

Connected Corridors Face-to-Face Meeting

Tuesday, Sept 12th , 2017 – 1:30 – 3:30 pm District 7 - Downtown





Agenda

- Introduction and Review
- Outreach
- Org Roles and Responsibilities
- Communications
- ITS Elements
- **C2C**
- Data Hub
- Data Quality and Estimation
- Modeling and Response Planning
- Action Items and Closing



Lisa has taken a new job

- "It's been a pleasure to work with all of you and I want to thank you for being good, responsible partners! It made my job much easier."
 - "Also, if there is ever a press event or something like that for the I-210 Pilot, I would really like to attend."



Our Corridor: The I-210

4





Systems Engineering Next Steps

- 5
- Design Documents How will the requirements be met
- Hardware and Software Building the system



Schedule





Integration – Subsystems and Subefforts





Integration





Technical Architecture and Components





Gantt Chart – 1 of 3

			2018
Assist	Responsible	Task Name 👻	Q2 Q3 Q4 Q1 Q2 Q3 Q4
Cal	PATH	Cloud Architecture	
All	PATH	Network Comm Design	
RIITS	PATH	Network Comm - I	
	RIITS	Network Comm - II	
	Cal	Freeway SHOPP	
All	Cal	Call For Projects - Design	
All	PATH	CFP - Sign Design	
All	Cal	CFP Construction	
	PATH	Internal Data Hub Path	
	PATH	Data Hub Interfaces	
Cal	PATH	Data Hub Internals	
	PATH	Choose COTS	
	PATH,COTS	First Cots Integration	
	PATH, All	Integrate with Data Hub	



Gantt Chart – 2 of 3

Assist 🔷 👻	Responsible 👻	Task Name 👻	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PATH	Cal	Arterial Closures		:					
RIITS,511	511	511							
	Cal	Transit			į				
RIITS	PATH	Video - Design				ļ			
RIITS	PATH/RIITS	Video - Implement							4
PATH	Cal	PEMS Interfaces							
PATH	Cal	PEMS - Implement							
PATH	Cal	ATMS Interfaces		÷					
	Cal	ATMS - Implement						;	
RIITS	Cal	Environmental						:	
Cty, City	Cal	Travel Time	_	÷					
All	PATH	Integrate System			:		<u></u>	<u>)</u>	
	PATH	Test System		:	:			:	
All	PATH	Launch System						:	
		C2C Interfaces		:	:			:	
All		C2C Working	-						
AII	FAIR	CZC WORKING			•				
ρατη	ρατη	Sign Control Interface		:	:			:	
	ΡΔΤΗ	Sign Control Completed	-					:	
	FAIII	sign control completed	1	•				•	











Gantt Chart – 3 of 3

Assist 🚽 👻	Responsible \bullet	Task Name 👻	Q2	Q3	Q4	Q1	Q2	Q3	Q4
City/Cnty	PATH	City Data			•			:	-
PATH	Cal	Caltrans' Data						:	-
					:			:	:
	PATH	Estimation Interfaces						:	:
PATH	PATH	Estimation Working			1	ľ –): :	:
					1			:	:
	PATH	Prediction Interfaces	E				:	:	:
	PATH	Prediction Working	E					:	:
					:			:	:
	PATH	Rules Engine Beta			-			:	:
	PATH	Rules Engine Interfaces		Ì		h		:	:
	PATH	Rules Engine Working			:	ľ.	ļ	:	:
					1			:	:
All	PATH	Rules			:			ļ	:
All	PATH	Response Plans			·			ļ	:
							:	1	:
	Cal, PATH	Personnel/Orgs						ļ	:
		_						:	:
PATH	Cal	PATH Contract Update						:	:
PATH	Cal	Next PATH Contract			ļ		[:	:
							•	,	,



Prioritized Subtasks

	Essential for Launch		Not Sure		4 Months after Launch
PATH	Data Quality - Non Real Time	CT/PATH	Pems	СТ	Air Quality
PATH	Rules	PATH	511	СТ	Arterial Detection
СТ	210 TMS Upgrade	CT/PATH	KH or McCain	СТ	Full Outreach
СТ	ATMS	PATH	LA County F to C	СТ	Personnel fully trained
СТ	Cabinets and Controllers			СТ	Ramp Signs
СТ	Lane Closure Freeway			СТ	Transit
PATH	Cloud Architecture			PATH	Arterial Estimation
PATH	Data Hub (All things in there)			PATH	Data Quality - Real Time
PATH	DSS Build 1			PATH	Freeway Estimation
PATH	Integration			PATH	DSS Build 2
PATH	One COTS system			PATH	Lane Closure Arterial
PATH	Rules Engine			PATH	Machine Learning
PATH	TMDD Interfaces			PATH	Prediction
CT/Path	C2C Comm Phase 1			PATH	Video
CT/PATH	KH or McCain				
CT/PATH	TMC to Cloud				
CT/PATH	TSMSS				
PATH	Arterial Signs				
ст	MOU				
PATH	Personnel in place				
PATH	Project Management				
PATH	Reduced outreach				
PATH	Sign Control				

Based on launching with rules based DSS

Then moving to model enhanced DSS 4 months later



Risks - Summarized

Significant Risks

- C2C TMDD interface implementation timing
- Timely integration of purple box vendors

Secondary Risks

- Network Communication
- Corridor wide data quality
- Travelers following reroutes
- Construction on the I-210
- Software development schedule under pressure due to UC facilities issues



¹⁵ Outreach and Communications

Outreach

Project Charter Amendment

- Awaiting comments from RIITS
- Have received comments from 511 and will make minor modifications to their responsibilities

- Update by Caltrans
- Please work with Michelle on the next set of articles for the Connected newsletter
- ITS Presentation on CC Cloud and CC ability to reduce barriers to entry for ICM efforts across the state
 - Nick, is the Caltrans web site available for reference in that presentation





Design

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Note from Jesse on Architecture

- "I (finally!) do have comments on the 210-CC Project Architecture, which I must write up."
- "Overall, very good!"



KSAs and Organizational Design

Org Roles and Responsibilities (SMG)

- Kicked off the effort with a day-long workshop at Caltrans
 - Discussed requirements document and ramifications with Caltrans
- Agreed to identify the most critical roles for Caltrans to commit to.
- Preliminary criteria for evaluating roles include:
 - Is the role critical for re-routing activation?
 - Would the lack of the role possibly lead to losing partner participation?
 - Does the role impact ICM development in a timely manner?
 - Will the lack of the role lead to reduced system performance?
 - Will the lack of the role affect public perception?



