



# SPM IN LAS VEGAS

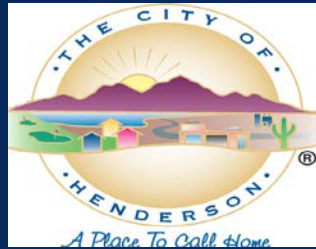
JANUARY 26, 2016



- Freeway and Arterial System of Transportation (FAST), under Regional Transportation Commission (RTC) of So. Nevada
- Transit under RTC
- Freeway Operation in Southern NV for NDOT
- Maintain and Operate ITS devices for NDOT
- TMC with Highway Patrol



Brief Introduction of FAST

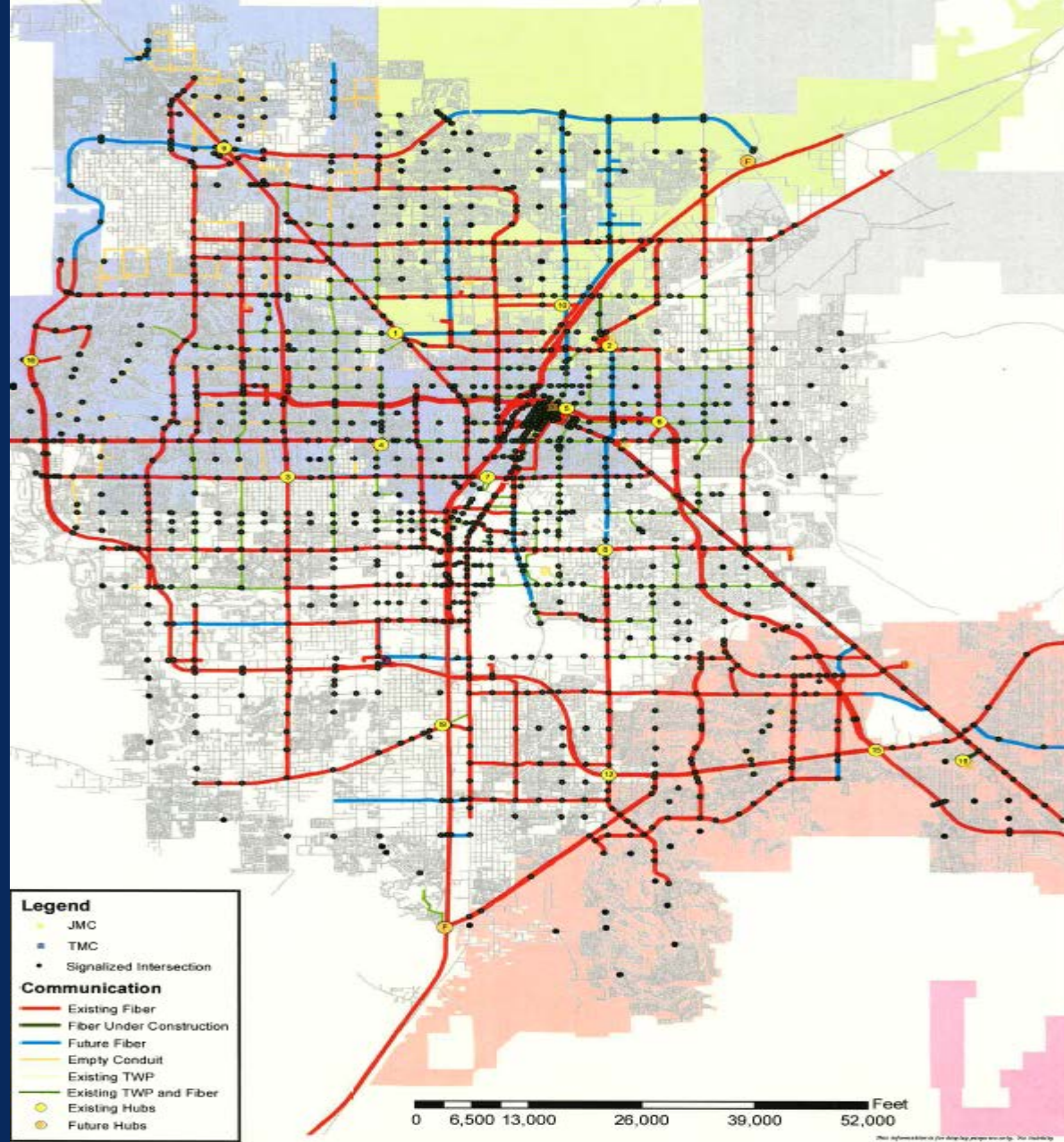


- Signal coordination in Las Vegas Metropolitan Area (City of Las Vegas, North Las Vegas, Henderson, Clark County, Boulder City and Mesquite)

FAST provides Multi Agency Signal Coordination

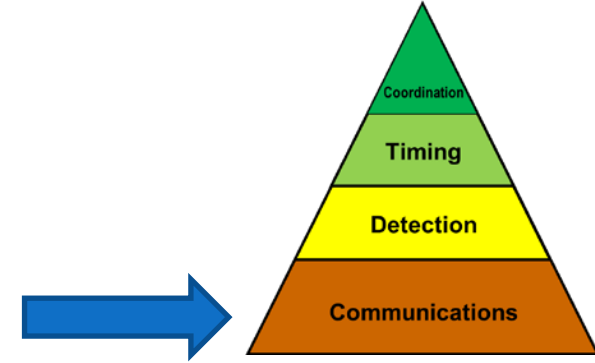


# FAST TMC Control Room



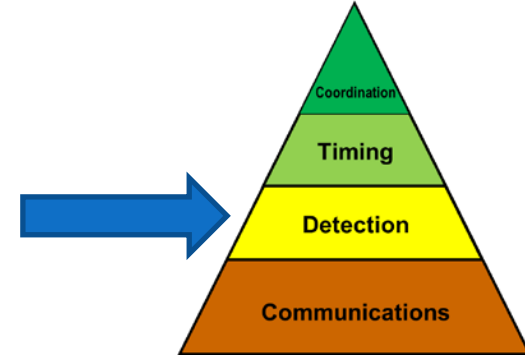
# Las Vegas Urban Region

# AGENCY FACTOIDS (SYSTEM/COMM.)

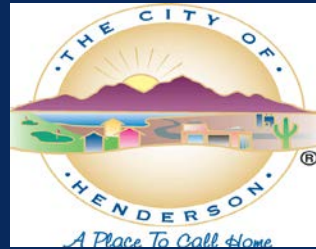


- Number of signalized intersections
  - >1000 connected by fiber
  - 0 connected by radio
  - >200 connected by twisted pair
  - 0 connected by cellular (**Under testing**)
  - <100 not connected to communication
- 1 engineer and 7 technicians devoted to signals
- Naztec is Central System Vendor
- 240 of signals collecting high resolution data
- 1 Year of experience with high resolution data

