OVERVIEW OF UDOT SPM SYSTEM

SPM Workshop
Tuesday, January 26th

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Agency Factoids (System/Comm.)

- Number of signalized intersections (Statewide: 1977, UDOT: 1176)
 - # connected by fiber: Statewide: 1510. UDOT 1000. (90%)
 - # connected by radio: Statewide: 180. UDOT 65. (10%)
 - # connected by twisted pair: None
 - # connected by cellular: 3 (owned by Logan City).
 - # not connected to comm.: Statewide: 284. UDOT: 111

Agency Factoids (System/Comm.)

- Number of engineers/technicians devoted to signals
 - 27 UDOT Personnel
 - 4 Consultant Equivalents
 - 4 Contractor Equivalents

35 FTEs for 1176 traffic signals

- Central System Vendor: **Intelight** – 1619 of 1674
SCATS – 19 intersections
- # of signals collecting high resolution data: **1619 (82%)**.
- Years of experience with high resolution data: **3 ½ years**

SPM's in Utah

Revision: January 24, 2016

of Intersections by Metric - Utah

Note: Some Signals Have More than One Metric

Selected Signal
5199 US-89 Antelope Dr

Signals
Region: All
Metric Type: All
Filter: Signal Id

Signal List

Map

Metric Settings

Metric Type

- ☐ Approach Delay
- ☐ Approach Volume
- ☐ Arrivals On Red
- ☒ Purdue Coordination Diagram
- ☐ Pedestrian Delay
- ☐ Preemption Details
- ☐ Purdue Phase Termination
- ☐ Speed
- ☐ Split Monitor
- ☐ Turning Movement Counts

Time Y Axis Maximum: 150

Volume Y Axis Maximum: 2000

Volume Bin Size: 15

Dot Size: Small

☒ Show Plan Statistics

☒ Show Volumes

☐ Upload Current Data

Dates

Start Date: 1/26/2016 12:00 AM

End Date: 1/21/2016 11:59 PM

< 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

Create Metrics

Metric Usage Reports

February 23, 2013 to January 22, 2016

Note: These are only the logged entries. Usage is much higher than reported!

Agency Usage Reports

February 23, 2013 to January 22, 2016

Note: These are only the logged entries. Usage is much higher than reported!

Metric: Usage Reports
Detection Requirements: None

Types of Performance Metrics

Controller high-resolution data only

Purdue Phase Termination
Split Monitor

Pedestrian Delay
Preemption Details

Advanced Count Detection (~400 ft behind stop bar)

Purdue Coordination Diagram
Approach Volume
Platoon Ratio

Arrivals on Red
Approach Delay
Executive Summary Reports
Purdue Link Pivot

Advanced Detection with Speed

Approach Speed (Wavetronix Advance)

Lane-by-lane Presence Detection

Purdue Split Failure

Lane-by-lane Count Detection

Turning Movement Counts
Yellow & Red Actuations

Probe Travel Time Data (GPS or Bluetooth)

Purdue Travel Time Diagram

All detectors (except speed metric) can be radar, loops, video, pucks – it doesn't matter.

Executive Reports & Prioritizing

- *Are signal operations improving, staying the same, or getting worse and by how much?*
- *How does an agency most effectively prioritize resources and workload?*
- *What are our areas of most need?*

Statewide Summary 24 hours / day in Utah for September 2015

Month		Arrival on Red		Volume	Intersections	
Month	Percent	Platoon Ratio	Daily Average Per Approach		Total	Number of Approaches
Sept. 2015	30%	1.12	9,540		505	1,024

- Region, corridor, and intersection summaries also available.
 - Prioritize coordination projects where they're needed the most.
- Engineers could now **directly measure** what previously they could only **estimate and model**.

Metric: Executive Reports

Detection Requirements: Advance Counters

Percent of Vehicles Arriving on Green - **Riverdale Rd**

10:00 AM to 2:00 PM Monday through Friday

Heavy rain rips apart I-15 in Nevada, forces freeway closure

By Ken Ritter, Michelle Rindels , Associated Press | Posted Sep 9th, 2014 @ 7:44pm

September 9, 2014 – September 12, 2014

I-15 Closed Southbound in Nevada for 4 days.

- Detour thru Cedar City
- Used ATMS
 - Signals on central system
 - Made Adjustments
 - CCTV, VMS, IMT, HAR

Optimization Example: Emergency Freeway Closure

Phase 4 shown – Freeway off-ramp
One week of data

Normal Traffic on
Sunday and Monday

Increased traffic began on Friday afternoon
due to freeway washout in Nevada as shown by more frequent gap-out
as shown by more frequent and lower split being used
and higher split being used

● Gap out

● Pedestrian activation

● Max out

● Force off

Metric: Purdue Phase Termination Chart

Detection Requirements: None

Perceived Hierarchy of Signal Control – Not Always Correct

Traffic Adaptive

In sync by adapting to changes in traffic

Traffic Responsive

In sync by choosing a library of plans

Coordinated

In sync with actuation on side streets

Fully-Actuated

Detection on all approaches

Semi-Actuated

Detection on side streets only

Fixed Time

No Detection – Fixed Green Time

Perceived Hierarchy of Signal Control – Not Always Correct

Adaptive Is Not Always the Best Option

Traffic Adaptive

Traffic Responsive

Coordinated

Fully-Actuated

Semi-Actuated

Fixed Time

Westernite

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President's Message: Volunteerism

By Karen Aspelin, P.E., PTOE, ITE Western District President

Admit it, as much as we may gripe about the "one percenters," the very small minority of the wealthiest Americans, there's not many of us who wouldn't want to be part of that group. Well,

Sometimes "Really Good" Time of Day Coordination Does Outperform Adaptive Control

The City of Roseville, California's Experience

By Matt Weir, P.E., T.E., PTOE, Kimley-Horn and Associates, Inc. and Jason Shykowski, P.E., T.E., City of Roseville

The District's Annual Meeting Best Paper Award is one of the most prestigious presented each year. The award-winning paper is presented here:

Some jurisdictions have asked for a full refund from the adaptive systems they have previously purchased.

SPMs May Be the Best Option

SPMs

Traffic Adaptive

Traffic Responsive

Coordinated

Fully-Actuated

Semi-Actuated

Fixed Time

SPMs can be used to manage and optimize all modes of operation, can outperform adaptive control and is much cheaper and simpler.

Why Model What You Can Measure?

“Our success will not be measured by how much data we collect, but instead how we use the data to improve the operation of our transportation network.”

– Steve Kuciemba - Parsons Brinckerhoff

“Well measured results that show a high return-on-investment is the key to receiving additional resources and sustained support.”

– Rob Clayton – Utah Department of Transportation

Questions?

Mark Taylor