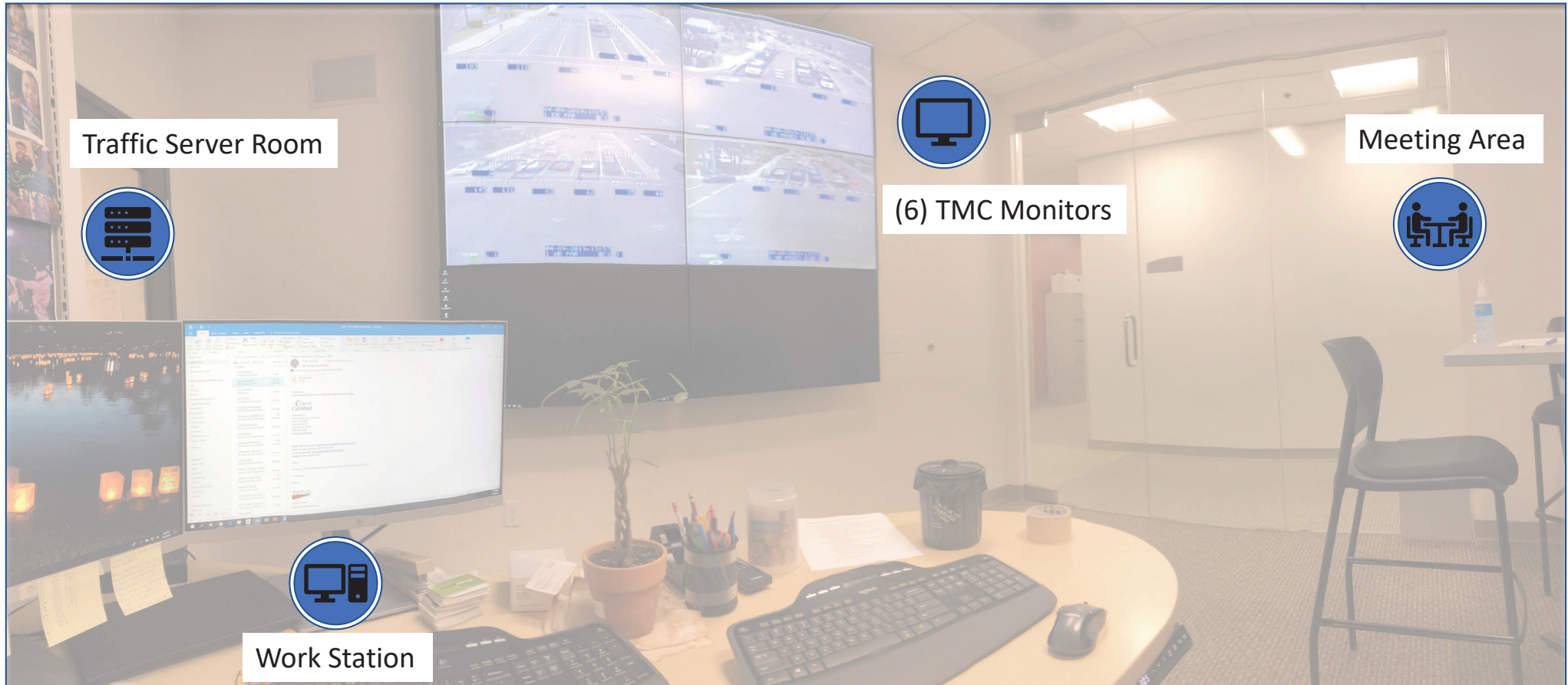


Novel ITS for School Safety City of Carlsbad

Mr. Tam Tran, Traffic Systems Operations Specialist

City of Carlsbad Traffic Management Center



City of Carlsbad Field Equipment Assets

