Autoscope VISION

Red Light Extension Utilizing HD Video Detection

Thousand Oaks, CA

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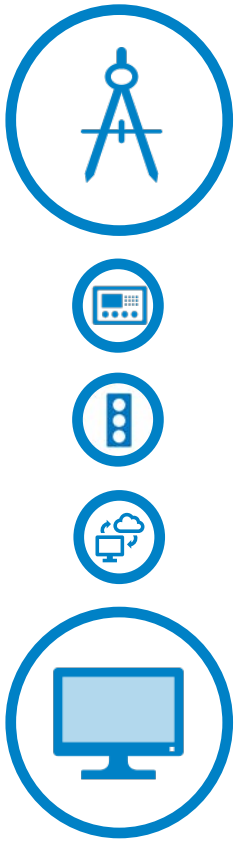
AGENDA



INTRODUCTION

Project Background

High Definition (HD) Detection

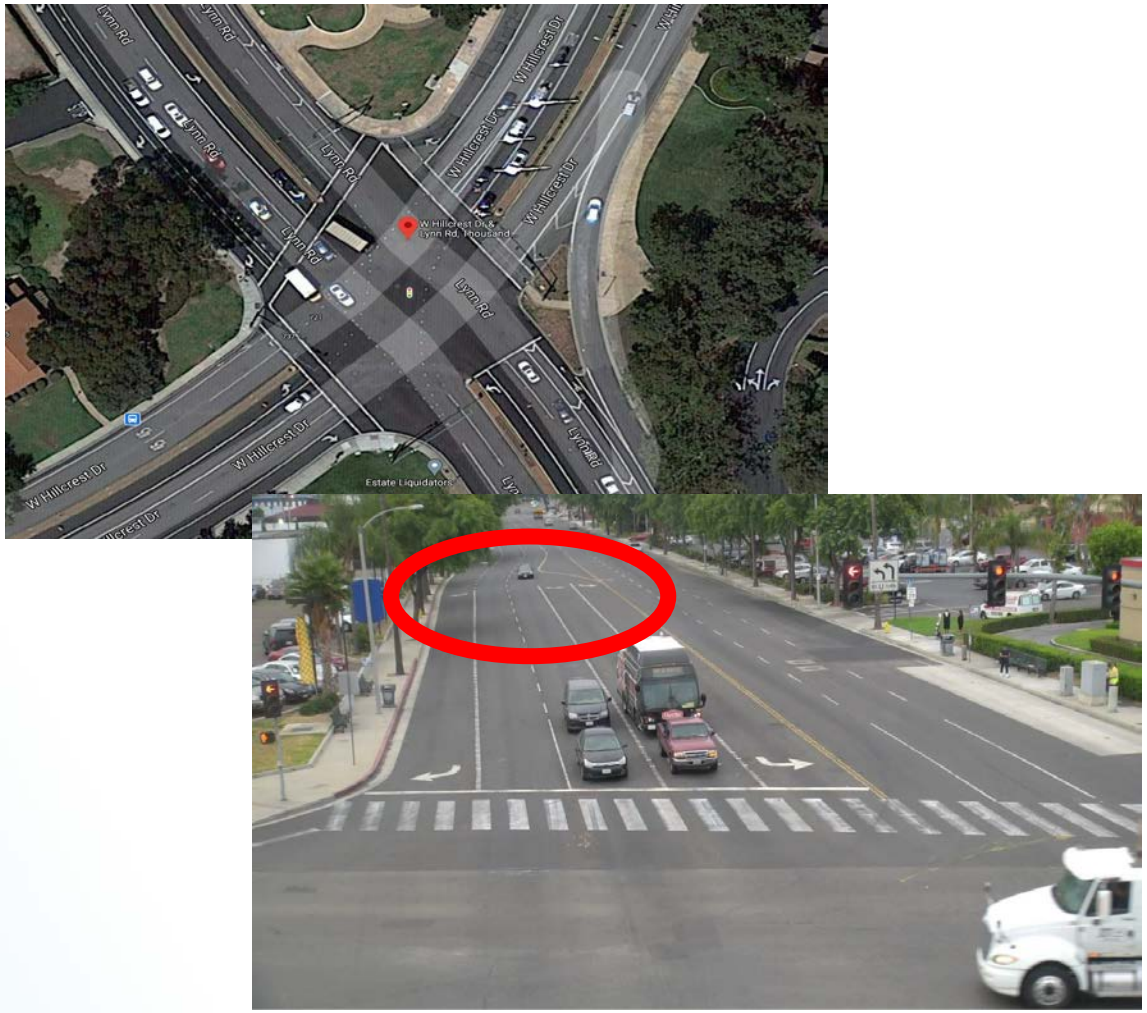
New Features

RED LIGHT EXTENSION

Autoscope® VISION

Red Light Extension

- Thousand Oaks, CA
- Based on advanced detection and speed threshold detection
- Autoscope Vision
- High-Definition (HD) Detection
- Safety application
- Pilot location extended to multiple intersections in the City



