Tackling Red Light Running Crashes- A Technology Blueprint

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Iteris

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The Problem in Lakeland, FL (Anecdotally)

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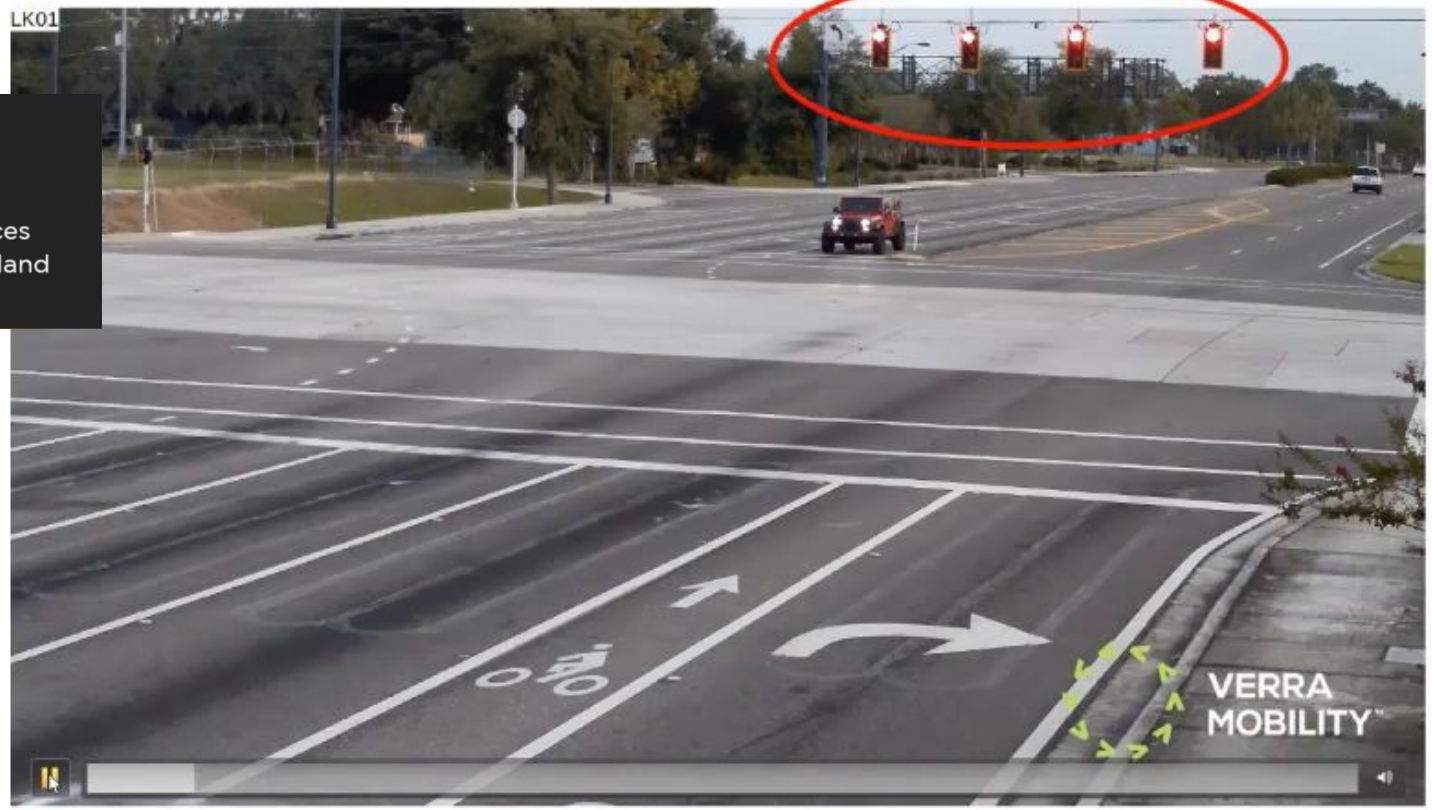
Memorial and Florida Avenue



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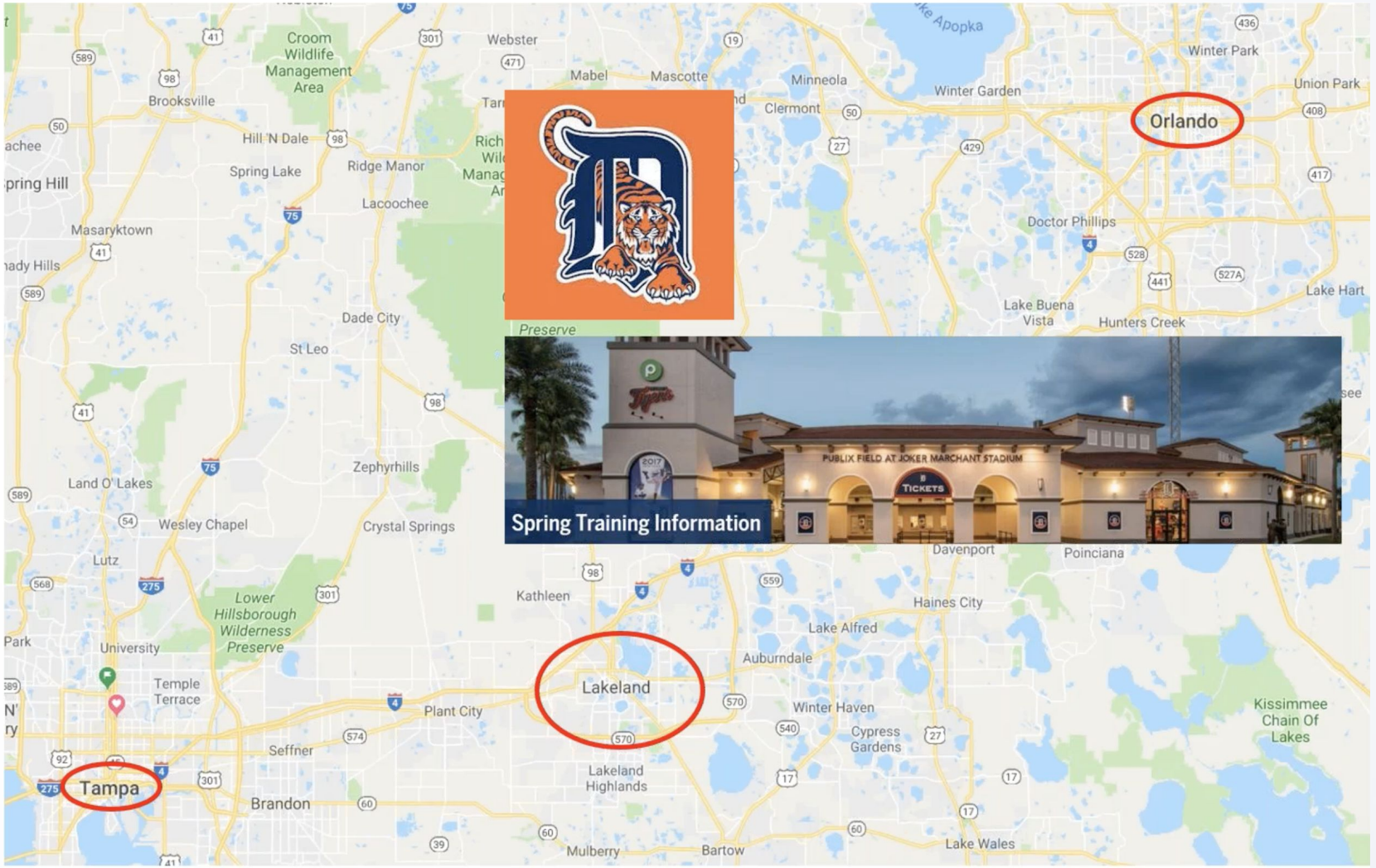
Lakeland, Florida