Detection Camera



EVP IR / GPS



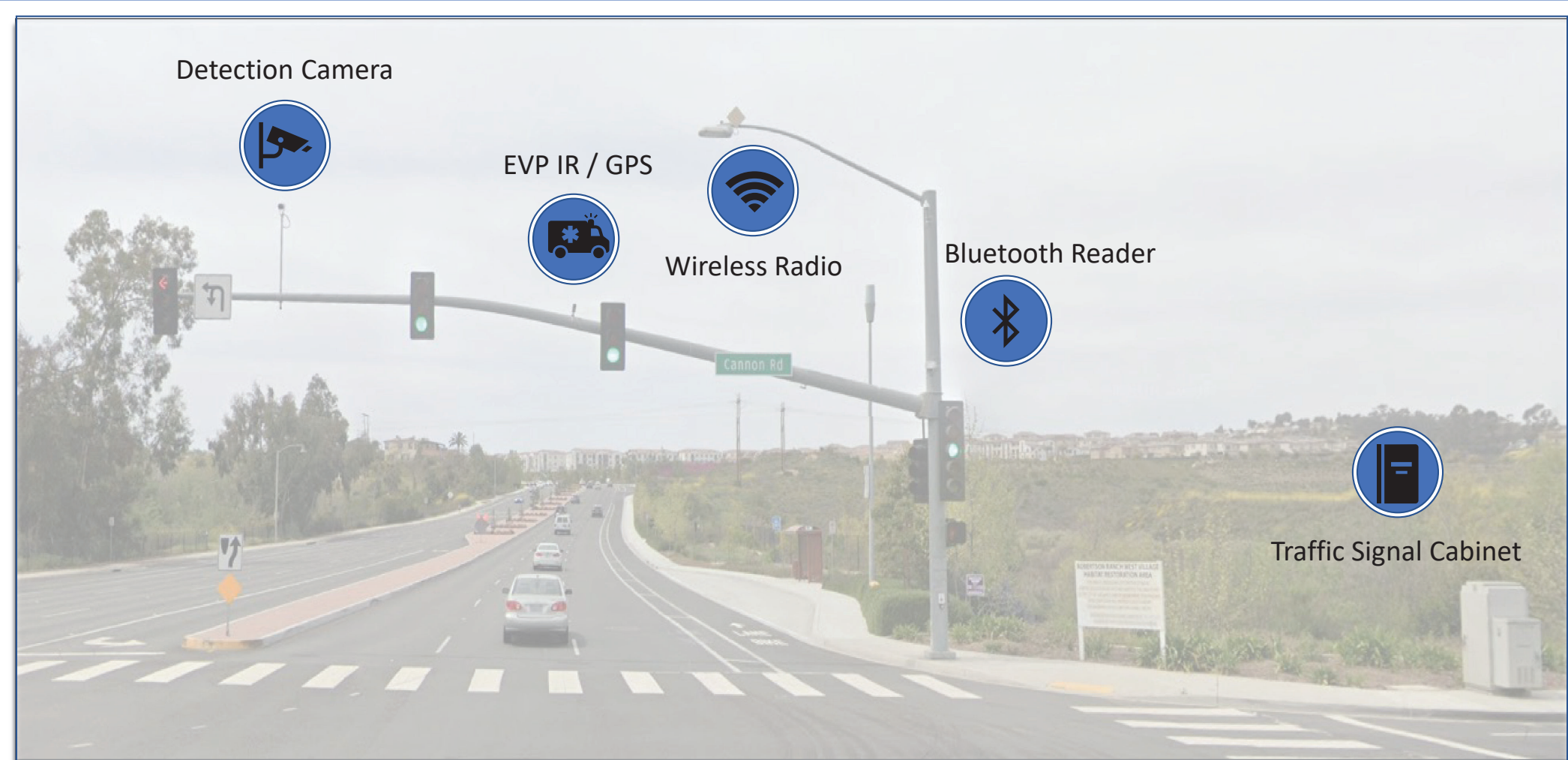
Wireless Radio



Bluetooth Reader

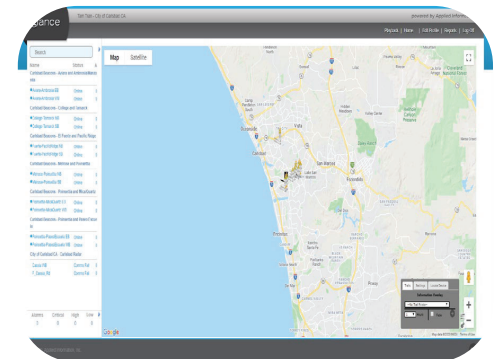
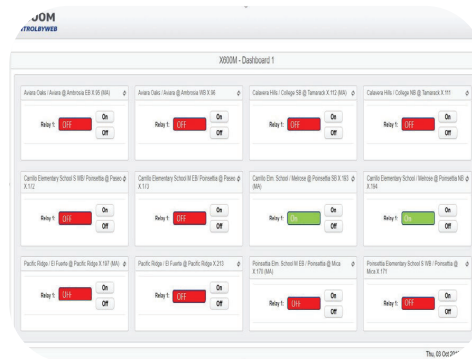