# AGENCY FACTOIDS (DETECTION)



- Length of stop bar detectors on minor movement (One 6'x6' for through lane, Four 6'x6' for left turn lane )
- Use of dilemma zone or other detection on arterial main line (Yes)
- Detection Technologies used (Video, Loop, Radar)
- “Lane by Lane” or “Lane Group Detection” (Both)
- Link to detection standard number scheme (Yes)
- Detection Testing and Maintenance Practices (Yes)
- 100% of Signals with Emergency Vehicle Preemption
- 100% of Signals with RR Preemption



- Stop Bar Detection by Phase Direction
- Minimal Advance Detection
- Detection (Loops, Video, Radar) varies by Agency
- Older traffic signal cabinets (TS-1)

Detection Scheme Various by Agency





# Signal Performance Metrics



Charts

Reports

Links

FAQ

->Signal Metrics

Selected Signal

No Signal Selected

Signals

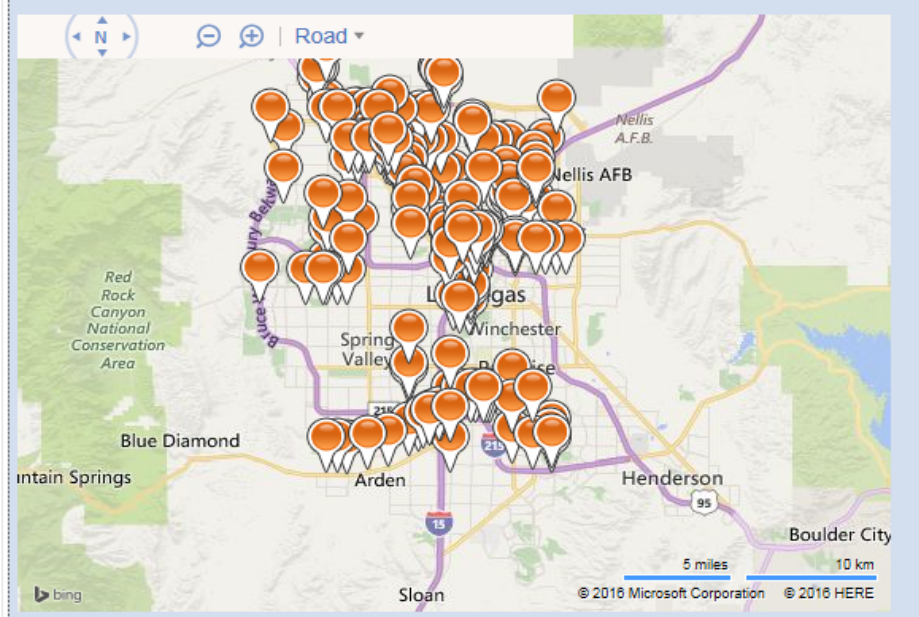
Region

Metric Type

Filter

Signal List

Map



Metric Settings

Metric Type

- Approach Delay
- Approach Volume
- Arrivals On Red
- Purdue Coordination Diagram
- Purdue Phase Termination
- Speed
- Split Monitor
- Turning Movement Counts

Time Y Axis Maximum

Volume Y Axis Maximum

Volume Bin Size

Dot Size

Show Plan Statistics

Show Volumes

[Export Data](#)

