Signal Performance Metrics

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Who is Seminole County?

- Small County located just north of Orange County and the City of Orlando
- Population: 422,718 (2010)
- Area: 345 sq. miles
- 7 Cities

Seminole County Factoids (System/Comm.)

- 382 signalized intersections
 - 369 connected by fiber
 - 12 connected by radio
 - None connected by twisted pair or cellular
 - 1 not connected to communication
- 2 engineers and 9 technicians devoted to signals (7 additional technicians for fiber/ITS/locates)
- Central System Vendor – Trafficware (ATMS.Now)
- 273 signals collecting high resolution data, expect all by end of 2016
- < 1 Year of experience with high resolution data (Feb 2015)

Seminole County Factoids (Detection)

- Length of stop bar detectors on minor movement – typically 40', some 20' (adaptive)
- Use of dilemma zone or other detection on arterial main line – advanced loops for dilemma zone, stop bar loops for adaptive
- Detection Technologies used – loops, video (w and w/out thermal), radar, pod
- “Lane by Lane” or “Lane Group Detection” – lane by lane
- Link to detection standard number scheme – in order by phasing (L1, L2, etc.)
- Detection Testing and Maintenance Practices – initial meg readings, monitored daily through central, verify on PMs
- 322 Signals with Emergency Vehicle Preemption
- 9 Signals with RR Preemption

SPM Deployment

- Worked with FDOT and UDOT to start the initial installation in January 2015
- After break in firewall configured, link went “public” in February 2015
- Initial deployment – 39 signals
- Currently at 273 signals
- Using Trafficware (Naztec) ATC Controllers (version 76.12d +) and advance loops
- Computer/storage requirements (ave 23MB per day per controller – for 273 controllers this is 6.3G per day and 2.3T per year)

Case Study/Use #1 – Approach Volumes

- Working to reduce our data collection costs by using SPM
- Annual 24-hour tube counts at 484 locations
- At \$57 each, almost \$28k a year
- 70% of annual data collection budget of \$40k, which is also used for TMCs, approach counts, O&D, etc.
- May still need to perform rural counts, but can possibly eliminate most urban counts
- Better data – continuous counts versus 24-hour counts

Case Study/Use #1 – Approach Volumes

Volume report for US17-92 SeminolaBlvd (ADT) on the Northbound and Southbound approaches.
9/14/2015 7:00:00 AM - 9/14/2015 9:00:00 AM
Approach count accuracy: undercounts by 5-25%

Metric	Value
Total Volume	6,005
Peak Hour	7:30 AM - 8:30 AM
Peak Hour Volume	3,174
PHF	0.974
Peak-Hour K-factor	NA
Northbound Total Volume	1,830
Northbound Peak Hour	8:15 AM - 9:15 AM
Northbound Peak Hour Volume	998
Northbound PHF	0.872
Northbound Peak-Hour K-factor	NA
Northbound Peak-Hour D-factor	1.99
Southbound Total Volume	4,175
Southbound Peak Hour	7:30 AM - 8:30 AM
Southbound Peak Hour Volume	2,244
Southbound PHF	1
Southbound Peak-Hour K-factor	NA
Southbound Peak-Hour D-factor	0.414

Case Study/Use #1A – Volume Fluctuations

- Off-shoot of Use #1
- Use Approach Volumes to determine specific volume growth along corridors
- Example – detouring to US 17/92 due to Interstate 4 Ultimate Project

Case Study/Use #1A – Volume Fluctuations

- AM Peak (7am to 9am) – Southbound traffic increased 11%
- Need retime?

Before (9/14/15)

Metric	Value
Total Volume	6,005
Peak Hour	7:30 AM - 8:30 AM
Peak Hour Volume	3,174
PHF	0.974
Peak-Hour K-factor	NA
Northbound Total Volume	1,830
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Southbound Total Volume	4,175
Southbound Peak Hour	7:30 AM - 8:30 AM
Southbound Peak Hour Volume	2,244
Southbound PHF	1
Southbound Peak-Hour K-factor	NA
Southbound Peak-Hour D-factor	0.414

After (12/14/15)

Southbound Total Volume	4,621
Southbound Peak Hour	7:30 AM - 8:30 AM
Southbound Peak Hour Volume	2,449
Southbound PHF	1
Southbound Peak-Hour K-factor	NA
Southbound Peak-Hour D-factor	0.397

Case Study/Use #3 – Evaluating Retiming Efforts

- Use Purdue Phase Termination metric to evaluate before/after of a retiming effort
- Review before/after of AoR, AoG, # Max Outs, # Gap Outs
- Simple example – check to see if phase maxing out in before condition improves after

Case Study/Use #3 – Evaluating Retiming Efforts

Phase 4
Force-
Offs
Before
Retime

Phase 4
Force-
Offs
After
Retime

Case Study/Use #4 – Before/After (On/Off) Studies

- Use Purdue Coordination Diagram and AoG (and AoR) to evaluate before/after (on/off) of adaptive systems
- We log when adaptive systems were down for maint., comm. issues, etc. and use those dates to compare the systems to when they were operating normally
- We equip our adaptive corridors with Bluetooth to evaluate corridor travel times, but SPM can be used to look at arrivals at specific signals

Case Study/Use #4 – Before/After (On/Off) Studies

SR436 EssexAve Signal 1535 Phase: 2 Westbound
Wednesday, May 20, 2015 12:00 PM - Wednesday, May 20, 2015 7:00 PM

76% AoG

SR436 EssexAve Signal 1535 Phase: 2 Westbound
Wednesday, May 13, 2015 12:00 PM - Wednesday, May 13, 2015 7:00 PM

88% AoG

Side Notes

- Split Monitor metric very useful in trouble shooting, evaluating complaints, etc. We are used to split history in our central software, but for agencies not having this, Split Monitor very helpful
- Trafficware has created a Purdue Logging module for ATMS.Now software. Should have it shortly to compare to SPM

ATMS.Now Purdue Logging (beta)

Concerns

- Setting up SPM for other FL agencies
- Updating versions and added features
 - Version dated February 2015
 - No link pivot, reporting, optimization
 - Requires complete re-install
- Big picture view needed
 - May be available, but not in our version
 - Great detail for individual signals, but determining corridor wide metrics are not easy and time consuming
 - Also curious to see if any consultants or equipment manufacturers will expand on corridor reporting or optimization
- Data storage
 - Add all our signals to SPM, > 3T per year
 - With ATMS.Now Purdue Logging on-line, this will double
 - How long should we store data?

Questions or Comments

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<http://spm.seminolecountyfl.gov/signalperformancemetrics/>