Traffic Signal Cabinet



Traffic System Operations Assets

- 179 Traffic Signals
- 37 BlueTOAD (Bluetooth Reader)
- 20 Rectangular Rapid Flashing Beacons
- 5 CCTV
- 400+ Video Detection Cameras
- 12 School Zone Flasher
- 28 Radar Speed Feedback Signs



Issues with School Flasher Timeclock



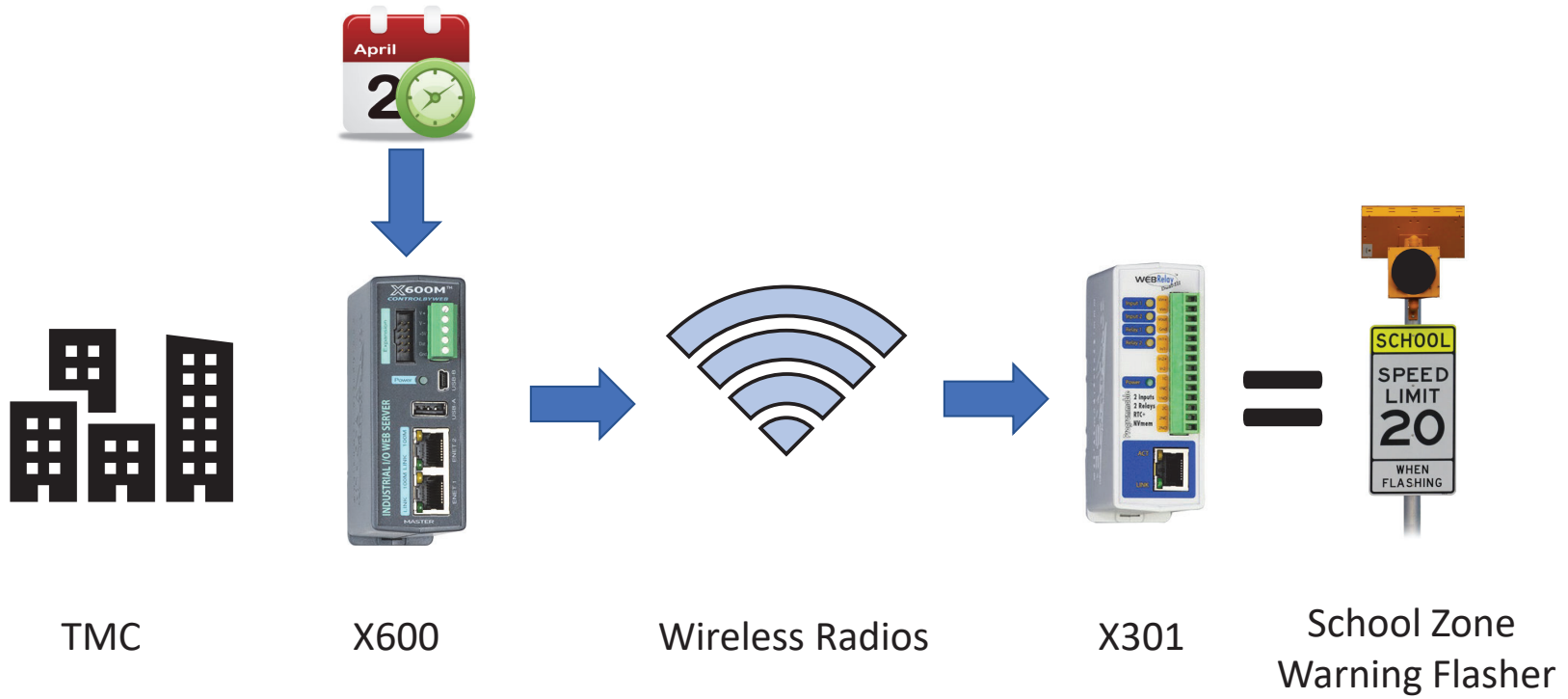
- Out dated
- Unsynchronized timeclock
- Program on-site
- Unable to check on status from TMC (No Dashboard)
- No ethernet ports
- ~18K to upgrade
- Close system, no API

School Zone Flasher Replacement: Web Relay



- WebUI Application
- Operation Dashboard
- Ethernet port
- ~3K to upgrade
- Open system with API