Dates

Start Date

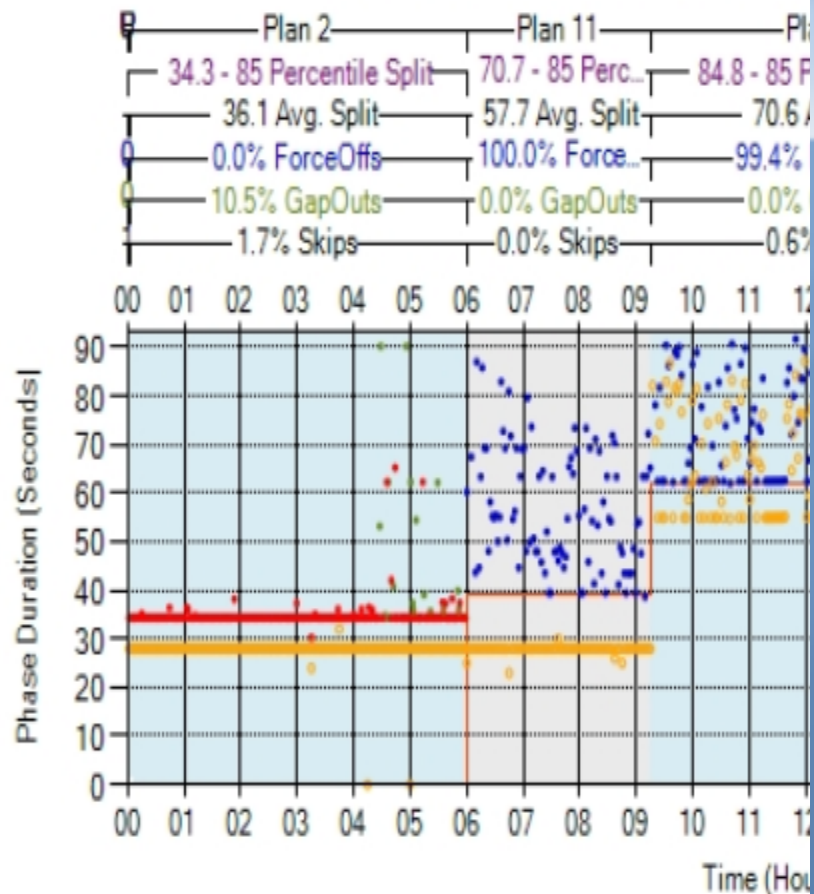
End Date

January 2016

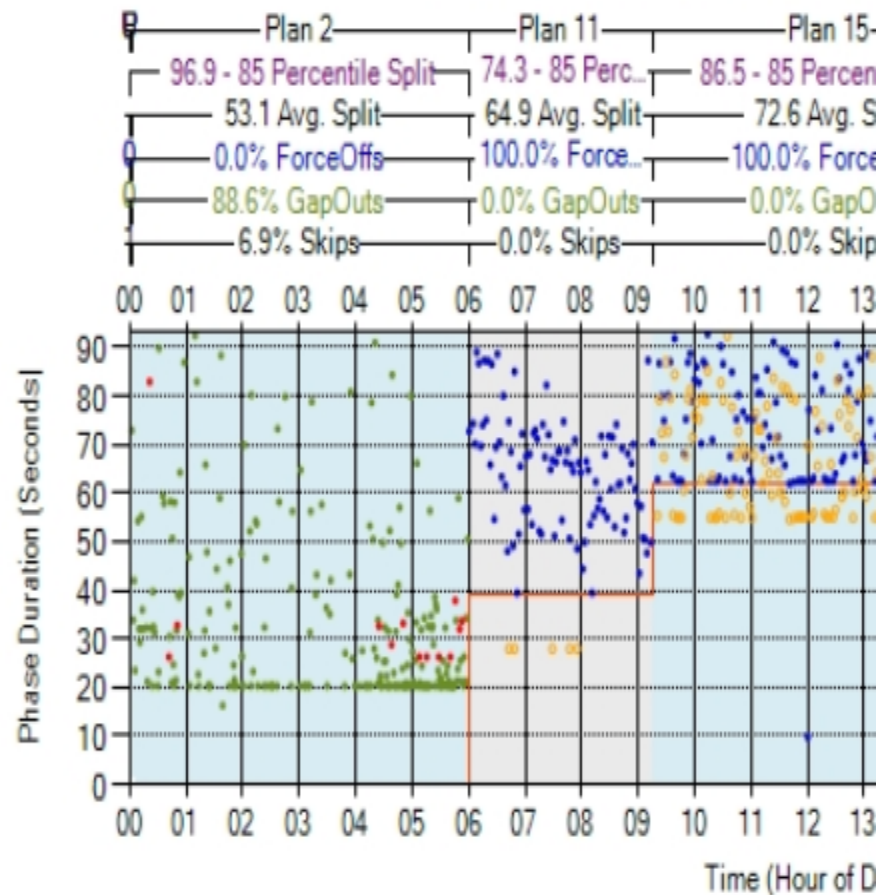
Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

FAST SPM (<http://challenger.nvfast.org/spm>)

Durango Dr Deer Springs Way SIG#3450  
Thursday, November 5, 2015 12:00 AM - Thursday

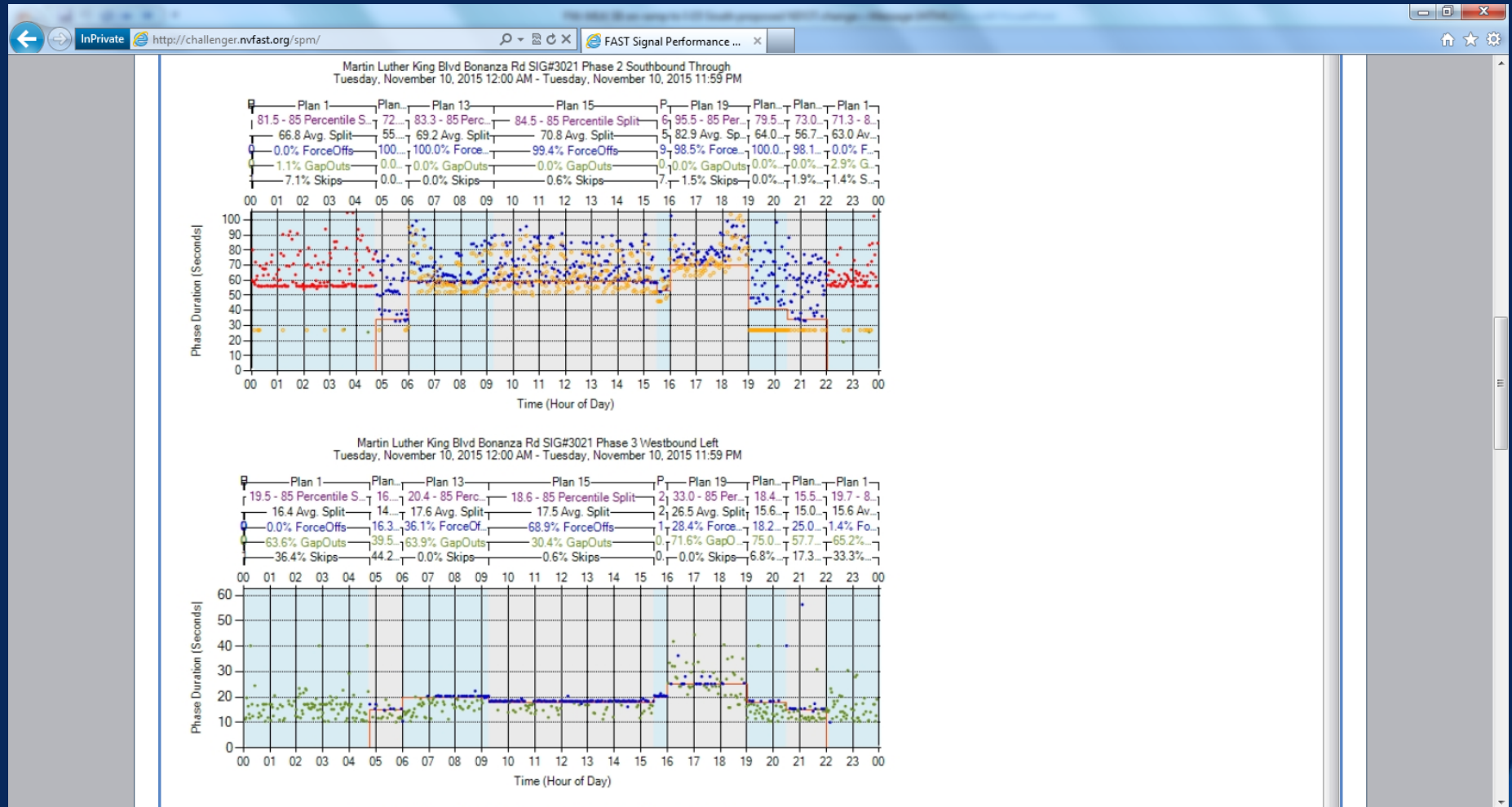


Durango Dr Deer Springs Way SIG#3450 Phase  
Tuesday, November 10, 2015 12:00 AM - Tuesday