- 110k population
- 177 traffic signals



Step 1:

Quantify the Problem

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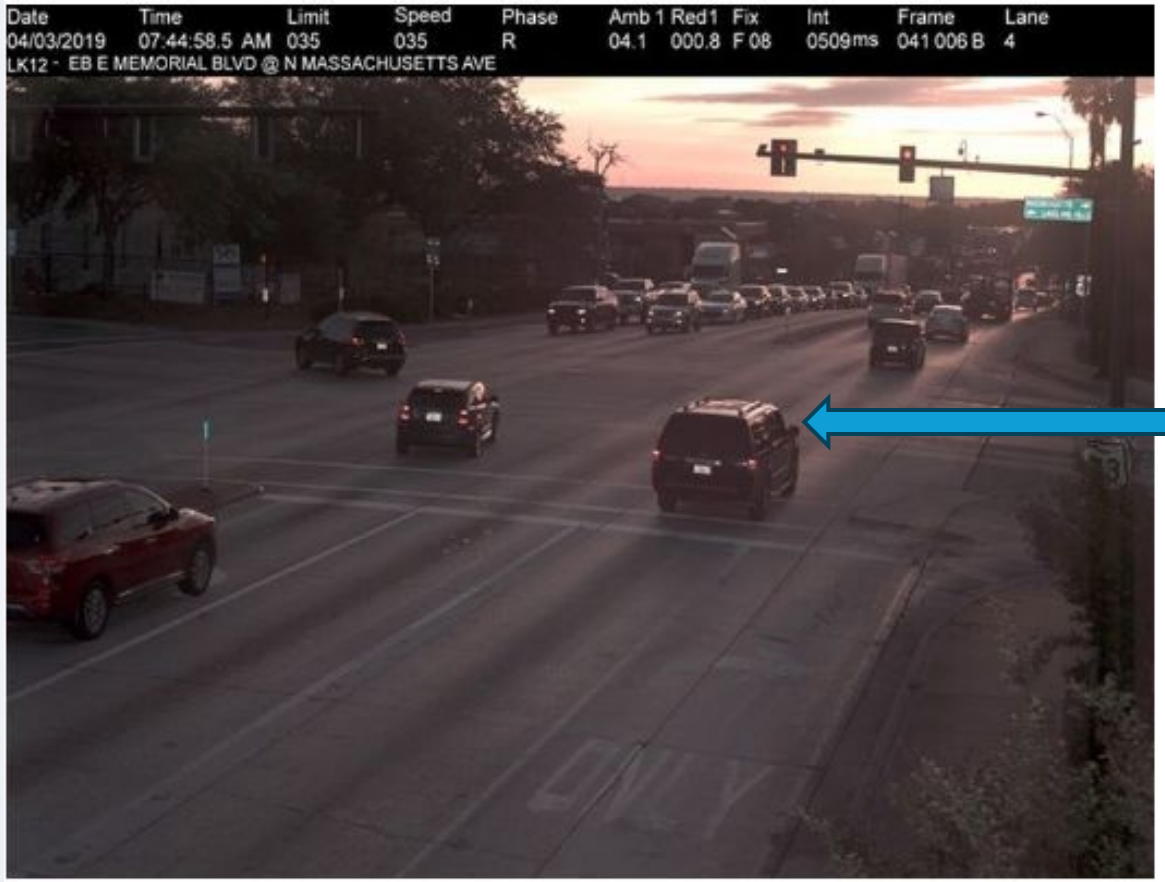
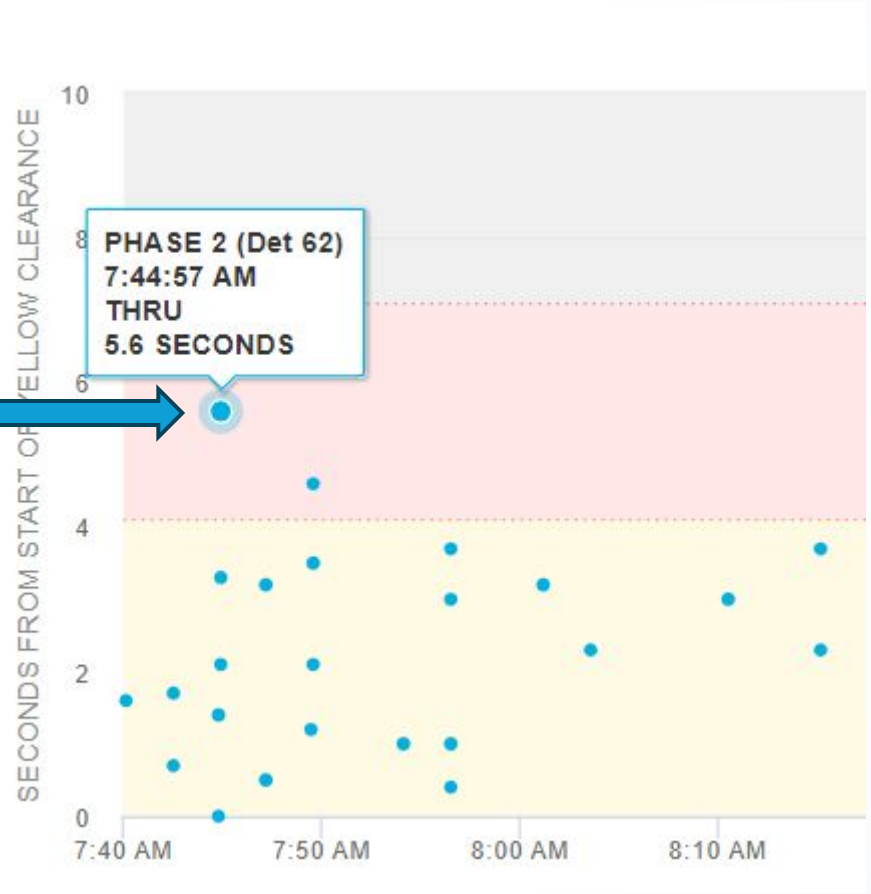
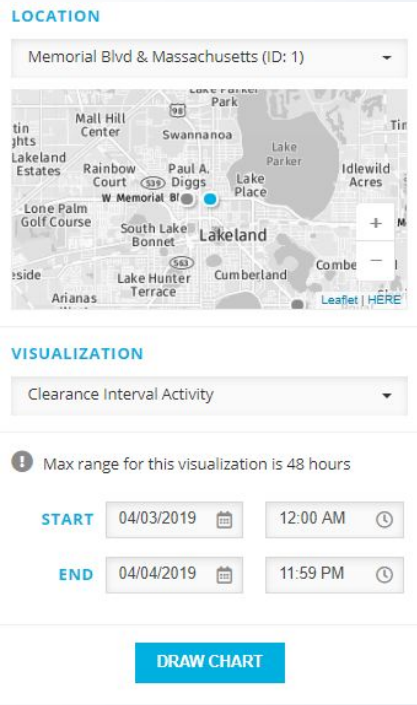
Building Trust in the Data:

Red light running cameras compared to Data from Signal Performance Measures







Red light running enforcement cameras decrease red light running crashes by 25% (TTI Study)

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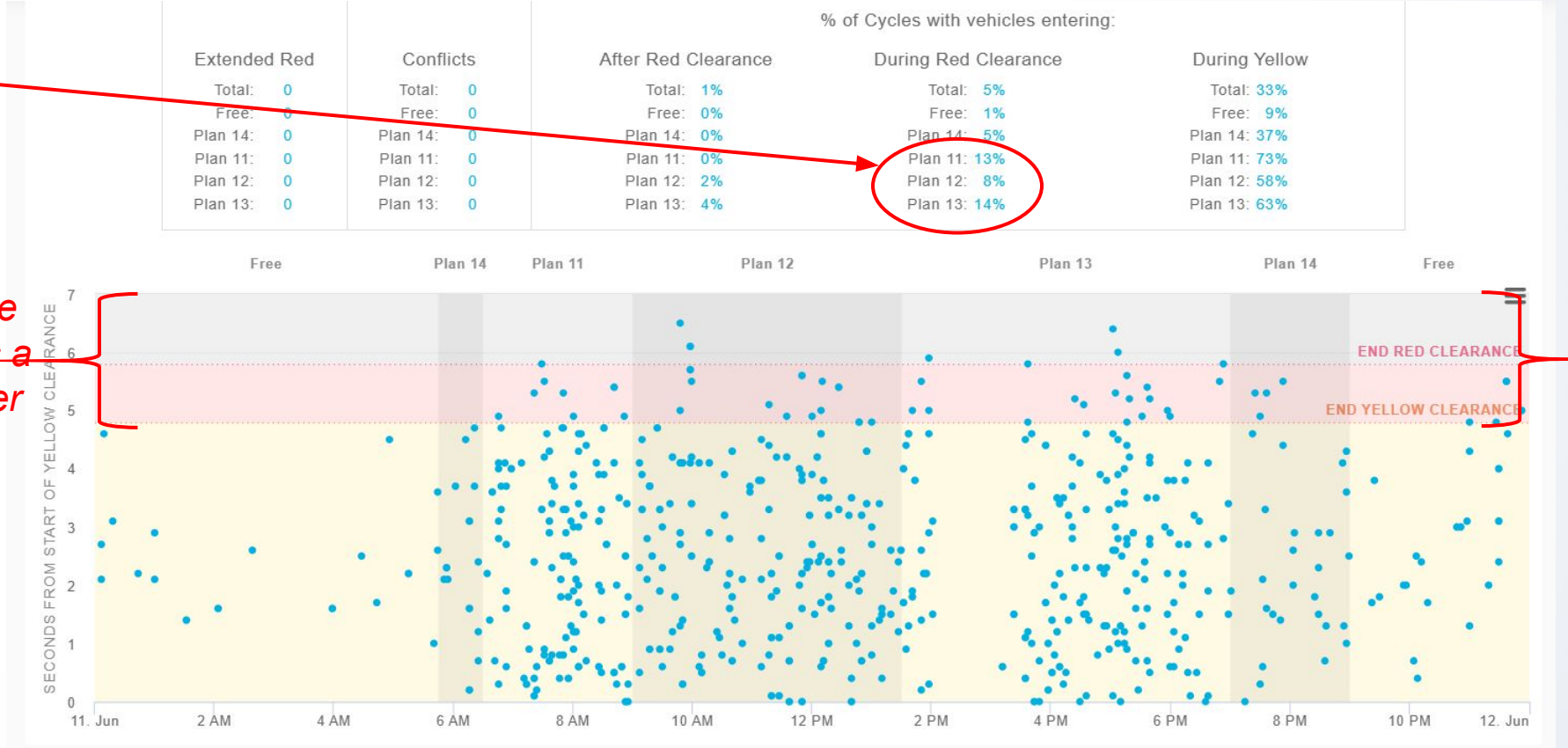
The Problem in Lakeland, FL (Quantitatively)

13-14% of cycles during the busy AM / PM peak period have red light runners

Each dot in the pink or grey is a red-light runner



Step 2:

Implement a countermeasure that addresses the problem

Red Extend Application

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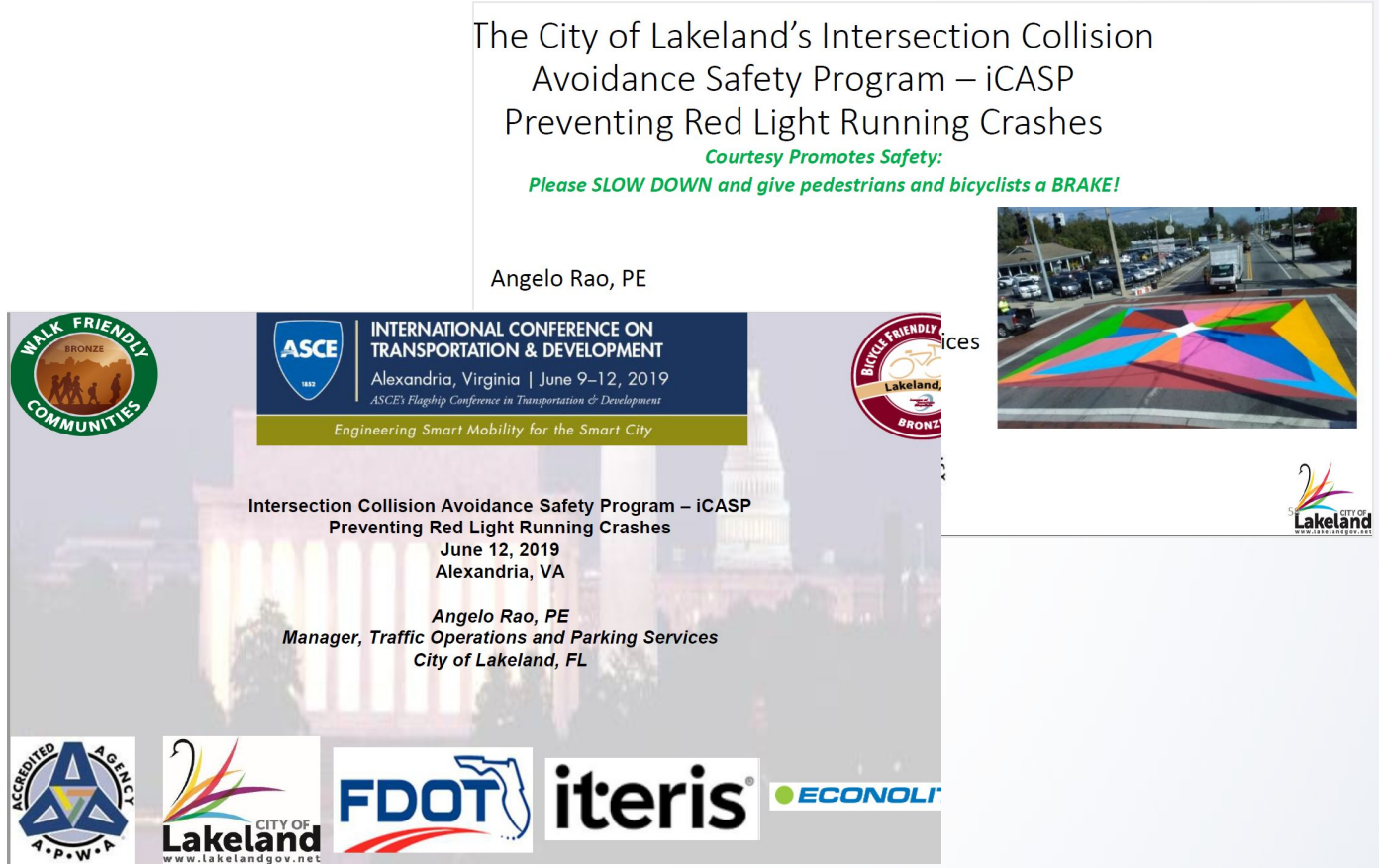
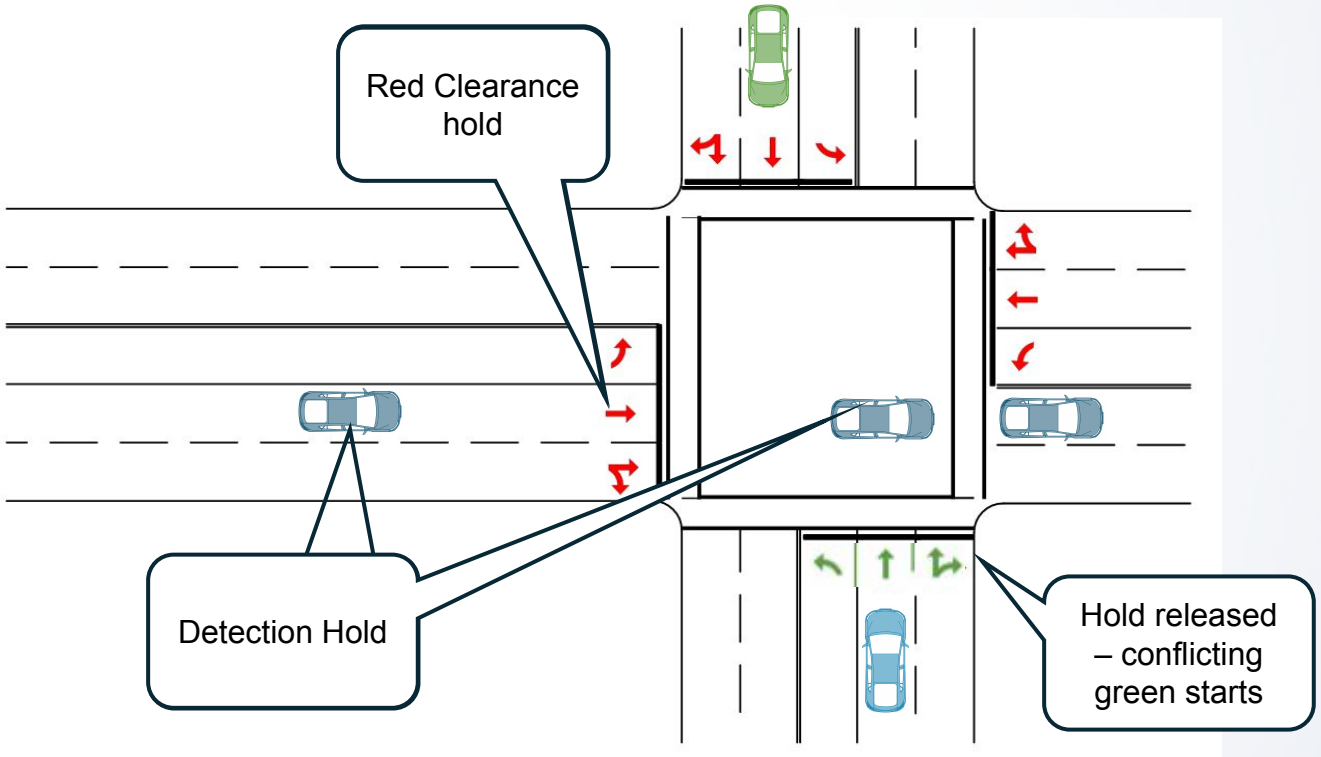
Lakeland FL – iCASP Program

- Lakeland started a program to investigate what can be done about this safety program
- Implemented technology to address the problem
  - Controller with Red Extension capabilities
  - Speed Sensitive Detection
- Data analytics to monitor performance



What is Red Extend (aka Red Protect)