Web Relay Operation Process



Web Relay School Flashers Dashboard

X600M
CONTROLBYWEB

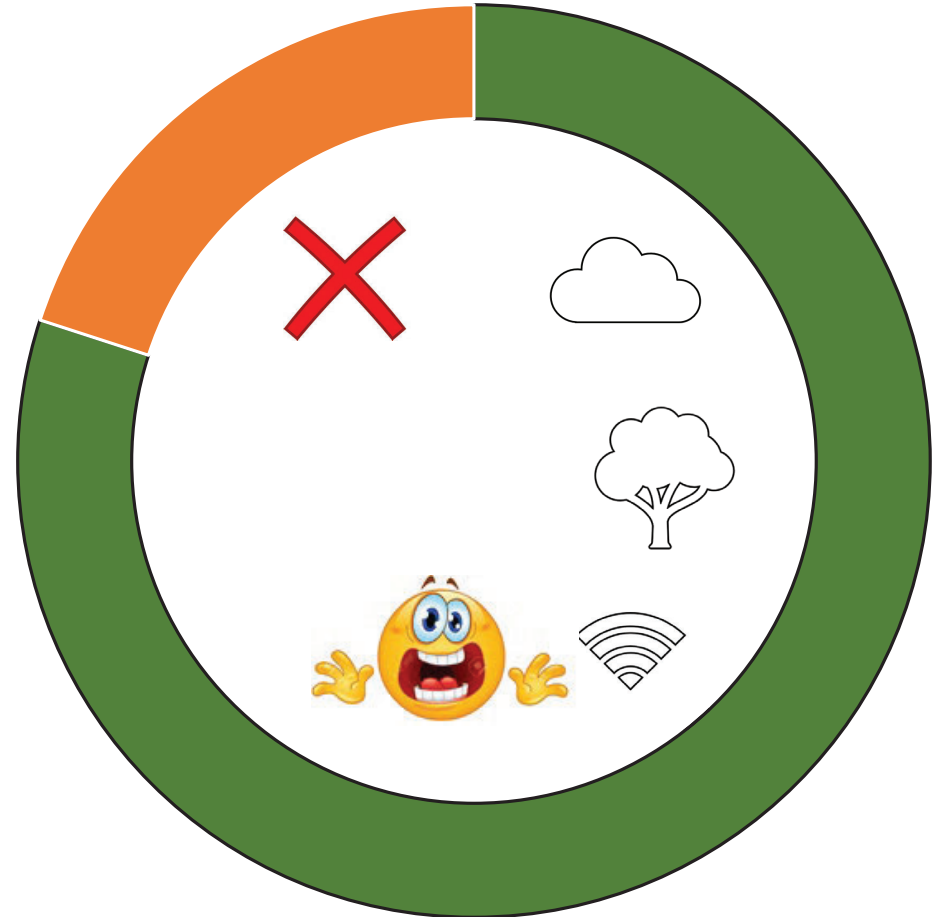
X600M - Dashboard 1

Aviara Oaks / Aviara @ Ambrosia EB X.95 (MA)	Aviara Oaks / Aviara @ Ambrosia WB X.96	Calavera Hills / College SB @ Tamarack X.112 (MA)	Calavera Hills / College NB @ Tamarack X.111
Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>
Carrillo Elementary School S WB/ Poinsettia @ Paseo X.172	Carrillo Elementary School M EB/ Poinsettia @ Paseo X.173	Carrillo Elm. School / Melrose @ Poinsettia SB X.193 (MA)	Carrillo Elementary School / Melrose @ Poinsettia NB X.194
Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: On <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: On <input type="button" value="On"/> <input type="button" value="Off"/>
Pacific Ridge / El Fuerte @ Pacific Ridge X.197 (MA)	Pacific Ridge / El Fuerte @ Pacific Ridge X.213	Poinsettia Elm. School M EB / Poinsettia @ Mica X.170 (MA)	Poinsettia Elementary School S WB / Poinsettia @ Mica X.171
Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>	Relay 1: OFF <input type="button" value="On"/> <input type="button" value="Off"/>