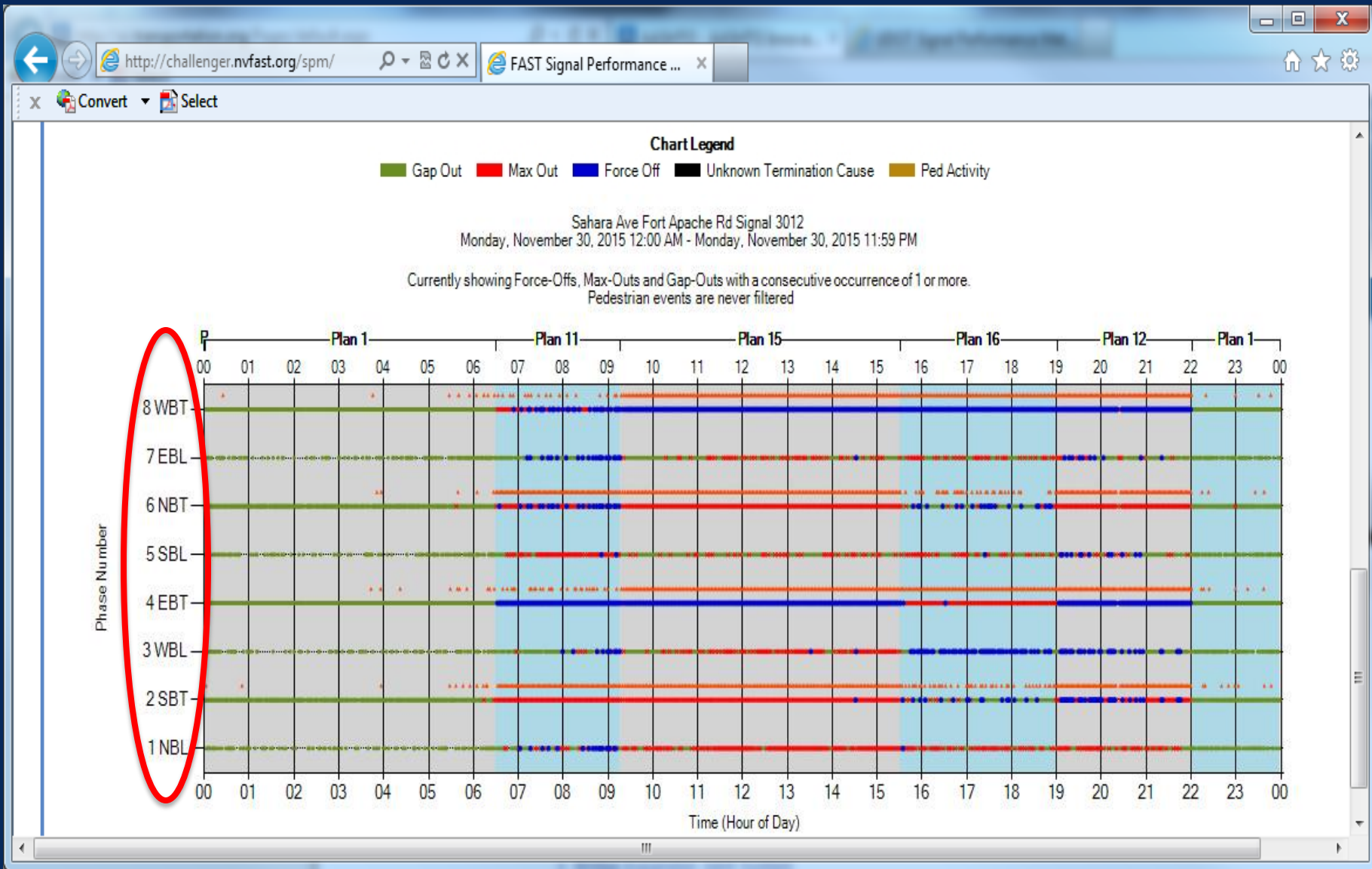


# Case Study (Continuous Max-outs due to Ped Button Failure)

- MLK programmed SB through is 59 seconds
- Gain time from other phases
- 85 percentile split time is 80 secs
- 100% force off