Org Roles and Responsibilities

- Caltrans has met to go through roles one more time using these and other criteria as appropriate
 - Results discussed by Caltrans
- Next step
 - Review Caltrans findings
 - Agree on framework for interviewing D4 and D11
 - Set up interviews



Proof of Concept

Proof Of Concept – COTS (Purple Box)

- The following companies have been selected to participate in the pilot
 - Kapsch
 - Parsons
 - Telegra
- We believe we have legal understandings with everyone
- We met with Kapsch for a full day to discuss system integration
 - They will be getting back to us later this week with their schedule
 - They again validated our design and provided positive feedback
- Based on Kapsch's schedule we will be approaching other vendors



Proof of Concept Dates

25			
	June August Sept Nov Dec May	2017 2017 2017 2017 2017 2018 2019	 Choose vendors who will participate in pilot Complete agreements with vendors as needed Begin integration planning with vendors Begin integration of vendor COTS products Launch pilot utilizing COTS software of first vendor Complete Integration of second vendors COTS software
	Aug	2019	 Complete Integration of third vendors COTS software
	The anticipate	ed schedu	le for Caltrans procurement is:
	Mav	2018	– Caltrans will begin internal procurement process
	Oct	2019	 Procurement document released
	April	2020	– COTS vendor chosen
	July	2020	 Complete contractual negotiations

Nov 2020 – Install production software



Network Communication

Jesus and Erlan



Phased Approach

Phase 1 – Transmit traffic data only (no video data)

- Site-to-site VPN over the Internet
 - Arcadia
 - Pasadena
- Current RIITS connection to Caltrans D7
 - LACO
- Obtained agreement from Arcadia, Pasadena and LACO personnel on approach and configuration parameters

Phase 2 – Transmit traffic data over fiber network

- 10 Gbps fiber network
- Video distribution



Phase 1 Overview

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Phase 1 Logical Network





Site to Site VPN Parameters



- Create Site to Site VPN tunnels over existing Internet circuit
- VPN tunnels will terminate at RIITS VPN gateways
- Requires public IPv4 address that is not behind NAT
- VPN devices needs to be compatible



LACO Connection High Level Steps



- Use existing connection
 between LACO and RIITS
- Create new VLAN ID and IP network for ICM data traffic
- Configure current interface
 as a trunk port to support
 multiple VLANs
- Requires non-overlapping
 VLAN ID and IP address
 range



Timeline

32





Identification of hub and node locations (1 month)

Phase 1 – Establish temporary connection to ICM (2 months)



Aug	Sep	0đ
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Highlights

- Joint collaboration between Arcadia and RIITS to define scope of work and responsibilities to extend fiber connection from Arcadia fiber to I-210
- RIITS assessing feasibility to share Caltrans video feed via current TrafficLand partnership



Next Steps

Begin Phase1 implementation

- Verify VPN equipment and configuration compatibility
- Provide change request to RIITS
- Provide change ticket to RIITS contractor
- Schedule agency availability
- Continue with Phase 2 and video portion of the ICM fiber network



Appendix



Site to Site VPN Configuration Parameters

Configuration Parameters					
Pre-shared key	Pre-establish between RIITS and agencies				
IKE encryption algorithm	AES 256				
IKE integrity algorithm	SHA 256				
Diffie Hellman group	Group 2				
IPSec encryption algorithm	AES 256				
IPSec integrity algorithm	SHA 256				
Perfect Forward Secrecy (PFS) Group	PFS2				
Security Association (SA) Lifetime	27000 seconds				
Public IP address	TBD				
Local TMC IP address range	TBD				
Route based VPN	Static routes				


VPN Configuration Sample (Cisco ASA)

object-group network RIITS-NETWORKS description RIITS networks via Azure network-object X.X.X.X 255.X.X.X object-group network TMC-NETWORKS description Networks used for the ICM network-object X.X.X.X 255.X.X.0 access-list RIITS-VPN-ACL extended permit ip object-group TMC-NETWORKS object-group RIITS-NETWORKS crypto ipsec ikev1 transform-set ESP-AES-256-SHA esp-aes-256 esp-sha-hmac crypto ipsec security-association lifetime seconds 27000 crypto map RIITS-CRYPTO-MAP 1 match address RIITS-VPN-ACL crypto map RIITS-CRYPTO-MAP 1 set peer X.X.X.X crypto map RIITS-CRYPTO-MAP 1 set ikev1 transform-set ESP-AES-256-SHA crypto map RIITS-CRYPTO-MAP interface outside crypto ikev1 enable outside crypto ikev1 policy 5 authentication pre-share encryption aes-256 hash sha group 2 lifetime 28800 tunnel-group X.X.X.X type ipsec-121 tunnel-group X.X.X.X ipsec-attributes ikev1 pre-shared-key XXXX interface X/X switchport mode trunk switchport trunk allow vlan XXX - XXX



LACO Configuration Parameters

Configuration Parameters					
VLAN ID	900				
IP Address Range	10.90.1.0/24				
Interface trunk standard	802.1Q				

Interface Configuration Sample (Cisco)

interface X/X switchport mode trunk switchport trunk allow vlan XXX - XXX



Call for Projects

PARSONS

PARSONS

Caltrans D7 I-210 Connected Corridors

Procurement Support

delivering a better world

Dan Lukasik Vice President

uenvening a better world

Agenda

- Timeline / Current Status
- Equipment by Jurisdiction
- Equipment by Package
- Next Steps

Timeline

Met Face-to-Face with Stakeholders	Aug 2 - 21
 Distributed Updated Equipment List <u>CALL to CONFIRM by Sept 7</u> Confirmation from Arcadia Confirmation from Monrovia 	Sept 1, 2017
 Distributed Procurement Packages to Stakeholders CALL to CONFIRM by Sept 21 	Sept 7, 2017
Update Procurement Estimate	Sept 15, 2017
Procurement Award	Dec 29, 2017

Package 4 – Details to Resolve

Finalize procurement details for Fiber Drop

Address connectivity challenges in Monrovia and Duarte, with LACO's assist

LA COUNTY

	Fauinment To Be	#2 Bluetooth (BlueMac)	#4 Communication Upgrade	#6 Video Detection	#7 Data Comm Module and
	Equipment to be			System	Video Detection Software
	Installed	Antenna & Module	Radio - Proxim 5GHz (Tsunami		Upgrade
		Mounted on Pole	10150 BS)	Vantage Vector	
		Cable	MIMO 2x2, 22 dBI panel	EdgeConnect Modules	Edge Connect Modules
		POE Injector	antenna	(4 Cameras Capable)	Cables
		Plugs into unused Port	Surge Arrestor	Cables	Installation
		Installation	POE Injector	Installation	
			Ethernet Switch (Layer 2)		
			Cables		
	Location		Installation		
#					
1	Colorado Blvd/Lotus Ave		Qty 1	Qty 1	
2	Colorado Blvd/Rosemead Blvd	Qty 1			Qty 1
3	Rosemead Blvd/Foothill	Qty 1			
4	Rosemead Blvd/Del Mar Blvd				Qty 1
5	Rosemead Blvd/California Blvd				Qty 1
6	Rosemead Blvd/Huntington Dr	Qty 1			Qty 1
7	Rosemead Blvd/Duarte Rd	Qty 1			
8	Colorado Blvd & Merlon Ave		Qty 1		
9	Colorado St/Michillinda Ave		Qty 1	Qty 1	
10	Myrtle Ave/Peck Rd	Qty 1			
	Los Angeles County TMC				
		5	3	2	4