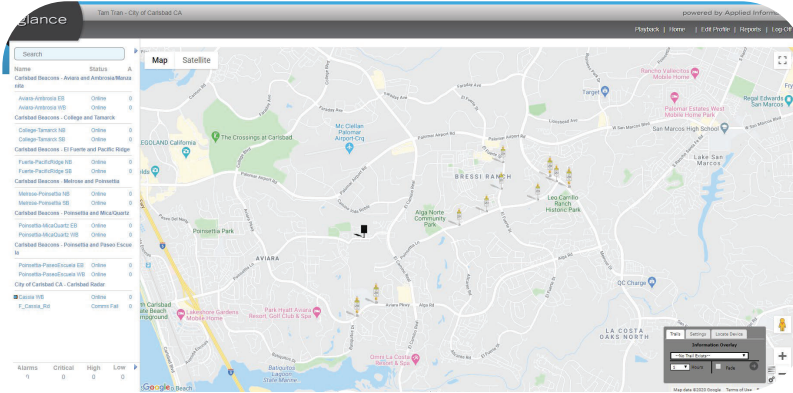
Thu, 03 Oct 2019 08:03:02

Web Relay School Flashers Issues

- Not enough sun to charge the solar battery
 - Consecutive cloudy days
 - Shades and overgrown trees
- Power consumption from wireless radio/s
- Lack of system performance monitoring tool
 - Lamp status
 - Solar panels
 - Communication reliability
 - No reports



Applied Information System Overview



- Manage Radar Speed Feed Sign & School Zone Flasher
- WebUI Application
- Operation Dashboard
- Open system with API
- Data ownership
- Low power consumption
- Monitoring tools

« Prev | Next »
College-Tamarack NB [Edit] [Refresh]

Current Status: Online
 Current Alerts: Calavera Hills X to B
 Current Schedule: OK
 Power Status: OK
 Current Device Status: 4 Hours
 Timezone: 16 Minutes 23 Seconds
 Time Since Last Contact: 2/26/2020 11:18:12 PM

	Now	Min	Max	Avg
AC Voltage (V)	115.3	111.6	116.0	113.8
Monitor Battery (V)	1.8	1.5	1.6	1.5

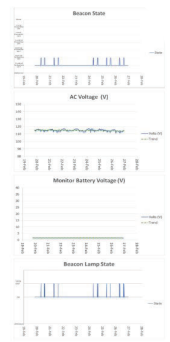
Status: Closed
 Cabinet Door: Central Schedule - OFF
 Beacon Status: OK
 Lamp Status: Inputs

Beacon Control
 On
 Off
 Schedule

Next Scheduled Event...

Time	Schedule
7:00 AM Thursday, February 27, 2020	Beacon ON
8:05 AM Thursday, February 27, 2020	Beacon OFF
1:10 PM Thursday, February 27, 2020	Beacon ON
2:42 PM Thursday, February 27, 2020	Beacon OFF
7:00 AM Friday, February 28, 2020	Beacon ON
8:05 AM Friday, February 28, 2020	Beacon OFF
2:23 PM Friday, February 28, 2020	Beacon ON

[More Details](#)