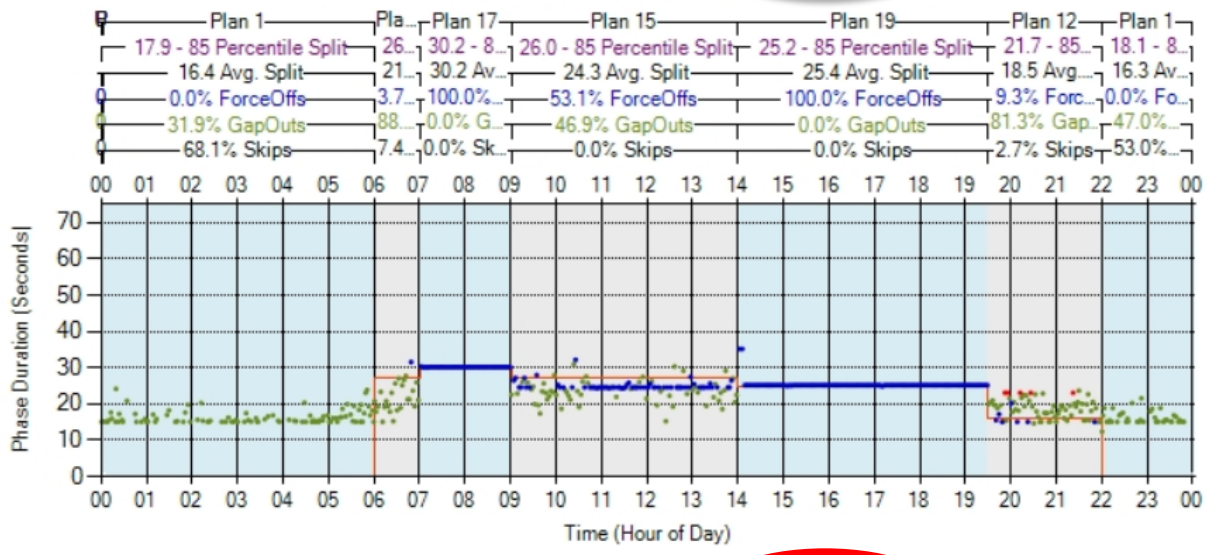


# Case Study (Easily Tell the Phase Duration from Split Monitor)

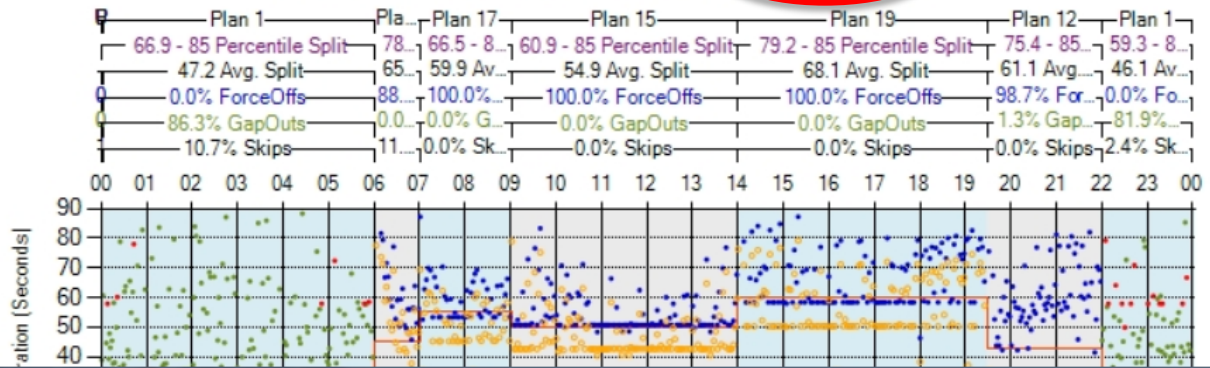


Enhancements (Add Phase Direction)

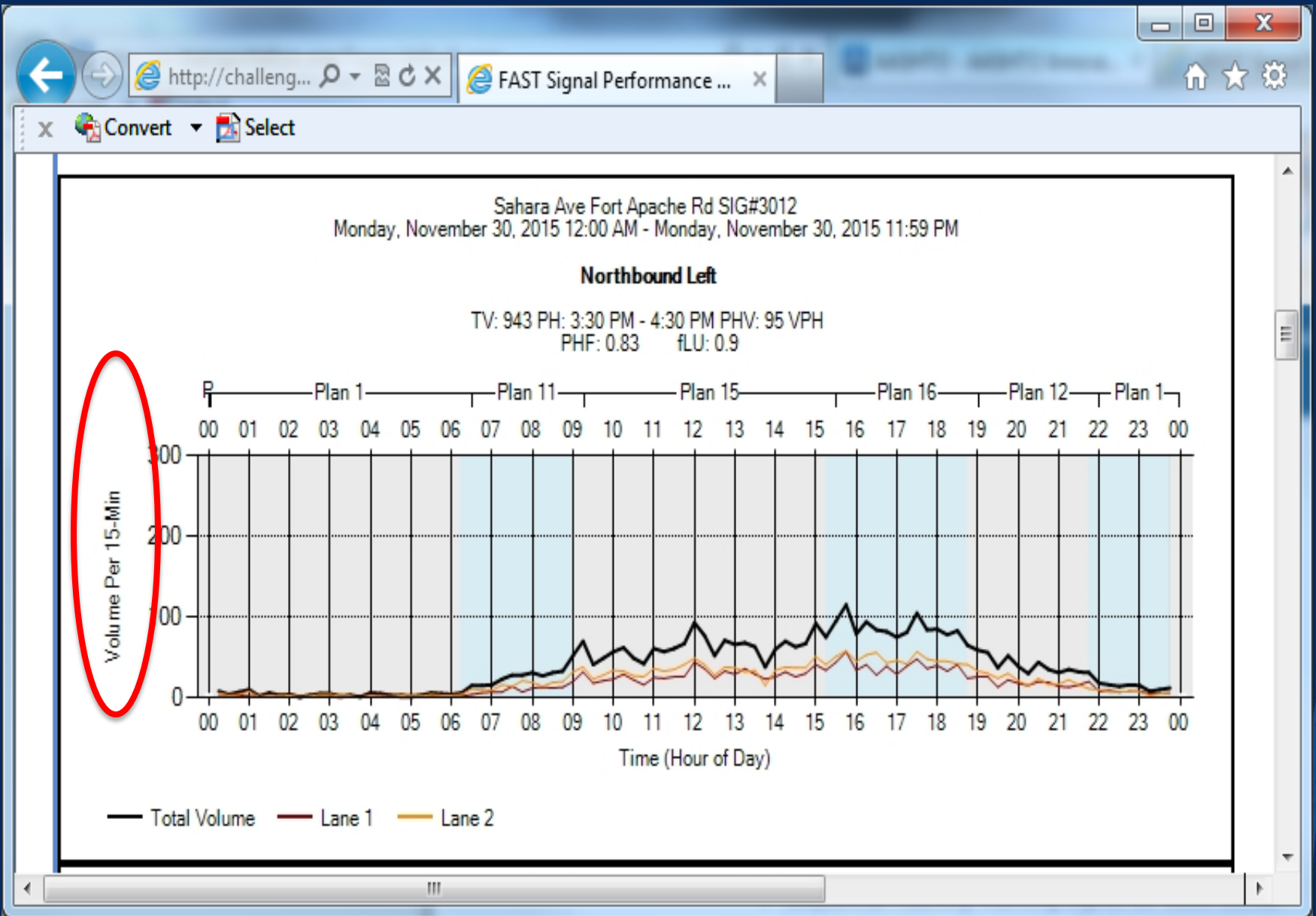
Blue Diamond Rd Rainbow Blvd SIG#2321 Phase 7 Eastbound Left  
 Thursday, January 14, 2016 12:00 AM - Thursday, January 14, 2016 11:59 PM



Blue Diamond Rd Rainbow Blvd SIG#2321 Phase 8 Westbound Through  
 Thursday, January 14, 2016 12:00 AM - Thursday, January 14, 2016 11:59 PM