3

Monrovia

#	Location	#2 Bluetooth (BlueMac) Antenna & Module Mounted on Pole Cable POE Injector Plugs into unused Port Installation	#4 Communication Upgrade Radio - Proxim 5GHz (Tsunami 10150 BS) MIMO 2x2, 22 dBl panel antenna Surge Arrestor POE Injector Ethernet Switch (Layer 2) Cables Installation	NEW QTY#4 New Oty	#5 2033 McCain 2070 Advanced Traffic Conrtollers (ATC) Latest D4 Firmware Timing Plan Updates Installation	#6 Video Detection System Vantage Vector EdgeConnect Modules (4 Camera Capable) Cables Installation	#7 Data Comm Module and Video Detection Software Upgrade Edge Connect Modules Cables Installation
1	Foothill Blvd/5th Ave	Qty 1	Qty 1	x			
2	Foothill Blvd/Madison Ave		Qty 1	х			
3	Huntington Dr/5th Ave	Qty 1		1		Qty 1	
4	Foothill Blvd/Violet Ave		Qty 1	х			
5	Foothill Blvd/Mayflower Ave		Qty 1	х	Qty 1		
6	Huntington Dr/Mayflower					Qty 1	
7	Duarte Rd/Mayflower Ave		Qty 1	1	Note - 5-3 Upgrade Firmware Only	Qty 1	
8	Foothill Blvd/Magnolia Ave		Qty 1	х			
9	Foothill Blvd/Primrose Ave		Qty 1	х	Qty 1		
10	Foothill Blvd & Myrtle Ave	Qty 1	Qty 1	х			
11	Foothill Blvd/lvy Ave		Qty 1	х	Qty 1		
12	Foothill Blvd/Canyon Blvd		Qty 1	х			
13	Myrtle Ave & Central Ave		Qty 1 - Note - 4-1	1			
14	Huntington Dr/Myrtle Ave	Qty 1				Qty 1	
15	Duarte Rd/Myrtle Ave		Qty 1	3	Note - 5-3 Upgrade Firmware Only		Qty 1
16	Foothill Blvd/Shamrock Ave		Qty 1	х			
17	Foothill/Mountain (access point)	Qty 1		X			
18	Mountain Ave/Lemon Ave		Qty 1	1			
19	Mountain Ave/Royal Oaks Ave		Qty 1	1			
20	Huntington Dr/Mountain Ave			2		Qty 1	
21	Duarte Rd/Mountain Ave		Qty 1	2	Note - 5-3 Upgrade Firmware Only		Qty 1
22	Duarte Rd/California				Note - 5-3 Upgrade Firmware Only		Qty 1
23	Central / Mountain Ave <mark>(new)</mark>			1			
		5	24		7	5	3
			(16 + 8)				
			Note 4-1		Note 5-3		
			Remove Existing Padio		Ungrade Eirmware Only		
			heriove Existing Radio		opgrade rinnwate Only		

Install (Upgrade) Radio Old Equip to Contractor

Duarte

	Equipment To Be Installed	#2 Bluetooth (BlueMac)	#4 Communication Upgrade		#6 Video Detection System	#7 Data Comm Module and Video
						Detection Software Upgrade
		Antenna & Modul e	Radio - Proxim 5GHz		Iteris Vantage Vector	
		Mounted on Pole	(Tsunami 10150 BS)		EdgeConnect Modules	Iteris Edge Connect Modules
		Cable	MIMO 2x2, 22 dBI panel		(4 Camera Capable)	Cables
		POE Injector	antenna		Cables	Installation
		Plugs into unused Port	Surge Arrestor		Installation	
		Installation	POEInjector			
			Ethernet Switch (Layer 2)			
			Cables	NEW		
	Location		Installation	QTY #4		
#						
1	Mountain Ave/BMW Dwy		Qty 1	1		
2	Huntington Dr/Buena Vista St	Qty 1			Qty 1	
3	Buena Vista St & Central Ave		Qty 1	1		
4	Buena Vista St & Evergreen Ave		Qty 1	2		
5	Buena Vista/Duarte		Qty 1	2		Qty 1
6	Duarte/Hope		Qty 1	1		
7	Huntington Dr/Highland			1	Qty 1	
8	Huntington Dr/Mt. Olive/605	Qty 1		1		
9	Huntington Dr/Las Lomas				Qty 1	
10	Huntington & 210 EB (new)			1		
11	Huntington & Crestfield (new)			1		
	City of Duarte TMC					
		2	11		3	1
			(5+6)			

PASADENA (p1 of 2)

		Equipment To Be Installed	#2 Bluetooth (BlueMac)	#3 New Cabinets	#5 2033 McCain	#6 Video Detection System	#7 Data Comm Module and Video
		Equipment to be instance					Detection Software Upgrade
			Antenna & Module	332 Cabinet	2070 Advanced Traffic	Iteris Vantage Vector	
			Cabinet Mounted	2070 Controller	Conrtollers (ATC)	Iteris EdgeConnect Modules	Iteris Edge Connect Modules
			Cable	Installation	Latest D4 Firmware	(4 Camera Capable)	Cables
PASA	DENA		POEInjector		Timing Plan Updates	Cables	Installation
			Plugs into unused Port		Installation	Installation	
			Installation				
	*	Location	¥	*	*	•	v
1	622	Orange Grove Blvd/Colorado Blvd	1			Qty 1 - New VDS - Fiber	
2	127	Orange Grove Blvd & Fair Oaks Ave	1			Qty 1 - New VDS - Fiber	
3	141	Fair Oaks Ave/Villa St					Media Converter (Serial to Enet)
4	610	Fair Oaks Ave/ Corson St	1				
5	163	Walnut St & Fair Oaks Ave				Qty 1 - New VDS - Fiber	
	107	Fair Oaks Ave/Union St				Qty 1 - New VDS - Fiber	
6	157					Note 6-4	
7	215	Fair Oaks Ave/Colorado Blvd					Media Converter (Serial to Enet)
	276	Del Mar Blud/Fair Oaks Ave	1			Qty 1 - New VDS - Fiber	
8	270	Der Mar Brodyr an Oaks Ave	Ŧ			Note 6-4	
9	626	Arryo Pkwy/Green St					Media Converter (Serial to Enet)
10	628	Arroyo Pkwy/Del Mar Blvd					Media Converter (Serial to Enet)
11	629	Arroyo Pkwy/California Blvd					Media Converter (Serial to Enet)
12	354	Orange Grove Blvd/Garfield Ave				Qty 1 - New VDS - Fiber	
13	153	Maple St/Los Robles Ave	1				
14	280	Los Robles Ave/Del Mar Blvd					Comm Module & SW (Econolite)
					Qty 1		
15	154	El Molino Ave/Maple St		Qty 1 - TWP	Note 5-1		
					Qty 1		
16	158	El Molino Ave/Corson St		Qty 1 - TWP	Note 5-1		
17	207	Lake Ave/Union St					Comm Module & SW (Econolite Hub)
	202	Lake Ave/Del Mar Rhud				Qty 1 - New VDS - Fiber	
18	283	Lake Ave/Del Mar Bivd				Note 6-4	
					Qty 1		
19	155	Wilson Ave/Maple St		Qty 1 - TWP	Note 5-1		
					Qty 1		
20	159	Wilson Ave/Corson St		Qty 1 - TWP	Note 5-1		

