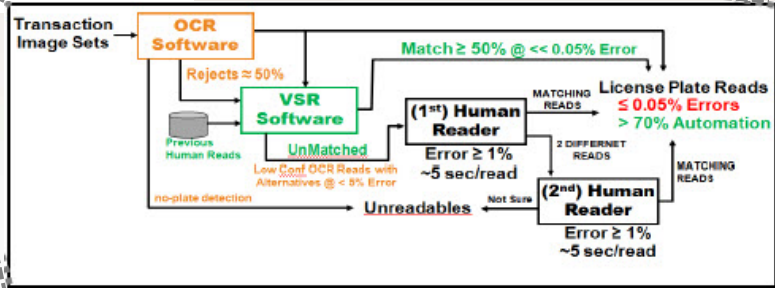
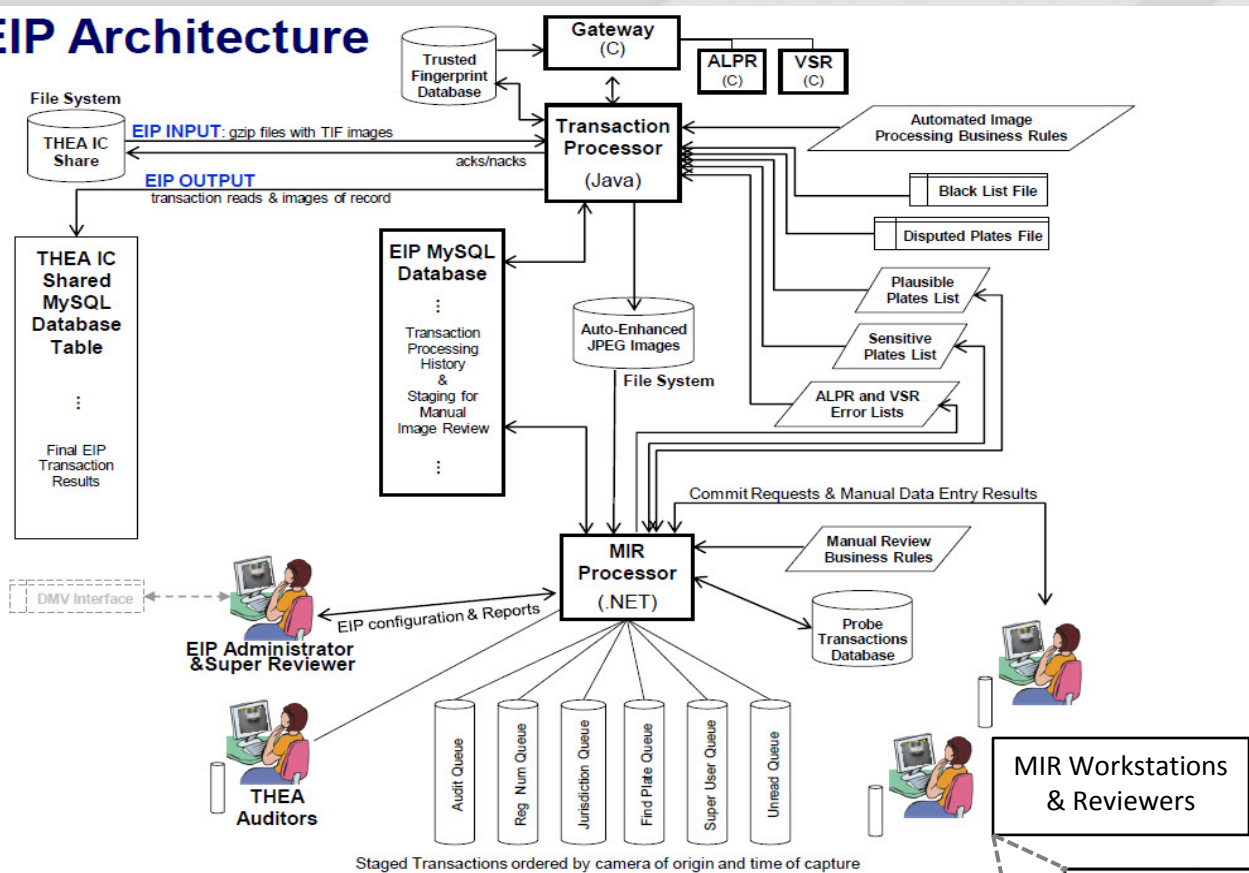




Image Processing Automation Rate  $\geq 70\%$

Image Processing Automation Rate  $\geq 70\%$  =

$$\frac{\text{(Human labor required by IP System to process a large representative set of live video transactions @ 0.05\% read error rate)}}{\text{(Human labor required to process same set of video transactions @ 0.05\% error rate without any automated plate reading/recognition)}}$$

Read Error rate  $\leq 0.05\%$  (99.95% Accuracy)

Read Error rate  $\leq 0.05\%$  (99.95% Accuracy) =

$$\frac{\text{(Number of read errors output by the IP System across a large representative set of live video transactions)}}{\text{(Total number of the video transactions input to the IP System for processing (human readable and nonreadable))}}$$

Leakage rate  $\leq 0.1\%$

Leakage rate  $\leq 0.1\%$  =

$$\frac{\text{(Number of transactions not read by the IP System that had a human readable plate)}}{\text{(Total number of the video transactions input to the IP System for processing (human readable and nonreadable))}}$$



*It feels like Friday!!!*