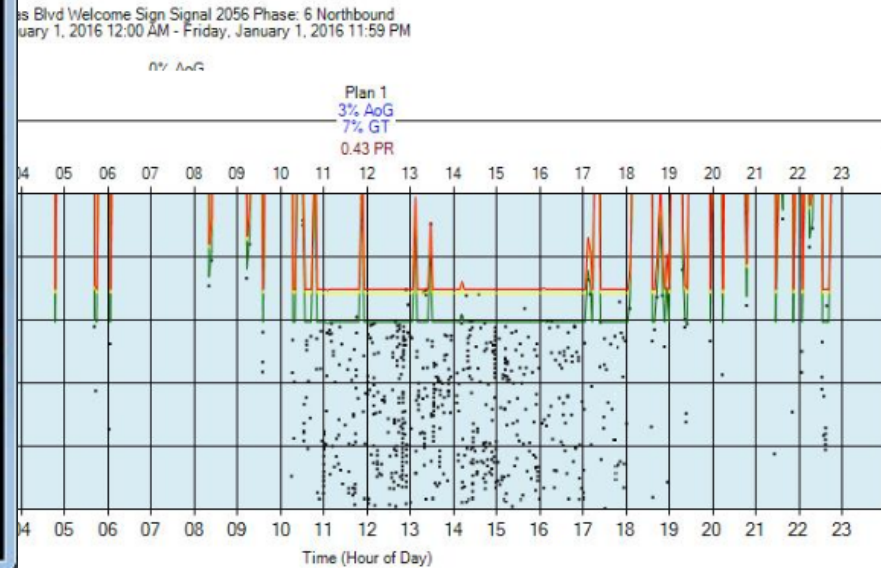
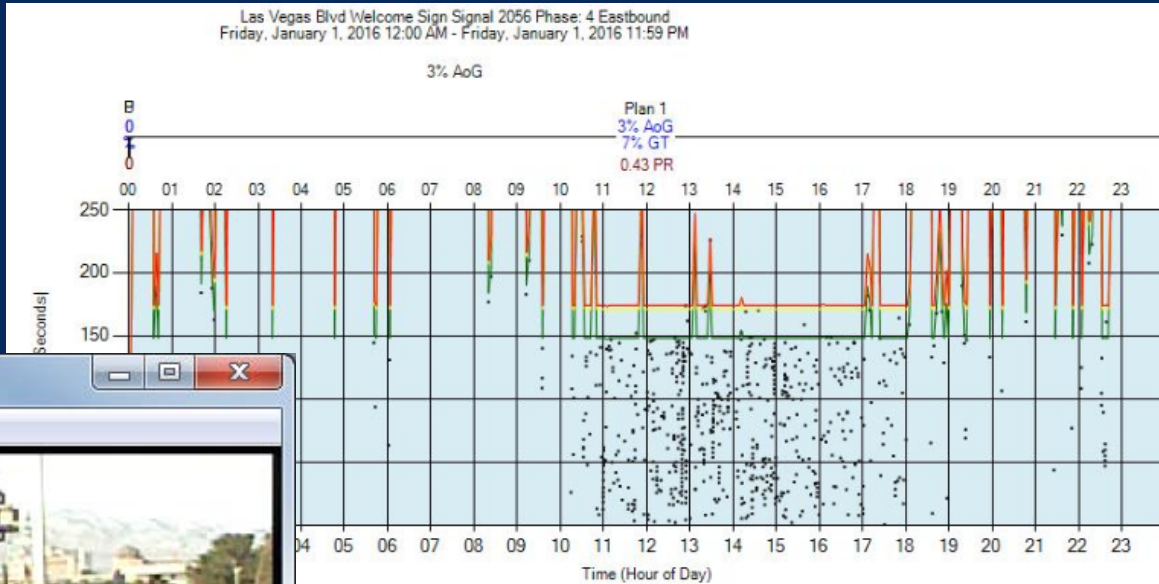


Enhancements (Add Phase Direction)

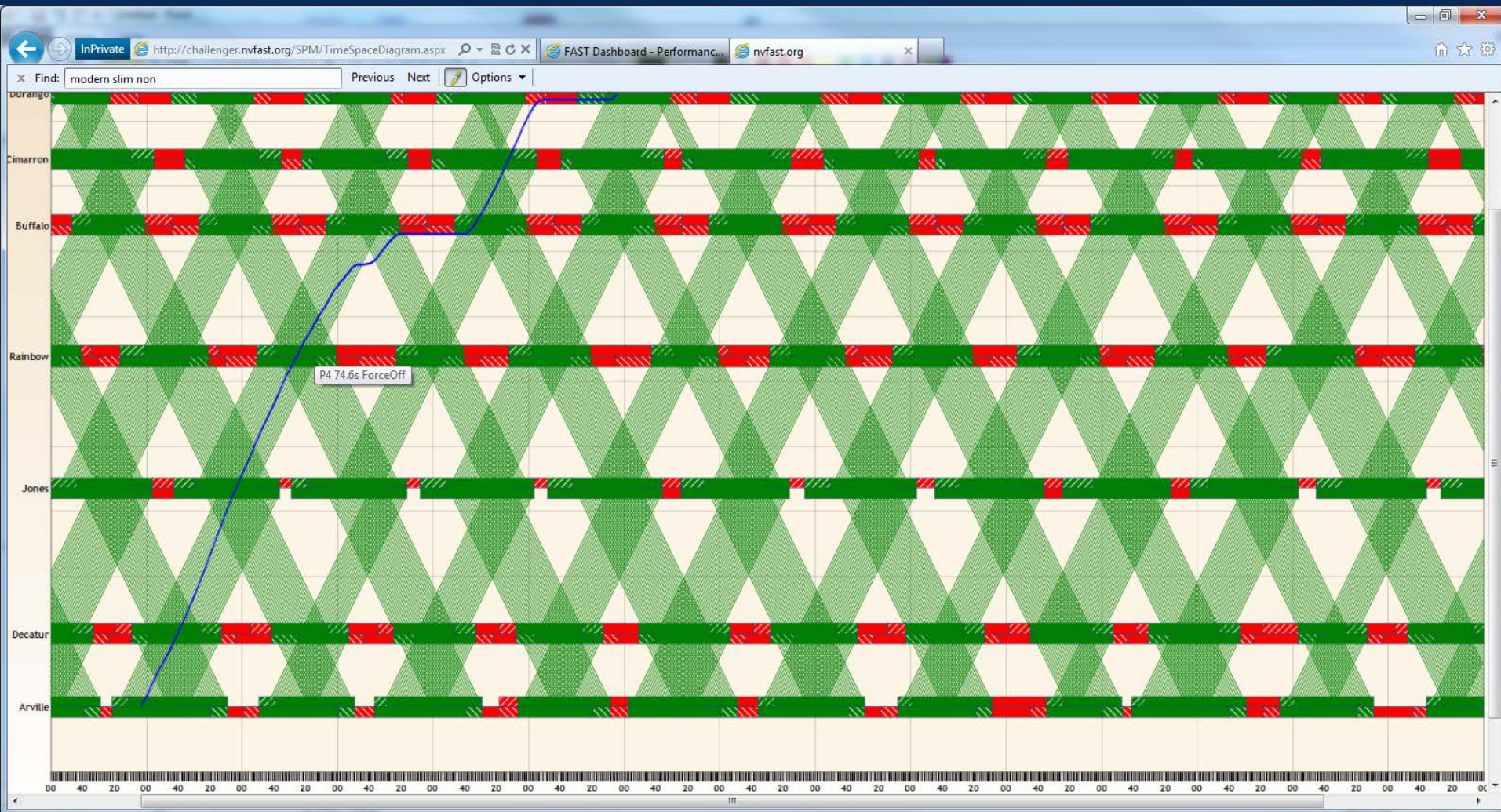


Enhancements (Modified the hourly volume)