PASADENA (p2 of 2)

		Equipment To Be Installed	#2 Bluetooth (BlueMac)	#3 New Cabinets	#5 2033 McCain	#6 Video Detection System	#7 Data Comm Module and Video
			Antenna & Module Cabinet Mounted	332 Cabinet 2070 Controller	2070 Advanced Traffic Conrtollers (ATC)	Iteris Vantage Vector Iteris EdgeConnect Modules	Iteris Edge Connect Modules
			Cable	Installation	Latest D4 Firmware	(4 Camera Capable)	Cables
PASAD	ENA		POE Injector		Timing Plan Updates	Cables	Installation
			Plugs into unused Port		Installation	Installation	
			Installation				
	*	Location	·	-	*	*	•
21	134	Orange Grove Blvd/Hill Ave	1				
22	176	Walnut St/Hill Ave	1				
23	265	Green St/Hill Ave	1				
					Qty 1		
24	156	Sierra Bonita Ave/Maple St		Qty 1 - TWP	Note 5-1		
					Qty 1		
25	160	Sierra Bonita Ave/Corson St		Qty 1 - TWP	Note 5-1		
26	289	Del Mar Blvd/Allen Ave					Edge Connect Module
27	21.0	Walput St/Gerra Madra Plud		Oby 1 Eibor	Qty 1 Note F 1	Oty 1 Now/VDS Eibor	
27	139	Orange Grove Blyd/Sierra Madre Blyd	1	QUY I - FIDEI	NOTE 2-1		
20	133	Maple St & Sierra Madre Blvd	1				
30	294	Del mar Blyd/San Gabriel Blyd	1				
21	188	Foothill Blvd/Sierra Madre Villa Ave			Qty 1	Qty 1 - New VDS - Fiber	
31			11	7	NOLE 3-2	NOLE 0-4	<u>ہ</u>
				,	5		5
					Note 5-1	Note 6-4	Note 7-3
			Action -		Paired with LI #3	Remove Existing VDS	Existing Conf A -
			Need to address Bluetooth		Requires Timing Signal	Replace with New VDS	Existing Econolite Solo Pro - Fiber
			Server Requirements		Update	Old Equip to Contractor	Update with Axis 241Q Serial to ENET
							server
					Note 5-2		<u>Note 7-4</u>
					Current 332 Cabinet		Existing Conf B -
					Requires 2070		Existing Econolite Solo Terra - Fiber
					Controller,		Update with Axis 241Q Serial to ENET
					Firmware		server
							Note 7-5
							Existing Conf C -
							Existing Econolite Solo Mini Hub -
							Note 7-6
							Existing Conf D -
							Existing ITERIS Vantage Edge - Fiber

ARCADIA (p1 of 2)

	Equipment To Be Installed	#1 Bluetooth (Velocity)	#3 New Cabinets	#4 Communication	#5 2033 McCain	#6 Video Detection	#7 Data Comm
	22 65			Upgrade		System	Module and Video
	Location	Bluetooth/Wi-Fi Module (Rack- Mounted) Surface Mount Multiband GSM/CDMA or WiMAX, WiFi & GPS Antenna (Cabinet-Mounted) Attenuator Cable Accessories Bluetooth Installation(Brackets Mounting, Cabling & Hookup) Bluetooth Configuration & Turn-On Support	New Tessco Cabinet 2018 KCLip McCain 2070 ATC Controller 5GHz Wireless Radio Clary Battery Backup SNMP/HTTP Adapter Installation Removal of Old Cabinets	Radio - Proxim 5GHz (Tsunami 10150 BS) MIMO 2x2, 22 dBl panel antenna Surge Arrestor POE Injector Ethernet Switch (Layer 2) Cables Installation	2070 Advanced Traffic Conrtollers (ATC) Latest D4 Firmware Timing Plan Updates with Progression Installation	GridSmart VDS Performance Module Fisheye Camera System Swivel Bracket for dual plane Quick Connect Junction Box 58" Mounting Arm with 90 deg bend Astro-Brac Tenon Cables Installation	Detection Software Upgrade Firmware Upgrade to existing processor and Configuration Labor No HW Module
1	Huntington Dr/Sunset Blvd			1	1	Qty 1 - Note 6-1	Sector In Contract States
2	Baldwin Ave/Foothill Blvd						Qty 1 - Note 7-1
3	Colorado Blvd/Baldwin	Qty 1	9		Qty 1 - Note 5-1		
4	Huntington Dr/Baldwin Ave						Qty 1 - Note 7-1
5	Baldwin Ave/Camino Real Ave						
6	Baldwin Ave/Longden Ave				Qty 1 - Note 5-1		
7	Baldwin Ave/Las Tunas Dr	1			Qty 1 - Note 5-1		
8	Huntington Dr/Holly Ave					Qty 1 - Note 6-2	
9	Colorado Blvd/Colorado Pl	Qty 1		1	Qty 1 - Note 5-1		
10	Huntington Dr/Colorado Pl						Qty 1 - Note 7-1
11	Foothill Blvd/Santa Anita Ave	Qty 1			J.		Qty 1 - Note 7-1
12	Colorado Blvd/San Antonio St	j)	Qty 1	Qty 1	Qty 1 - Note 5-1		
13	Colorado Blvd/Santa Anita Ave			Qty 1			Qty 1 - Note 7-1
14	Santa Anita Ave & Santa Clara St)					Qty 1 - Note 7-1
15	Huntington Dr/Santa Clara St						Qty 1 - Note 7-1
16	Huntington Dr/Santa Anita Ave	Qty 1					Qty 1 - Note 7-1
17	Santa Anita Ave/Campus Dr	ļ]			<u> </u>		Qty 1 - Note 7-1
18	Santa Anita Ave/Duarte Rd						Qty 1 - Note 7-1
19	Santa Anita Ave/Longden Ave						Qty 1 - Note 7-1
20	Santa Anita Ave/Live Oaks Ave))			1		Qty 1 - Note 7-1
21	Santa Anita Ave/Camino Real Ave						Qty 1 - Note 7-1