- Detection system predicts Red Light Runner
- Controller doesn't start conflict phase until RLR is clear of intersection



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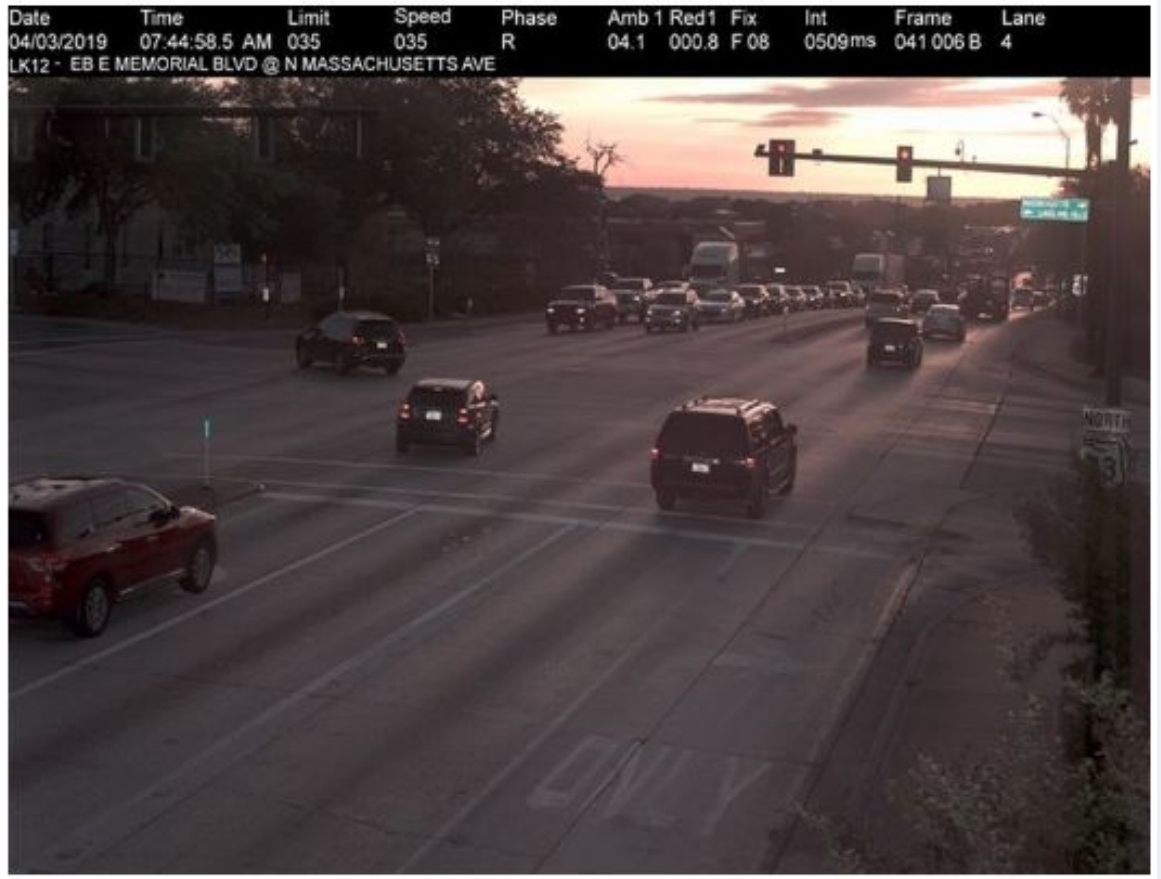
The Key: Predict a Red Light Runner

- Predict early enough to do something about it
- Use what we know about driver behavior
- Use data to customize for the intersection



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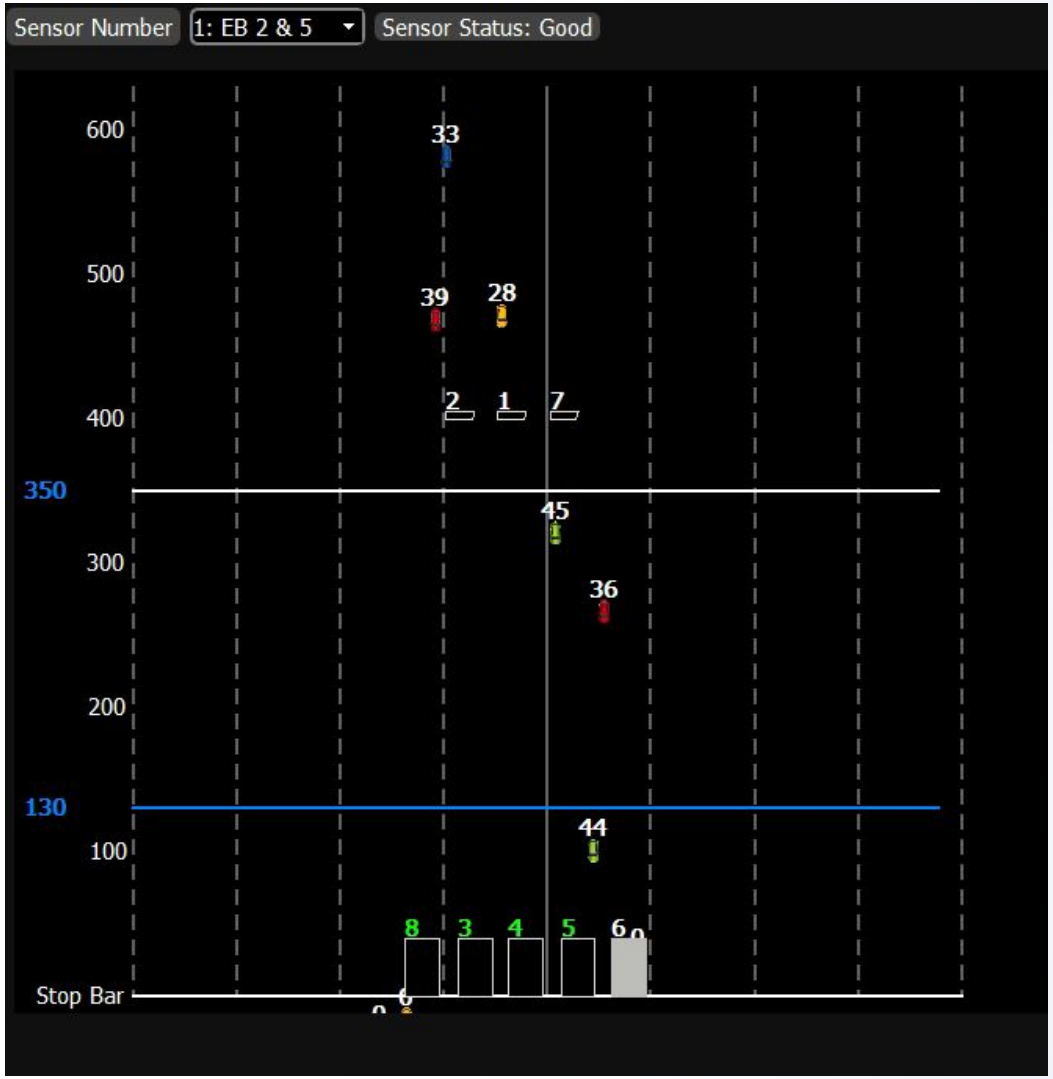
Radar Trip Lines for Red Extend