Applied Information (Glance) System Map

glance

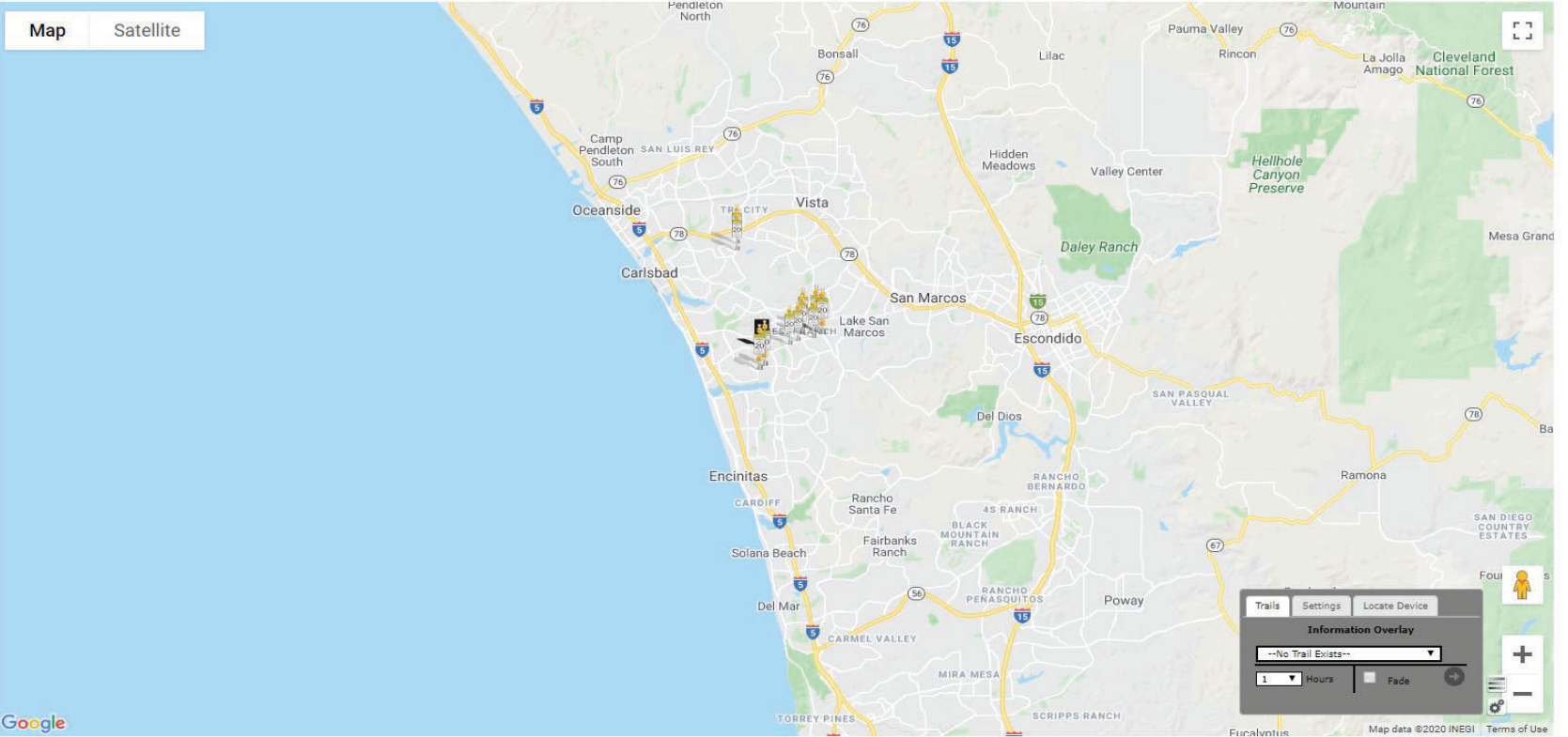
Tam Tran - City of Carlsbad CA

powered by Applied Information

[Playback](#) | [Home](#) | [Edit Profile](#) | [Reports](#) | [Log-Off](#)

Search

Name	Status	A
Carlsbad Beacons - Aviara and Ambrosia/Manzanita		
• Aviara-Ambrosia EB	Online	0
• Aviara-Ambrosia WB	Online	0
Carlsbad Beacons - College and Tamarck		
• College-Tamarck NB	Online	0
• College-Tamarck SB	Online	0
Carlsbad Beacons - El Fuerte and Pacific Ridge		
• Fuerte-PacificRidge NB	Online	0
• Fuerte-PacificRidge SB	Online	0
Carlsbad Beacons - Melrose and Poinsettia		
• Melrose-Poinsettia NB	Online	0
• Melrose-Poinsettia SB	Online	0
Carlsbad Beacons - Poinsettia and Mica/Quartz		
• Poinsettia-MicaQuartz EB	Online	0
• Poinsettia-MicaQuartz WB	Online	0
Carlsbad Beacons - Poinsettia and Paseo Escuela		
• Poinsettia-PaseoEscuela EB	Online	0
• Poinsettia-PaseoEscuela WB	Online	0
City of Carlsbad CA - Carlsbad Radar		
Cassia WB	Comms Fail	0
F_Cassia_Rd	Comms Fail	0



Alarms	Critical	High	Low
0	0	0	0



Applied Information (Glance) System Scheduling

[Select All] | [Deselect All]
 Carlsbad Beacons - Aviara and Ambrosia/Manzanita [-]

- Aviara-Ambrosia EB
- Aviara-Ambrosia WB

Carlsbad Beacons - College and Tamarck [-]

- College-Tamarck NB
- College-Tamarck SB

Carlsbad Beacons - El Fuerte and Pacific Ridge [-]

- Fuerte-PacificRidge NB
- Fuerte-PacificRidge SB

Carlsbad Beacons - Melrose and Poinsettia [-]

- Melrose-Poinsettia NB
- Melrose-Poinsettia SB

Carlsbad Beacons - Poinsettia and Mica/Quartz [-]

- Poinsettia-MicaQuartz EB
- Poinsettia-MicaQuartz WB

Carlsbad Beacons - Poinsettia and Paseo Escuela [-]

- Poinsettia-PaseoEscuela EB
- Poinsettia-PaseoEscuela WB

City of Carlsbad CA [-]