	Equipment To Be Installed	#1 Bluetooth (Velocitγ)	#3 New Cabinets	#4 Communication Upgrade	#5 2033 McCain	#6 Video Detection Sγstem	#7 Data Comm Module and Video Detection Software
	Location	Bluetooth/Wi-Fi Module (Rack- Mounted) Surface Mount Multiband GSM/CDMA or WiMAX, WiFi & GPS Antenna (Cabinet-Mounted) Attenuator Cable Accessories Bluetooth Installation(Brackets Mounting, Cabling & Hookup) Bluetooth Configuration & Turn- On Support	New Tessco Cabinet 2018 KCLip McCain 2070 ATC Controller 5GHz Wireless Radio Clary Battery Backup SNMP/HTTP Adapter Installation Removal of Old Cabinets	Radio - Proxim 5GHz (Tsunami 10150 BS) MIMO 2x2, 22 dBl panel antenna Surge Arrestor POE Injector Ethernet Switch (Layer 2) Cables Installation	2070 Advanced Traffic Conrtollers (ATC) Latest D4 Firmware Timing Plan Updates with Progression Installation	GridSmart VDS Performance Module Fisheye Camera System Swivel Bracket for dual plane Quick Connect Junction Box 58" Mounting Arm with 90 deg bend Astro-Brac Tenon Cables Installation	Upgrade Firmware Upgrade to existing processor and Configuration Labor No HW Module
-	v	-	-	v	-	-	-
22	Baldwin/Gate 8					Qty 1 - Note 6-3	
22	Foothill Blvd/First Ave/Highland Oaks D)r					Qty 1 - Note 7-2
23	Foothill Blvd/Second Ave.						Qty 1 - Note 7-2
N/A	' Delivered SPARE '				Qty 1 - Note 5-2		
		4	1	2	6	3	15
					Note 5-1 With Latest D4 Firmware 3 Timing Plan & 2 Progression	Note 6-1 Includes Removing old VDS, Installing new VDS, Camera - Qty 2 Old Equip to Contractor	Note 7-1 Iteris Processor and Edge Connect Firmware Upgrade Zoning Integration Support Labor Current HW in place
					<u>Note 5-2</u> Spare Unit - No Install	Note 6-2 Camera - Qty 2 w/ VDS module	Note 7-2 Zoning Integration Support to Vantage Live Labor Current HW in place
						<u>Note 6-3</u> Camera - Qty 1 w/ VDS module	

Package 1 – Bluetooth Travel Time



Based on Velocity product

4 Locations in Arcadia, supplementing currently deployed system

Equipment Installation Warranty

Package 2 – Bluetooth Travel Time



22 Locations in LA County, Monrovia, Duarte and Pasadena

Centralized data aggregation

Equipment Installation Warranty

Package 3 – Traffic Control Cabinet



7 Locations in Pasadena1 Location in Arcadia

Demo / Replace

Equipment Installation Warranty

Package 4 – Communication Upgrade



40 Radio Installs / Upgrades 34 Locations

Within LA County, Monrovia, Duarte and Arcadia

Equipment Installation Warranty

Package 5 – Controller



21 Locations Within Monrovia, Pasadena and Arcadia

Equipment Installation Warranty

Package 6 – VDS



22 Locations

Within LA County, Monrovia Duarte, Pasadena and Arcadia

Equipment Installation Warranty

Package 7 – Data Comm Module / SW Upgrade



31 Locations

Within LA County, Monrovia, Duarte, Pasadena, Arcadia

Equipment Installation Warranty

Next Steps

Review / Align Procurement Packages

Prepare for Installations commencing in early 2018

REROUTE SIGNAGE

SIGN LOCATIONS SIGN SELECTION PRELIMINARY ESTIMATE

Sign Locations

Reviewed and Defined Sign Locations with all stakeholders

Major Concerns: Availability of Electricity and Communication

- LA County (4 Locations), includes Duarte
- Pasadena (16 Locations)
- Arcadia (6 Locations)
- Caltrans District 7 (17 Locations)
- Still a work in progress on some Caltrans Locations
- Need to finalize Monrovia (6 Locations), although locations already reviewed with LA County
- Stakeholders are now reviewing for power and comm



Sign and Software Requirements

Sign

- Pixel Pitch [15 to 20 MM]
- 3' x 4'
- Can resist AASHTO wind load of >100 mph wind gust
- MUTCD text requirements (colors and height)
- Software
 - Sign to TMC connectivity
 - NTCIP connectivity with existing traffic software programs (NTCIP)
 - Signs come with basic software
 - C2C Connectivity
 - TMDD based from TMC to CC Data Hub



Pole Requirements

2 different Poles required

- Pole 10' in height for non solar power
- 1 pole 30' feet in height for solar power/wireless
- 12' sq. ft sign
 - Remain standing during 100 mph winds
- Weight
 - Up to 150 lbs of weight for heaviest potential sign
 - Additional weight for solar and wireless cabinet
- Looking at three designs
 - Caltrans' design for I-80 San Pablo corridor needs update
 - Caltrans' design for San Mateo corridor needs update
 - 3rd Party design in the works due Thursday Just short sign pole



Preferred Sign Selection (10')

Modified / Shortened VDS

Standard Plan ES-16D

San Mateo Smart Corridor

- 200 lb limit at maximum height 10'
- □ Sign 4' x 2'8" = 10.67 sq. ft
- Would need to recalculate for 12 sq. ft and additional weight





Preferred Sign Selection (30')

Standard Type 15TS

Standard Plan ES-7A

□ I-80 ICM Corridor Pole

- 15TS designed to accommodate CMS
- 120 lb limit at maximum height of 10' for sign
- 180 lb for solar panel batteries and panel limit at 4'
- □ Sign 4' x 2'8" = 10.67 sq. ft
- Would need to recalculate for 12 sq. ft and additional weight





Preliminary Sign Estimate

- □ CMS (\$10,000)
- □ Pole (\$3,500)
- □ Pull box (\$1,300)
- 🗆 Solar -
- \Box Wireless (\$5,000 x 2 = \$10,000)
- Cable; Service and Communication (\$500 per sign, \$450 for extender)
- About 26K per sign installed without solar
- Excluding the signs related to Caltrans the estimate is approximately \$832,000 for 32 signs



Next Steps

October 1 Deadline

Confirmation of Municipal Locations

Municipalities need to review and approve second round of discussion

Confirmation of Caltrans Locations

- Ramp Locations (8 Locations)
- Frontage Roads (9 Locations)
- Confirm or establish final pole design
- Confirm Estimate is Within Budget
- Prepare Bid Documents for Procurement



Center to Center Data Exchange

C2C Updates

Transcore

- Awaiting go ahead from Caltrans to let contract.
- Progressed through University purchasing