- Speed Sensitive Trip Line set at distance where faster vehicles won't stop

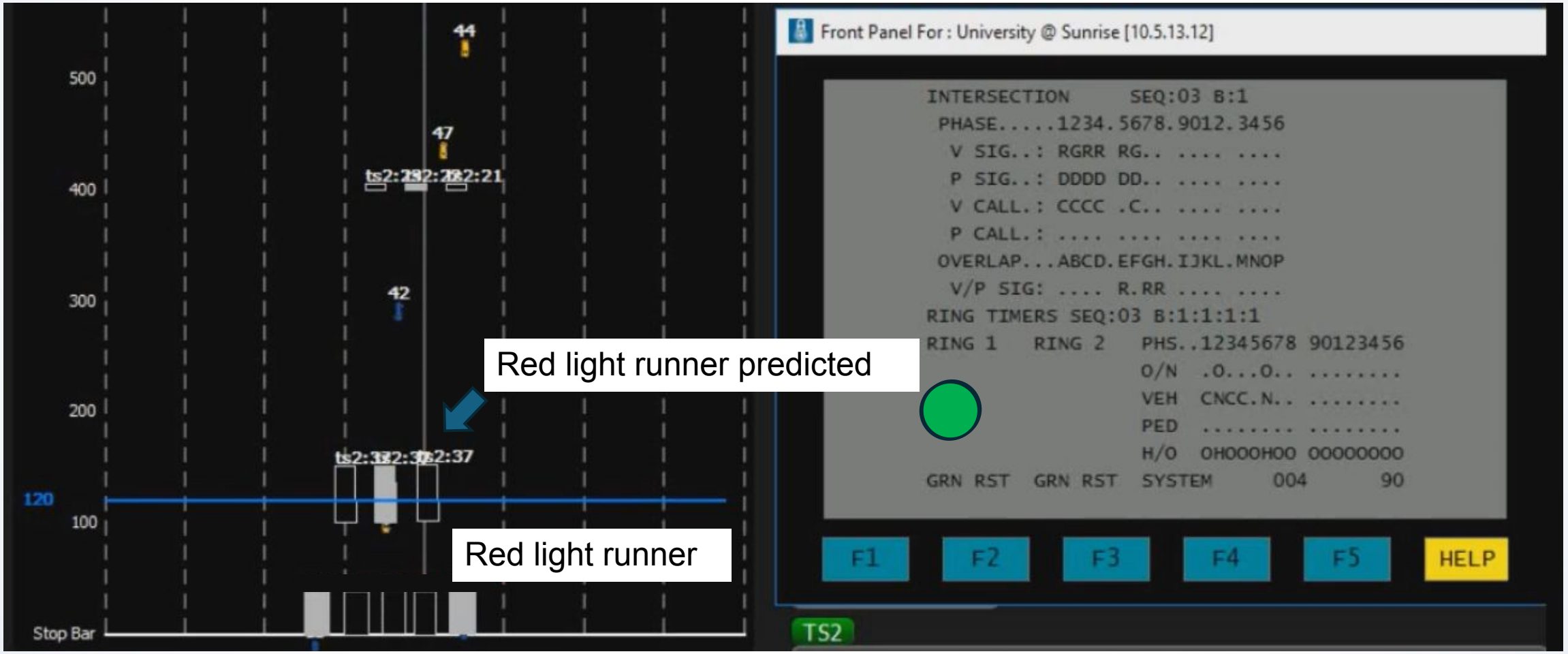
  Doesn't trigger for slow moving vehicles

- Predicts Red Light Runners and sends output to controller

  Red Protect/ Red Extend controller features extend the red clearance while output is active