# Ped Actuation Plot on New Year's Day



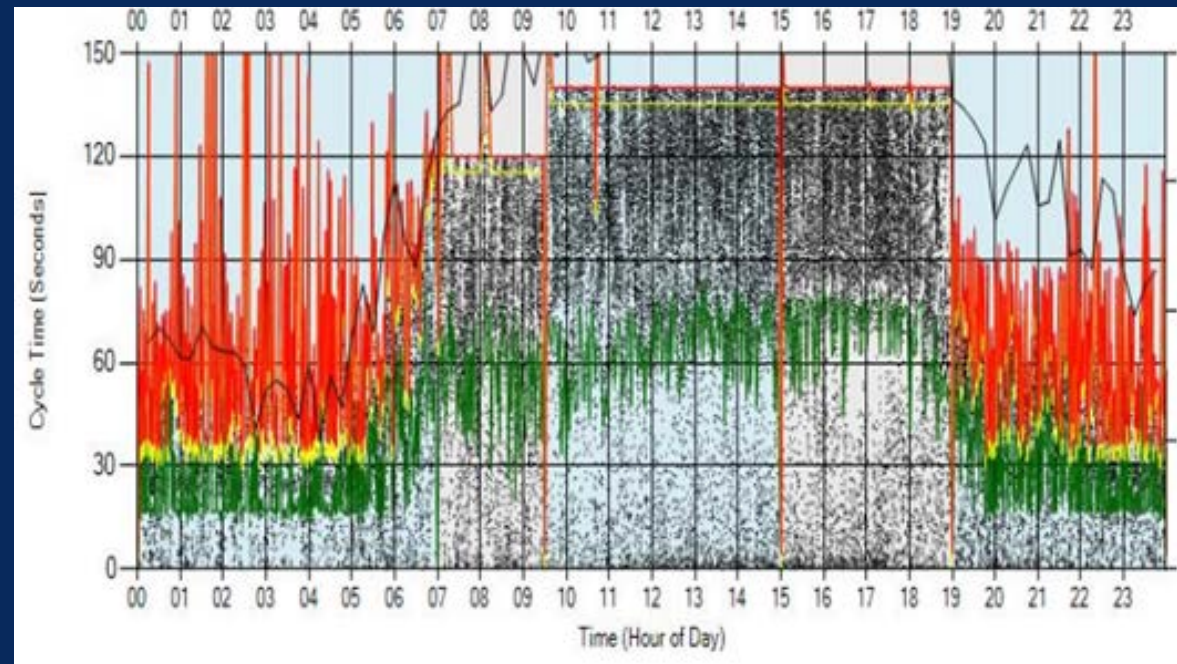
Enhancements (Ped actuation plot)



Enhancement (Time Space Diagram)

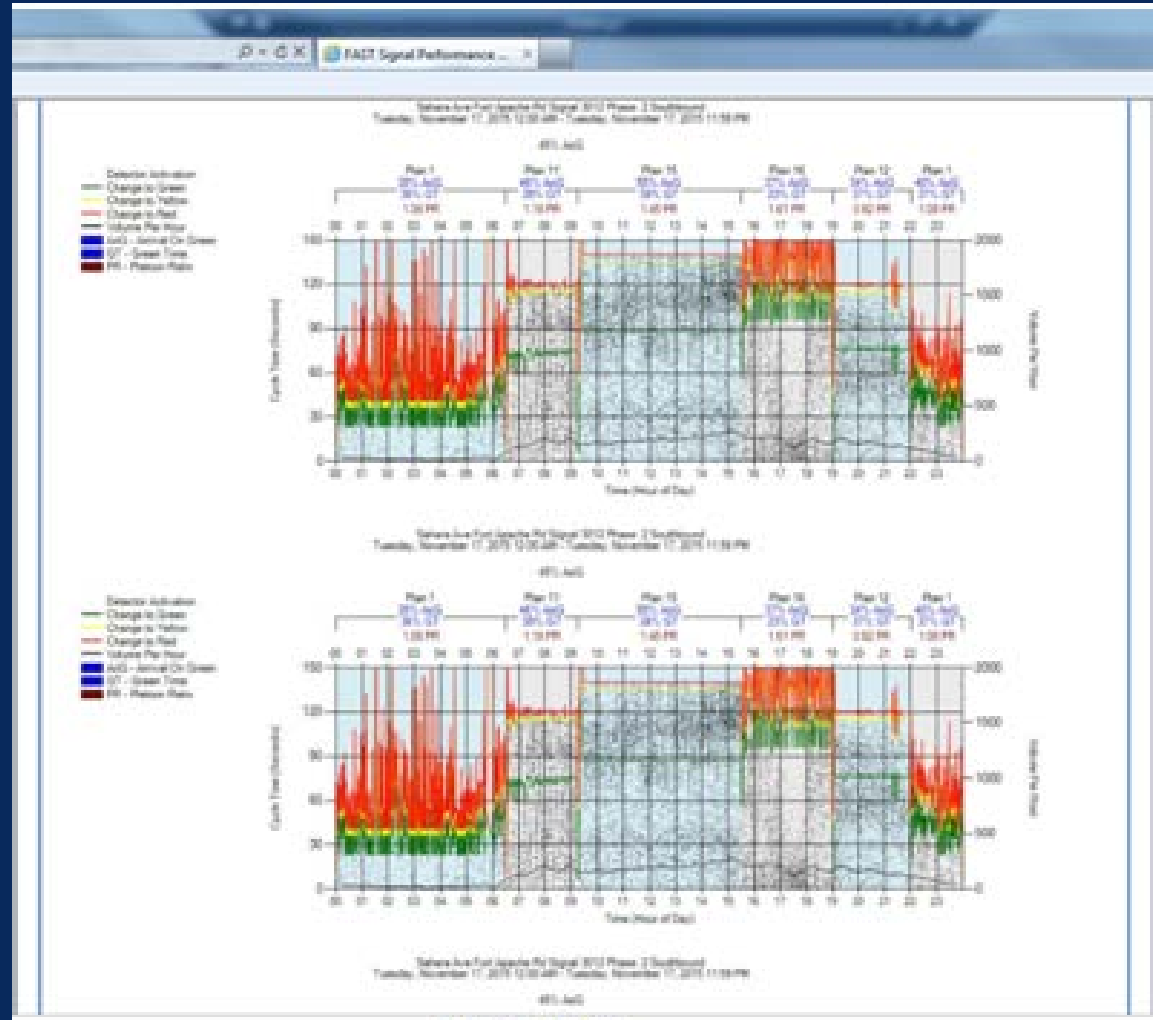


- Purdue Coordination Diagram shows too many dots.
- Arrival on Green are higher than actual
- SP\_PDCDetectorsBySignalAndDirection missing a criteria “Has\_PCD = 1”