Kimley Horn

- Received proposal
- Reviewed by County
- Awaiting updates to proposal
- Caltrans has started procurement process

McCain

- In review by Pasadena and other stakeholders
- Caltrans has started procurement process



DSS, Rules and Response Plans

DSS – Design Detail

70





Response Plan Generation

- Added timing offset to response plan components
 i.e Execute plan component at t + 1 Minute
- Continued to update smaller aspects of tool
- Complete adding in other response plan elements
- Build out additional routes



Response Plan Generation Tool

72

🖲 🛕 🔲 💭 🛞 😤 🔽 🖣 100% 🖾 Fri 2:28:19 PM 1 Q 👩 🖃 ń java response plan demo 5.3.0 ling.csv < Connected Corridors: Response Plans .py.csv Box Sync Size Kind Connected Corridors: Response Plans (v 0.8.3) s.csv ? 31.3 MB Java JAR file ▲ Google Drive +D 🛅 response plan demo File source: application default Change file source 🔻 Export default files anning new41 s & rules results My incident: 2 (of 5) lanes closed on WB-210 after WBAllen and before WBHill. Starting on Fri, and_old Sep 1, 2017 at 3:37 PM (reported 5 minutes later), lasting 60 minutes. 2017-08-15 Name Incident date 13 2017 My incident 9/1/2017 I-210 Alternate Routes pm650 Freeway, Direction repository Incident start time 210 ¥ WB -15:37 mz (2) 2017-02-07 Call for Projetar.gz Number of lanes Duration (min) 60 5 .html response-builder Number of lanes closed Reporting delay (min) ml 2 5 (AirDrop tml .2_n.jpg Box Last available offramp First available onramp WBAllen WBHill * Ŧ 6_n.jpg log .ard.jpg tmp .ia-1.jpg All My Files .dia.jpg t_23.jpg C iCloud Drive not_414 Applications Develop plans hot_600 (3) Desktop d.jpg Save results Documents .dent.xls .xlsx Creative Cloud Files opy.xlsx 0 Devices ok1.xlsx 6.m4v Greg's MacBook Pro .ed.pdf Remote Disc .pdf 📓 Macintosh HD > 🔳 Users 🔉 🏆 gregm > 🛅 Documents 🔺 🛅 Incident_response 🗕 🛅 response plan demo > 📓 RulesEngineTestingApplication-0.8.3-SHADE.jar 1 of 1 selected, 15.46 GB available


Addition of Start Delay Column

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	4 EoothillWalnut-Baldwin-Hill WB	Foothill Blvd & Sierra Madre Villa Ave. WB	Through Arrow DETOUR 1-210W Continue to Hill	14	5 Required Availa
	5 FoothillWalnut-Baldwin-Hill WB	Baldwin Ave & I-210 WB / Footbill Blvd NB	Left Arrow DETOURIL-210W	20	5 Required Availa
w	6 FoothillWalnut-Baldwin-Hill WB	Walnut St & Hill Ave WB	Right Arrow DETOUR 1-210W	26	5 Required Availa
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All element updates completed







78 ATMS, PEMS, 511, Lane Closure

ATMS, PEMS, 511, Lane Closure

ATMS Upgrades

- Provided extensive comments on requirements document
- Next meeting planned for next Wed (Sept 20th)

PEMS

- Quote received and is being reviewed
- Meeting held on August 28th
- Statement of work to be generated

511

- RIITS and PATH need to schedule design reviews
- Reviewing RIITS APIS

Arterial Lane Closure

No one has requested to look at the Arterial Lane Closure tracing system



Lane Closure System

		and the second	2	10 La	ne Cl	osur	e Sv	stem (1	LCS)		
Home Road	1 Closures	Closures by Cate	gory Ent	er Road Closi	ure Hel	p					
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Export to CSV Cones Down Start date E.g., Jul 23 2017 End date	Apply	Reset									
E.g., Jul 23 2017 Direction Facilit	<u>Street</u> <u>Name</u>	Begin Description	End Description	<u>Closure</u> <u>Type</u>	Estimated Delay	Lanes Closed	<u>Total</u> Lanes	Expected End	<u>Cones-</u> Down Date	<u>Cones-Up</u> Date	
EB Local Road	<u>Colorado</u> <u>Blvd</u>	Intersection of Colorado Blvd and Madre Street, Pasadena, CA 91107, USA	Intersection of Colorado Blvd and Rosemead Blvd Pasadena, CA 91107, USA	Lane	15 minutes non Peek, 30 minutes Peek	1	2	06/30/2017 22:30	06/22/2017 16:30	06/22/2017 16:30	



Using the lane closure system

- 81
- □ Link <u>https://210lcstest.dot.ca.gov/</u>
- □ Mike approves new users
- Please try it out and see if it is acceptable for CC



Data Quality and Estimation

Data Quality

I-210 Westbound PM 25 -PM 43.25 achieved 91.6% data availability due to new loops and improved communications

Caltrans (freeways)	Arcadia	Pasa	dena	Summar	у				
Weekly Average Sensor Availability		I-210	✓ We	estbour	nd PM 2	5 - PM 4	13.25 <u>~</u>		
Hover over cells to view units in detecto days.	r- CD	СН	Fwy-Fwy	HOV	Mainline	Off Ramp	On Ramp	Total	
August 6 7 8 9 10 11 1	2		100.0%	83.8%	80.0%	65.2%	78.6%	79.5%	^
13 14 15 16 17 18 1	9		100.0%	84.6%	83.0%	82.4%	81.6%	83.7%	
2021222324252	6		100.0%	89.1%	92.6%	86.7%	91.8%	91.6%	~

Beginning of work to evaluate LACO arterial loop detector data and to import into model

Goltrans Metro



Foothill Transit

sevcoe

Freeway Sensor Availability

Weekly Average Sensor Availability	I-210 T Eastbound PM 25 - PM 43.25 T										
Hover over cells to view units in detector-days.	CD	СН	Fwy-Fwy	HOV	Mainline	Off Ramp	On Ramp	Total			
August 6 7 8 9 10 11 12			61.9%	76.7%	81.5%	73.2%	84.0%	79.5%			
13 14 15 16 17 18 19			66.7%	74.7%	81.5%	80.1%	84.6%	80.3%			
20 21 22 23 24 25 26			66.7%	75.1%	85.0%	85.3%	88.0%	83.5%			
27 28 29 30 31 1 2			66.7%	69.0%	76.9%	79.2%	80.6%	76.2%			
September 3 4 5 6 7 8 9			66.7%	73.1%	80.2%	85.7%	84.0%	80.0%			