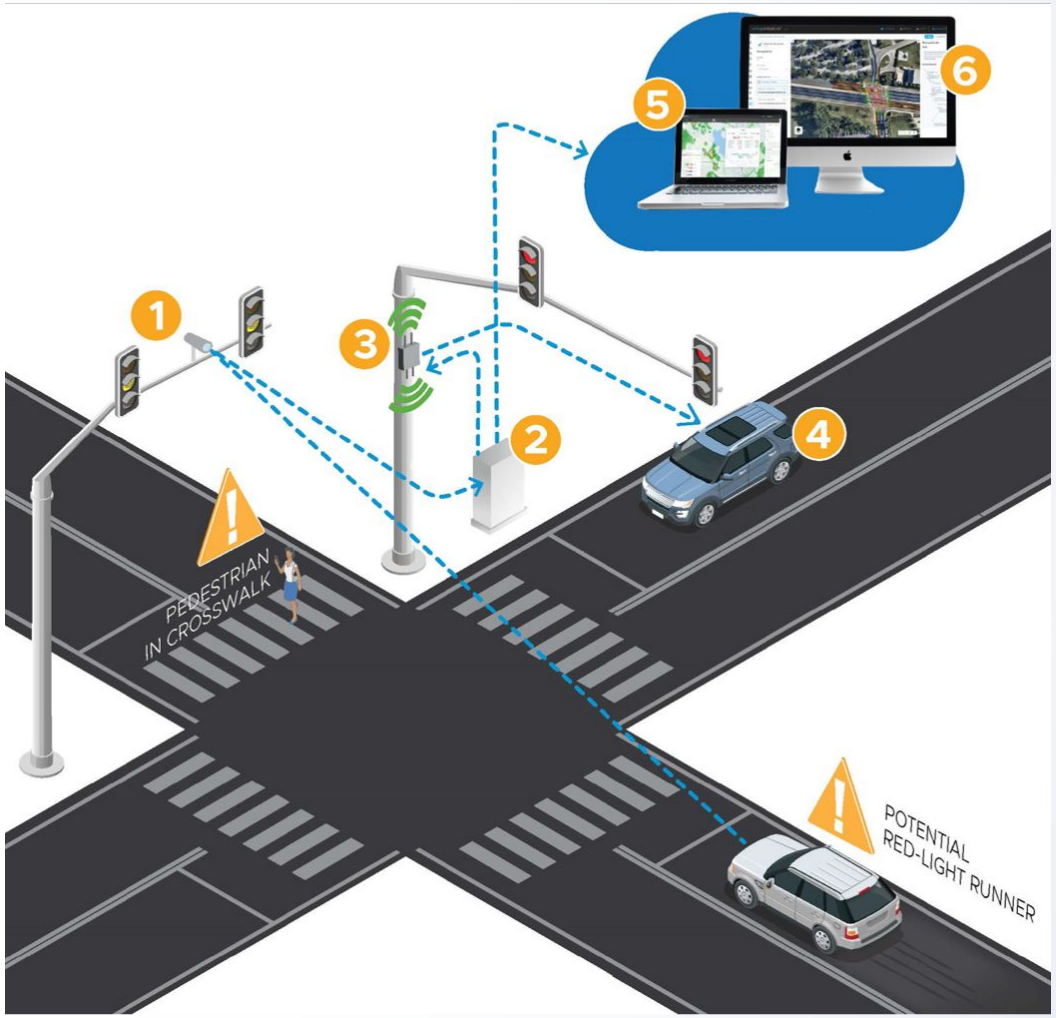


Red Extend Video



Warn Drivers: Connected Vehicle Alerts

1. Sensors predict red light runners
2. CV app engine ingests data and generates V2X messages
3. RSU broadcasts alert
4. OBU receives alert
5. Cloud-based software provides CV visualizations and RSU monitoring
6. Cloud-based software provides pedestrian activity and red-light running analytics



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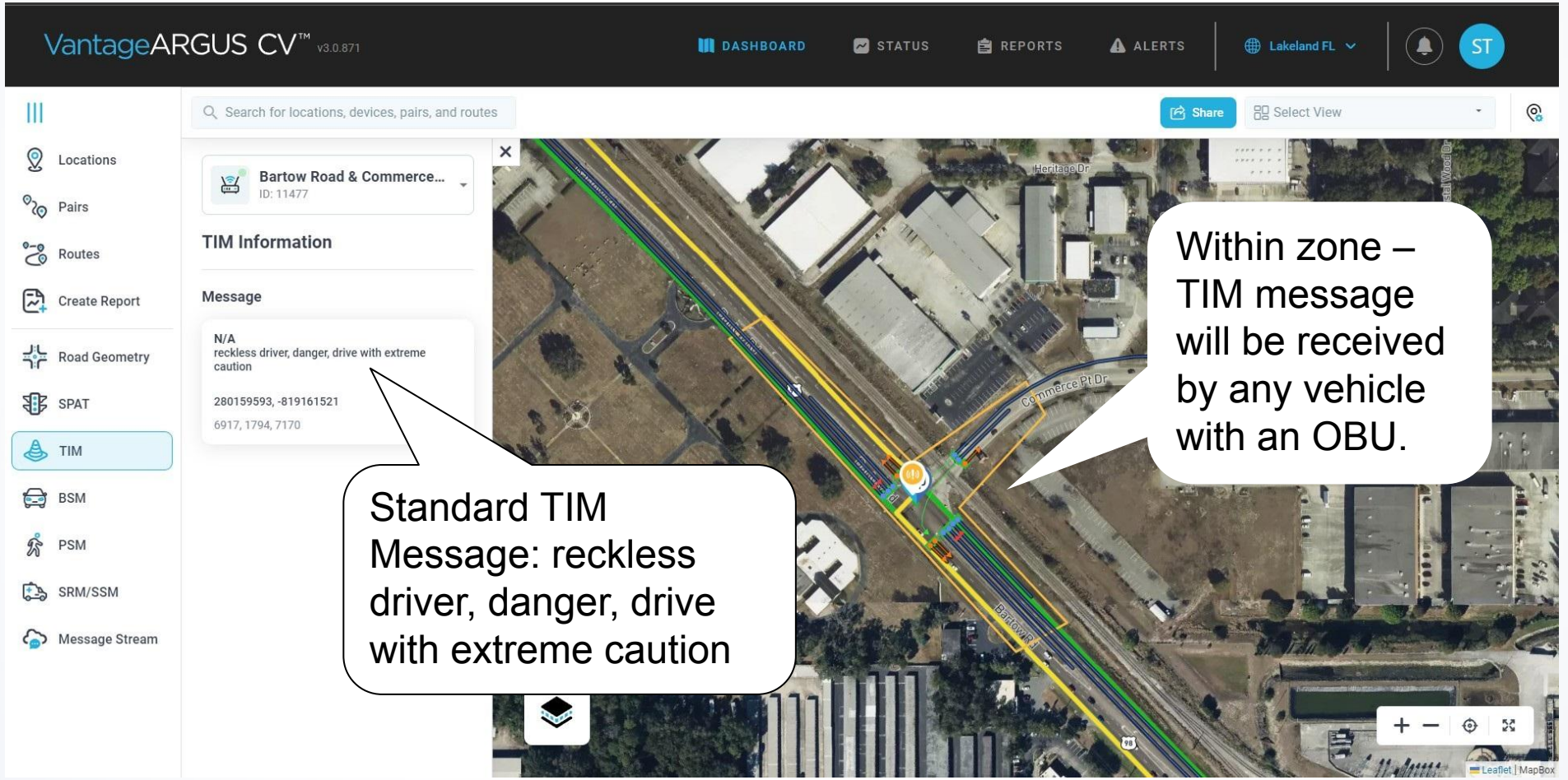
Red light runner warnings



Step 3:

Measure the Benefits of the Safety Countermeasures

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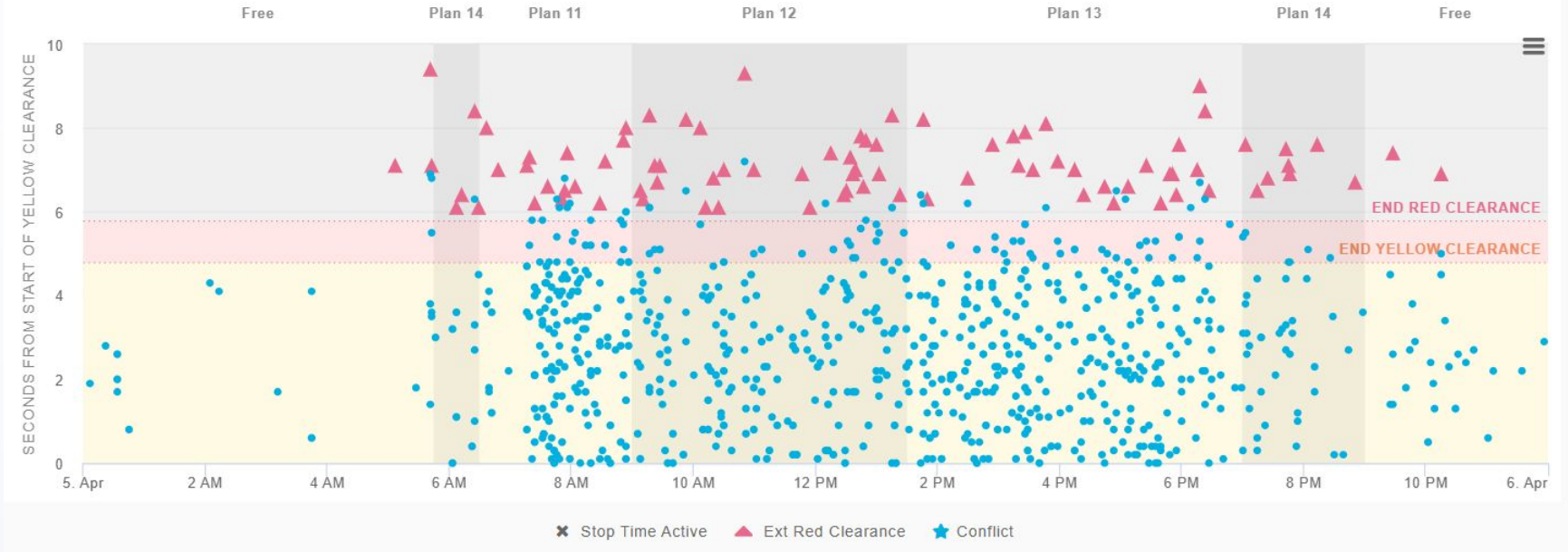
Vehicles Still Run Red Lights, But Crash Risk is Minimized

Extended Red		Conflicts		% of Cycles with vehicles entering: After Red Clearance		During Red Clearance		During Yellow	
Total:	85	Total:	0	Total:	3%	Total:	8%	Total:	37%
Free:	5	Free:	0	Free:	1%	Free:	1%	Free:	9%
Plan 14:	12	Plan 14:	0	Plan 14:	1%	Plan 14:	5%	Plan 14:	34%
Plan 11:	14	Plan 11:	0	Plan 11:	10%	Plan 11:	18%	Plan 11:	70%
Plan 12:	29	Plan 12:	0	Plan 12:	5%	Plan 12:	15%	Plan 12:	72%
Plan 13:	25	Plan 13:	0	Plan 13:	8%	Plan 13:	22%	Plan 13:	82%



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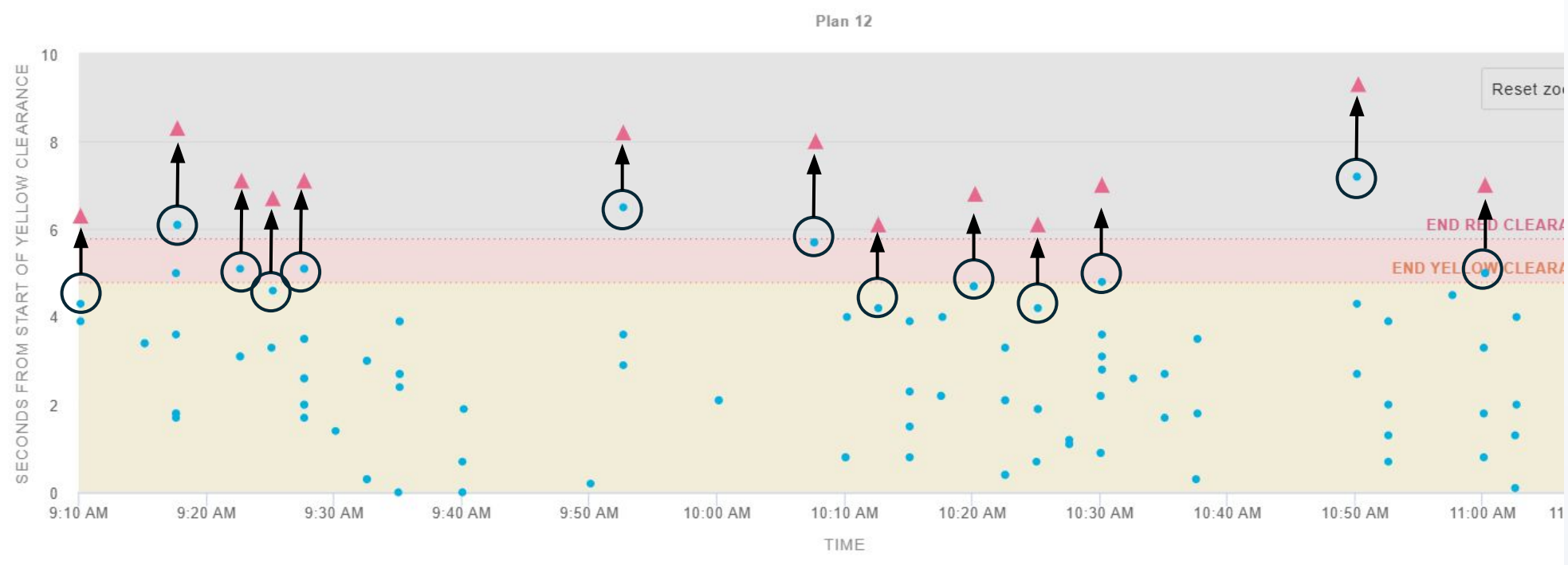
Two Technologies: Confirming the Operation

- – Video when cars are in the intersection
- – Radar predicted that a car was going to run the red light and extended the Red Clearance



Because Every Asks:
Red Light Running has not increased because they are protected

06/06/2019 12:00 AM - 06/06/2019 11:59 PM

	% of Cycles with vehicles entering	
	After Red Clearance	During Red Clearance
Total:	1%	5%
Free:	1%	0%
Plan 14:	2%	6%
Plan 11:	2%	15%
Plan 12:	3%	8%
Plan 13:	3%	14%

06/06/2025 12:00 AM - 06/06/2025 11:59 PM

	% of Cycles with vehicles entering:	
	After Red Clearance	During Red Clearance
Total:	1%	4%
Plan 99:	0%	1%
Plan 24:	0%	3%
Plan 21:	2%	8%
Plan 22:	2%	11%
Plan 23:	3%	6%

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Summary

- Off the shelf technology
- Monitored with data analytics software
- Reduced probability of crashes
- Did not increase red light runners
- The City’s 4 intersection pilot has expanded to 20+ intersections

Thank You

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