City of Carlsbad CA - Carlsbad Beacons [-]
 City of Carlsbad CA - Carlsbad Radar [-]

- Cassia WB
- F_Cassia_Rd

City of Carlsbad CA - Carlsbad Uninstalled [-]

Scenario Scheduling Holidays & Exceptions Program Delay Radar

List of Schedules

1	Aviara Oaks Elementary School	
2	Schedule 2	
3	Schedule 3	
4	Schedule 4	
5	Schedule 5	
6	Schedule 6	
7	Schedule 7	
8	Schedule 8	
9	Schedule 9	
10	Schedule 10	
11	Schedule 11	

Clear Selected

Save

Save & Publish

1 - Aviara Oaks Elementary School

	M	D	Days	Time	Command	Edit
1	ALL	ALL	MTWTF	07:30:00	Beacon ON	
2	ALL	ALL	MTWTF	08:15:00	Beacon OFF	
3	00:00:00		
4	ALL	ALL	...T...	13:35:00	Beacon ON	
5	ALL	ALL	...T...	14:35:00	Beacon OFF	
6	00:00:00		
7	ALL	ALL	MTW.F	14:30:00	Beacon ON	
8	ALL	ALL	MTW.F	15:30:00	Beacon OFF	

Applied Information (Glance) System Report

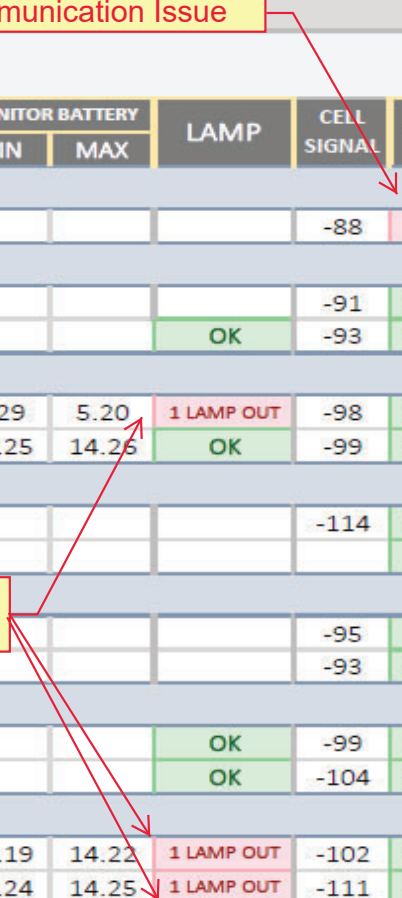
Beacon Health Report for Carlsbad Beacons

Communication Issue

26 November, 2019 06:16 AM

BUSINESS	DEVICE	SYSTEM VOLTAGE (AVG)			SOLAR ARRAY VOLT (AVG)			AC VOLTAGE			MONITOR BATTERY		LAMP	CELL SIGNAL	Comm Reliability %
		MIN	MAX	STATE	MIN	MAX	STATE	MIN	MAX	STATE	MIN	MAX			
City of Carlsbad CA: Carlsbad Beacons															
OFFLINE	Melrose-Poinsettia NB - RMA (12844)													-88	0%
Carlsbad Beacons: Aviara and Ambrosia/Manzanita															
ONLINE	Aviara-Ambrosia EB (12838)	12.99	14.37	GOOD	0.00	20.07	GOOD							-91	100%
ONLINE	Aviara-Ambrosia WB (12839)	12.57	14.91	GOOD	1.61	19.87	GOOD					OK		-93	100%
Carlsbad Beacons: College and Tamarck															
ONLINE	College-Tamarck NB (12840)							112.34	116.37	GOOD	4.29	5.20	1 LAMP OUT	-98	100%
ONLINE	College-Tamarck SB (12841)							112.92	117.10	GOOD	14.25	14.26	OK	-99	100%
Carlsbad Beacons: El Fuerte and Pacific Ridge															
ONLINE	Fuerte-PacificRidge NB (12842)	12.20	13.97	GOOD	13.00	14.88	GOOD							-114	100%
ONLINE	Fuerte-PacificRidge SB (12843)	12.20	14.19	GOOD	0.00	22.35	GOOD								98%
Carlsbad Beacons: Melrose and Poinsettia															
ONLINE	Melrose-Poinsettia NB (8810)	12.47	13.94	GOOD	13.29	14.86	GOOD							-95	98%
ONLINE	Melrose-Poinsettia SB (12845)	10.62	12.92	BAD	11.43	13.81	GOOD							-93	100%
Carlsbad Beacons: Poinsettia and Mica/Quartz															
ONLINE	Poinsettia-MicaQuartz EB (12846)	12.86	14.00	GOOD	13.65	14.87	GOOD						OK	-99	100%
ONLINE	Poinsettia-MicaQuartz WB (12847)	12.75	14.21	GOOD	0.03	22.59	GOOD						OK	-104	100%
Carlsbad Beacons: Poinsettia and Paseo Escuela															
ONLINE	Poinsettia-PaseoEscuela EB (12848)							116.52	121.04	GOOD	14.19	14.22	1 LAMP OUT	-102	100%
ONLINE	Poinsettia-PaseoEscuela WB (12849)							116.13	120.75	GOOD	14.24	14.25	1 LAMP OUT	-111	100%