Weekly Average Sensor Availability			I-210 ·	Westbour	nd PM 25 - PN	43.25 •		
Hover over cells to view units in detector-days.	<u>CD</u>	CH	Fwy-Ewy	HOV	Mainline	Off Ramp	On Ramp	Total
30 31 1 2 3 4 5			100.0%	84.6%	82.0%	60.5%	80.6%	80.5%
August 6 7 8 9 10 11 12			100.0%	83.8%	80.0%	65.2%	78.6%	79.5%
13 14 15 16 17 18 19			100.0%	84.6%	83.0%	82.4%	81.6%	83.7%
20 21 22 23 24 25 26			100.0%	89.1%	92.6%	86.7%	91.8%	91.6%
27 28 29 30 31 1 2			100.0%	84.2%	84.1%	76.2%	83.7%	83.8%

- This just in:
 - I-210 PM 25 43.25 WB has reached 90% again
 - SR-134 PM 11.4 13.5 WB is back up to 93%
 - I-605 PM 22.93 28 NB is at almost 95%
 - This is the first time we have had such great data on I-605 since we started keeping track in January of 2016



Detector by Day Report – Trends and Details

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3. 39 AZUSA1 HV 3. 39 AZUSA2 HV 3. 31 AZUSA2 ML 3. 32 AZUSA2 ML 3. 39 AZUSA2 ML 3. 39 AZUSA2 ML 3. 39 AZUSA2 ML 3. 39 AZUSA2 ML 2. 40 PASADENAA. ML 4. 40 CITRUSS1 HV 4. 40 CITRUS2 ML 4. 40 CITRUS2 HL 4. 40 CITRUS2 HL 4. 40 CITRUS2 HV 4. 40 CITRUS2 HL 4. 40 CITRUS2 HV 4. 41 EB204WOD ML 4. 41 FB204WOD ML	42 R3 39 AZUSA SP	FR									
12. 39 AZUSANB OR 13. 39 AZUSA2 HV 13. 39 AZUSA2 HV 13. 30 AZUSA2 HV 13. 40 PASADENAA HV 14. 40 CITRUSSB OR 4 40 CITRUSSB FR 4 40 CITRUSS HV 4 41 EP230-WOO ML		HV									
12. 39 AZUSA 2 HV 3. 39 AZUSA 2 HV 3. 40 PASADENAA HV 3. 40 PIRISEN AL. ML 4. 40 CITRUSS NL 4. 40 CITRUSS FR 4. 40 CITRUSS FR 4. 40 CITRUSS HV 4. 40 CITRUSS ML 4. 40 CITRUSS HV 4. 41 EP230-WOO ML	42R3 39 AZUSA NB	OR				100 C					
13: 39. AZUSA2 ML 12: 40. PASADENAA. HV 12: 40. PASADENAA. ML 14: 40 CITRUSSE OR 14: 40 CITRUSSE FR 14: 40 CITRUSSE FR 14: 40 CITRUSSE FR 14: 40 CITRUSSE HV 14: 40 CITRUSSE HV 14: 40 CITRUSSE HV 14: 40 CITRUSSE HV	42R3 39 AZUSA 2	HV									
12. 40 PASADENAA HV 12. 40 CITRUSSE OR 4 40 CITRUSSE OR 4 40 CITRUSSE FR 4 40 CITRUSSE FR 4 40 CITRUSSE ML 4 40 CITRUSSE MV 4 40 CITRUSSE HV 4 40 CITRUSSE HV 4 40 CITRUSSE HV 4 41 EFE210-WOO ML	42R3 39 AZUSA 2	ML									
12. 40 CITRUSS R 14. 40 CITRUSS R 14. 40 CITRUSS R 14. 40 CITRUSS R 14. 40 CITRUSS ML 14. 40 CITRUSS ML 14. 40 CITRUSS ML 14. 40 CITRUSS HV 14. 40 CITRUSS R 14. 40 CITRUSS HV 14. 40 CITRUSS R 14. 40 CITRUSS V 15. V 1	21R3 40 PASADENA A	HV									
AL 40 CITRUSS B OR AL 40 CITRUSS HV AL 40 CITRUSS R AL 40 CITRUSS ML AL 40 CITRUSS ML AL 40 CITRUSS ML AL 40 CITRUSS HV AL 40 CITRUSP OR AL 41. EB250-WOO ML AL 41. EB250-WOO ML	21R3 40 PASADENA A	ML									
AL. 40 CIRUS1 HV AL. 40 CIRUS1 ML AL. 40 CIRUS2 ML AL. 41 EB204WOD ML AL. 41 FE204WOD ML	42R4 40 CITRUS SB	OR									
4. 40 CITRUS1 ML 4. 40 CITRUS2 ML 4. 40 CITRUS2 HV 4. 40 CITRUSA B OR 4. 41 EP210-WO ML 4. 41 EP210-WO ML	42	HV									
14. 40 CITRUS2 ML 14. 40 CITRUS2 HV 14. 40 CITRUSN OR 14. 41. E/2210-WO ML 14. 11. E/2210-WO HV	42	MI									
44. 40 CITRUS2 HV 44. 40 CITRUSNE OR 44. 41E/2210-W/O ML 4. 41E/2210-W/O HV	42 R4 40 CITRUS 2	ML									
14. 40 CITRUSNE OR 14. 41. EP 210-WO ML 14. 41. EP 210-WO ML	42R4 40 CITRUS 2	HV									
4. 41. E/8210-WO ML 4. 41. E/8210-WO HV	42R4 40 CITRUS NB	OR									
4. 41. E/B210-W/O HV	21R4 41 E/B 210-W/O	ML									
	21R4 41 E/B 210-W/O	HV									×

- Green: Data appear usable
- Yellow: Available but unclassified
- Orange: Suspicious and outside expected pattern
- Black: Missing



Data Collection for cities and county

Arcadia

Weekly Data Quality (%)	D	etour Rout	es
	Good	Bađ	No Data
20-Aug-2017 To 26-Aug-2017	79.19	14.42	6.39
27-Aug-2017 To 02-Sep-2017	78.28	15.33	6.39

- Pasadena Good conversation with Pasadena and McCain.
 Working on weekly data feeds.
- County, Monrovia, Duarte We are now collecting and processing data from the IEN



LACO August Summary - Connection

- The connection for LACO was not very stable in the past weeks as the County was performing tests on the KITS server during that time period.
- We had another connection downtime on August 8th while fixing a bug at our end.
- The number of available detectors is about 9100 for LACO when the connection is good.
- The device update response time is about 25 to 40 seconds for LACO.