Customization for Vegas Detection Scheme

- Lane by lane adv zones will generate duplicate graphs.
- Lane group OK.



Customization for Vegas Detection Scheme

- Over 80% controllers no Purdue Logger
- Translate split history data in ATMS.Now to Pseudo-Purdue Log

Split History 2309 on 2016.01.14 0800.pdf - Adobe Acrobat Pro

File Edit View Window Help

Create [Icons]

1 / 1 [Icons] 76.9% [Icons] Tools Comment Share

### Split History

1/19/2016

**ID:** 2309  
**Name:** Blue Diamond Rd & Arville St (ATC)  
**Begin Date/Time:** 01/14/2016 8:00 am **End Date/Time:** 01/14/2016 8:59 am

DateTime	Pattern	Cycle	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10	SP11	SF
1/14/2016 08:01:15 AM	17	161	0	23	0	138	23	0	20	118	0	0	0	
1/14/2016 08:03:55 AM	17	160	0	50	15	95	30	20	21	89	0	0	0	
1/14/2016 08:06:35 AM	17	160	0	0	0	122	17	21	18	104	0	0	0	
1/14/2016 08:09:15 AM	17	160	0	0	14	103	22	21	20	97	0	0	0	
1/14/2016 08:11:55 AM	17	160	0	43	17	100	23	20	21	96	0	0	0	
1/14/2016 08:14:35 AM	17	160	14	0	0	145	14	0	21	125	0	0	0	
1/14/2016 08:17:15 AM	17	160	0	25	0	135	25	0	21	114	0	0	0	
1/14/2016 08:19:55 AM	17	160	21	22	14	103	23	20	21	96	0	0	0	
1/14/2016 08:22:35 AM	17	160	0	25	15	120	25	0	21	114	0	0	0	
1/14/2016 08:25:15 AM	17	160	0	37	0	123	17	20	21	102	0	0	0	
1/14/2016 08:27:55 AM	17	160	0	0	0	144	15	0	16	129	0	0	0	
1/14/2016 08:30:35 AM	17	160	0	0	19	106	14	20	21	105	0	0	0	
1/14/2016 08:33:15 AM	17	160	0	0	0	139	20	0	21	119	0	0	0	
1/14/2016 08:35:55 AM	17	160	0	73	0	87	25	48	21	66	0	0	0	
1/14/2016 08:38:35 AM	17	160	0	0	0	116	23	21	0	116	0	0	0	
1/14/2016 08:41:15 AM	17	160	37	0	16	101	22	20	21	97	0	0	0	
1/14/2016 08:43:55 AM	17	160	0	0	19	122	18	0	21	121	0	0	0	
1/14/2016 08:46:35 AM	17	160	0	43	21	96	23	20	21	96	0	0	0	
1/14/2016 08:49:15 AM	17	160	0	22	0	138	22	0	21	117	0	0	0	
1/14/2016 08:51:55 AM	17	160	0	0	14	108	17	20	21	102	0	0	0	
1/14/2016 08:54:35 AM	17	160	0	0	15	102	22	20	21	97	0	0	0	
1/14/2016 08:57:15 AM	17	160	0	0	0	133	26	0	21	113	0	0	0	
1/14/2016 08:59:55 AM	17	29	0	0	0	28	0	1	21	7	0	0	0	
<b>Average of 23 Cycles :</b>		154	3	16	8	113	20	13	20	102	0	0	0	
<b>Termination Counts</b>														
<b>Force off</b>			0	0	0	23	0	0	22	23	0	0	0	
<b>Gap</b>			3	10	11	0	22	12	0	0	0	0	0	
<b>Max</b>			0	0	0	0	0	1	0	0	0	0	0	

Support Non-Purdue Logger controllers

- Siemens i2 NextPhase
- Signal phase data and event data

The screenshot shows the 'Event Log' window with the following data:

Signal Phase Data	DeviceID	TimeStamp	EventDescription	Number
	2037	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	2
	4080	Dec 1 2015 2:31:25 PM	STOPPED_REPORTING_LOCAL_ZERO	0
	4177	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	4
	2288	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	8
	2094	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	4
	4177	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	4
	2288	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	8
	2094	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	4
	2183	Dec 1 2015 2:31:25 PM	PED_CALL_ACTIVE	6
	3310	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	3308	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	3307	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	3303	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	3157	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2474	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2437	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2246	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2186	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2096	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2095	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2094	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2070	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2044	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0
	2040	Dec 1 2015 2:31:25 PM	SET_CONTROLLER_PATTERN	0

Filter settings:  
 Time Stamp: Last 1 min.  
 From: 12/ 1/2015 2:16:26 PM  
 To: 12/ 1/2015 2:31:26 PM  
 Device ID: From: 1 To: 9999  
 List Size: Max: 1 x 1000  
 Range: 1000 records found.

Support Non-Purdue Logger controllers

- Controller FTP goes down randomly, requiring restarting controller in the field. Agency liability issue.
- Preemption events are not logged.

- Add Preemption Event Report
- Add Ped Actuation Report
- Filter watchdog problem detection list and email
- Report query criteria can be customized

Future Enhancements

- Signal Timing Strategies:
  - Flashing Yellow Arrow (FYA) Time of Day (TOD)
  - When to go into/out off Coordination
  - Dual Left PERMISSIVE during Non-Peak Hours
  - Others??

Future of SPM for FAST

## ➤ Update ITS and Traffic Signal Design Standards:

- Count Data from Loops, Radar, Video
- Speed Data from Radar, Bluetooth
- Travel Time Data from Bluetooth
- Travel Signal Cabinets (TS Type 2)
- Others??

Future of SPM for FAST



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