School Flash Beacon Lamp Condition



Applied Information (Glance) System Report 2

Beacon Health Report for Carlsbad Beacons

13 February, 2020 06:18 AM

BUSINESS	DEVICE	SYSTEM VOLTAGE (AVG)			SOLAR ARRAY VOLT (AVG)			AC VOLTAGE			MONITOR BATTERY		LAMP	CELL SIGNAL	Comm Reliability %
		MIN	MAX	STATE	MIN	MAX	STATE	MIN	MAX	STATE	MIN	MAX			
Carlsbad Beacons: Aviara and Ambrosia/Manzanita															
ONLINE	Aviara-Ambrosia EB (12838)	12.82	14.21	GOOD	0.00	20.65	GOOD						OK	-92	100%
ONLINE	Aviara-Ambrosia WB (12839)	12.23	14.71	GOOD	1.67	22.10	GOOD						OK	-91	100%
Carlsbad Beacons: College and Tamarck															
ONLINE	College-Tamarck NB (12840)							111.22	116.13	GOOD	1.53	1.55	OK	-98	100%
ONLINE	College-Tamarck SB (12841)							111.95	116.66	GOOD	14.24	14.27	OK	-101	100%
Carlsbad Beacons: El Fuerte and Pacific Ridge															
ONLINE	Fuerte-PacificRidge NB (12842)	12.08	14.27	GOOD	12.87	15.06	GOOD						OK	-111	100%
ONLINE	Fuerte-PacificRidge SB (12843)	12.16	14.24	GOOD	0.00	22.50	GOOD						OK	-112	100%
Carlsbad Beacons: Melrose and Poinsettia															
ONLINE	Melrose-Poinsettia NB (8810)	12.33	14.36	GOOD	13.15	15.10	GOOD						OK	-88	98%
ONLINE	Melrose-Poinsettia SB (12845)	11.82	12.71	GOOD	12.64	13.58	GOOD						OK	-101	100%
Carlsbad Beacons: Poinsettia and Mica/Quartz															
ONLINE	Poinsettia-MicaQuartz EB (12846)	12.77	14.05	GOOD	13.56	14.89	GOOD						OK	-99	100%
ONLINE	Poinsettia-MicaQuartz WB (12847)	12.68	14.24	GOOD	0.03	23.03	GOOD						OK	-106	100%
Carlsbad Beacons: Poinsettia and Paseo Escuela															
ONLINE	Poinsettia-PaseoEscuela EB (12848)							111.61	120.65	GOOD	14.19	14.22	OK	-103	100%
ONLINE	Poinsettia-PaseoEscuela WB (12849)							111.17	120.36	GOOD	14.24	14.26	OK	-109	100%

Applied Information (Glance) Speed Feedback Sign Report

Driver Feedback Report for [REDACTED]

1 October - 31 October, 2019 07:02 AM

[REDACTED] NB Daily Averages

DAY >	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Median Speed	43	46	45	45	45	46	46	45	45	45	45	45	45	44	44	45	45	45	44	45	45	44	46	46	45	45	46	45	45	43	47
85th Percentile	49	52	52	50	51	52	53	51	51	52	51	50	52	50	51	50	51	51	51	51	51	50	51	52	51	51	52	51	51	49	52
95th Percentile	54	55	55	54	55	55	56	56	54	55	54	55	55	54	55	53	55	55	54	55	55	53	54	55	54	55	55	54	54	53	55
Volume	65	50	52	48	39	33	47	50	51	52	51	40	34	50	50	51	51	50	32	32	48	49	52	50	49	34	34	48	52	51	4

[REDACTED] NB Median Speed (mph)