Mapping of LACO detectors

- According to the detector inventory information from the IEN, we were able to create the geometry mapping of 600 detectors at 56 intersections which are within the I-210 corridor.
- We also used Street View in Google Maps to obtain more detailed information of these detectors, which includes
 - Detector type
 - Detected traffic movements
 - Detector length
 - Distance to stopbar
 - Number of lanes



Example: Intersection 330 -- Live Oak@Myrtle/Peck



Example of detailed detector information

	Intersection				Sensor		Detector	Distance To	Number Of	
Intersection Name	ID	County	Road Name	Direction	ID	Movement	Length	Stopbar (ft)	Lane	Note
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	EB	7252	Advanced	24	235	5	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	EB	7253	Advanced	24	235	; :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	EB	7256	Left Turn	26	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	EB	7254	Through	39	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	EB	7255	Through	39	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	WB	7262	Advanced	24	270)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	WB	7263	Advanced	24	270)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	WB	7266	Left Turn	39	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	WB	7264	Through	26	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Live Oak Ave	WB	7265	Through and Right Tur	ı 26	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Myrtle Ave	SB	7257	Advanced	10	245	; :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Myrtle Ave	SB	7258	Advanced	10	245	; :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Myrtle Ave	SB	7261	Left Turn	39	C) :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Myrtle Ave	SB	7259	Through	39	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Myrtle Ave	SB	7260	Through and Right Tur	ı 39	C) :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Peck Rd	NB	2593	Advanced	10	285	; :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Peck Rd	NB	7248	Advanced	10	285	; :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Peck Rd	NB	7251	Left Turn	58	C) :	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Peck Rd	NB	7249	Through	26	C)	1 NA
Live_Oak_Ave_at_Myrtle_Ave_Peck_Rd	330	LACO	Peck Rd	NB	7250	Through and Right Tur	ı 26	C)	1 NA



Analysis of detector data

• Diagnostic states (Detector errors)

- Missing data
- Zero values
- High values
- Constant values
- Inconsistent values (between flow and occupancy)

• A detector is "Good" when the following criteria are met:

- Missing data <=5%
- Maximum length of "Zero values" <=4 hours
- High values <=5%
- No constant values
- Inconsistent values <=5%

• System performance metrics

- Average health rate
- Always working/failed



System Performance: Average health rate

The network-wide health rate was about 60% on a normal day.



Network-Wide Health Rate: LACO



System Performance: Always working/failed

- More than 150 detectors were always failed.
- All other detectors were failed for at least 12 days.



Available signal information

- We only get very limited signal information from the IEN for the intersections in LACO
 - E.g., Timing Plan, Desired Cycle Length, Desired Offset, and Control Mode

🕩 OrgID	h DeviceID	둼 LastUpdate	🕩 Date	🚹 Time	CommState	🕩 SignalState	📑 TimingPlan	DesiredCycleLength	DesiredOffset	둼 ActualOffset	ControlMode
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:38:12'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:38:12'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:38:12'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:38:12'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:41:53'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:41:53'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:41:53'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
'29:1'	'604'	'/2017.08.02/1	'2017.08.02'	'16:41:53'	'GOOD'	'NORMAL_OP	'3'	'120'	'112'	'0'	'ACTUATED'
LAC											

• We can get the planned/actual phase times from the IEN for Arcadia, but not for LACO.

<u>_</u> h 0	rgID	DeviceID	둼 LastUpdate	Date	🔥 Time	LastCycle	ch PhaseTime
5:1'		'6082'	'/2017.08.02/0	'2017.08.02'	'08:34:30'	'120'	'1:0;2:77;3:0;4:33;5:7;6:66;7:0;8:33;9:0;10:0;11:0;12:0;13:0;14:0;15:0;16:0;'
'5:1'		'6082'	'/2017.08.02/0	'2017.08.02'	'08:35:00'	'120'	'1:0;2:77;3:0;4:33;5:7;6:66;7:0;8:33;9:0;10:0;11:0;12:0;13:0;14:0;15:0;16:0;'
'5:1'		'6082'	'/2017.08.02/0	'2017.08.02'	'08:35:30'	'120'	'1:10;2:63;3:0;4:33;5:6;6:67;7:0;8:33;9:0;10:0;11:0;12:0;13:0;14:0;15:0;16:0;'
'5:1'		'6082'	'/2017.08.02/0	'2017.08.02'	'08:36:00'	'120'	'1:10;2:63;3:0;4:33;5:6;6:67;7:0;8:33;9:0;10:0;11:0;12:0;13:0;14:0;15:0;16:0;'
'5:1'		'6082'	'/2017.08.02/0	'2017.08.02'	'08:36:31'	'120'	'1:10;2:63;3:0;4:33;5:6;6:67;7:0;8:33;9:0;10:0;11:0;12:0;13:0;14:0;15:0;16:0;'
5:1'		'6082'	'/2017.08.02/0	'2017.08.02'	'08:37:01'	'120'	'1:10;2:63;3:0;4:33;5:6;6:67;7:0;8:33;9:0;10:0;11:0;12:0;13:0;14:0;15:0;16:0;'

Arcadia



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Data Hub and Cloud

ICM in AWS

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ICM in AWS

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How are pipelines and DSS/DH/CMS actions coordinated

Data Hub Command Gateway

- Orchestration of pipelines start, stop, status
- Workflow management
 - Data hub
 - Manage requests from CMS
 - Manage CMS/DSS/Data Hub workflows
 - Incident management
 - Restart/Stop/Start service requests
 - Operational requests
 - SEDA Staged Event Driven Architecture





Data Hub Command Gateway - design





Other Activities Underway

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- Successfully held Amazon cloud introductory meeting
- CloudFormation AWS deployment automation
- Testing Jmeter automated testing being developed
- Security design and implementation activities
 - Securely encrypt database privileges
 - IAM security roles least privilege
 - Database roles/privileges specific to service requirements
- Beginning discussions with vendors for C2C communications, TMDD modifications, interface definitions



Corridor Model update

Modeling and Response Planning

102

- Inventory list completed: required flush plans enumerated for 80 reroute segments using 148 signalized intersections and about 274 plans
- AM simulation period extended to run from 6 am to 11 am
- Continued refinement of meso-model





- Calibration mainly complete for afternoon peak (1 PM to 9 PM)
 - Specific traffic demand profile for each one-hour period
 - Passenger cars
 - HOV vehicles
 - Medium and heavy trucks
- Next stage: Complete calibration for 5 AM – 1 PM period





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Comparison of freeway mainline and ramps flows



Specific 1-hour periods





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Specific flow profile comparison examples



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□ Simulation example: Traffic density – 2 PM





107

□ Simulation Example: Traffic density – 3 PM





108

□ Simulation example: Traffic density – 5 PM




109

□ Simulation example: Traffic density – 8 PM





110

□ Example 2: Speeds relative to speed limit – 1 PM





111

□ Example 2: Speeds relative to speed limit – 5 PM





112

Example 2: Speeds relative to speed limit – 6 PM





113

Example 2: Speeds relative to speed limit – 7 PM





114

Example 2: Speeds relative to speed limit – 8 PM





115

Example 2: Speeds relative to speed limit – 9 PM





Thank You and **Next Meeting** (Suggest Oct 24th) in Arcadia?)