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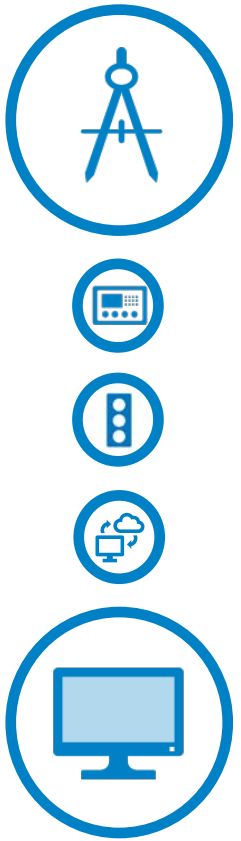

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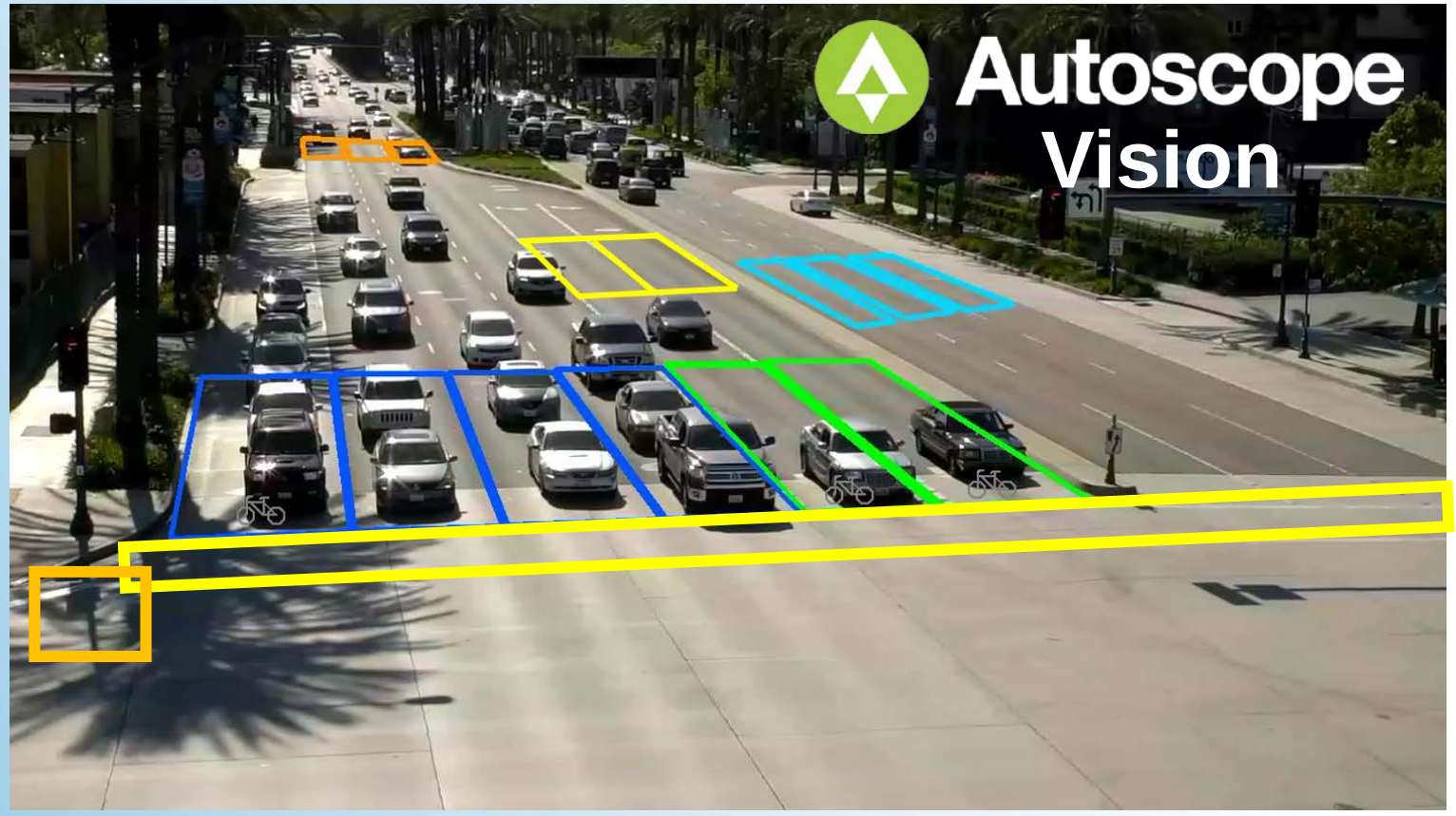
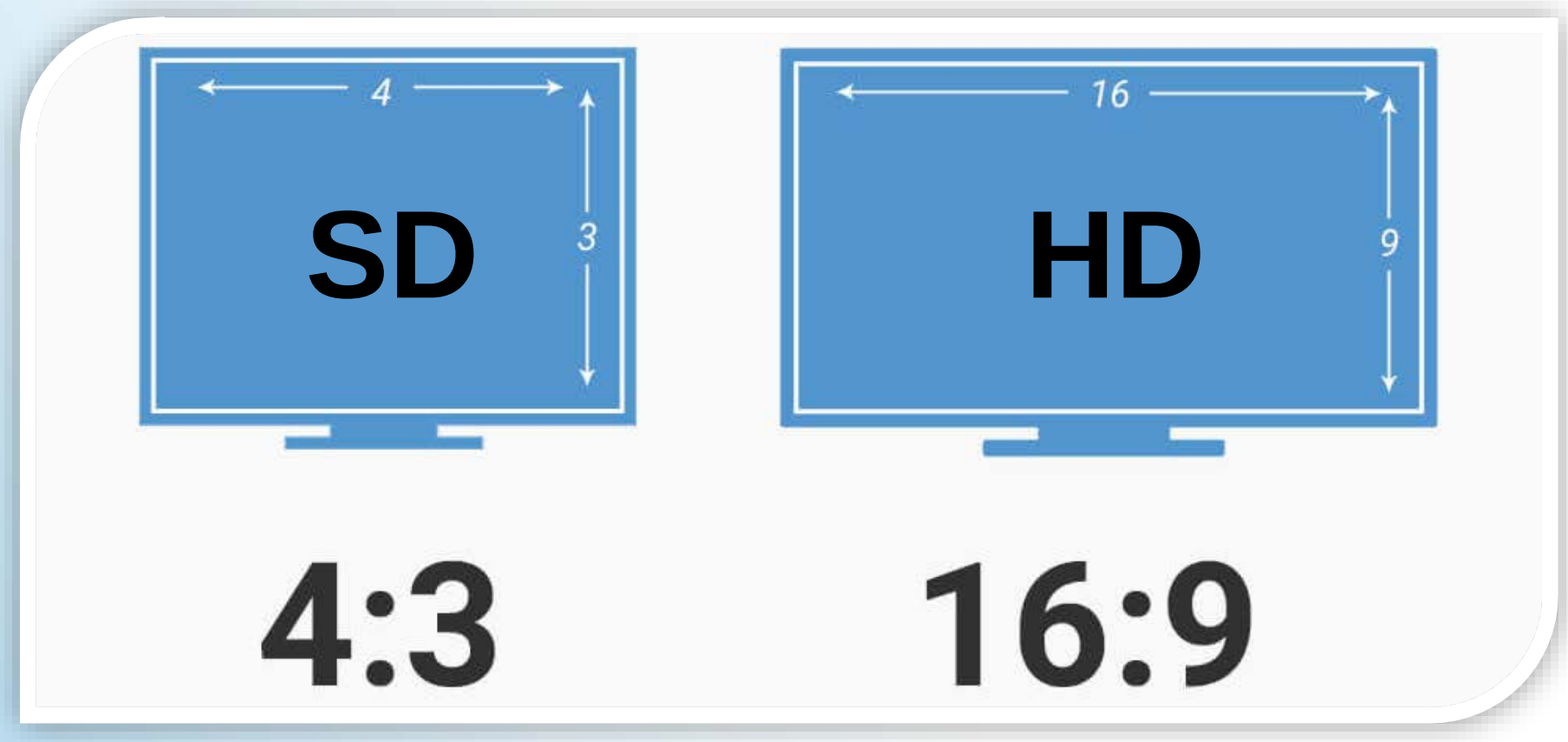
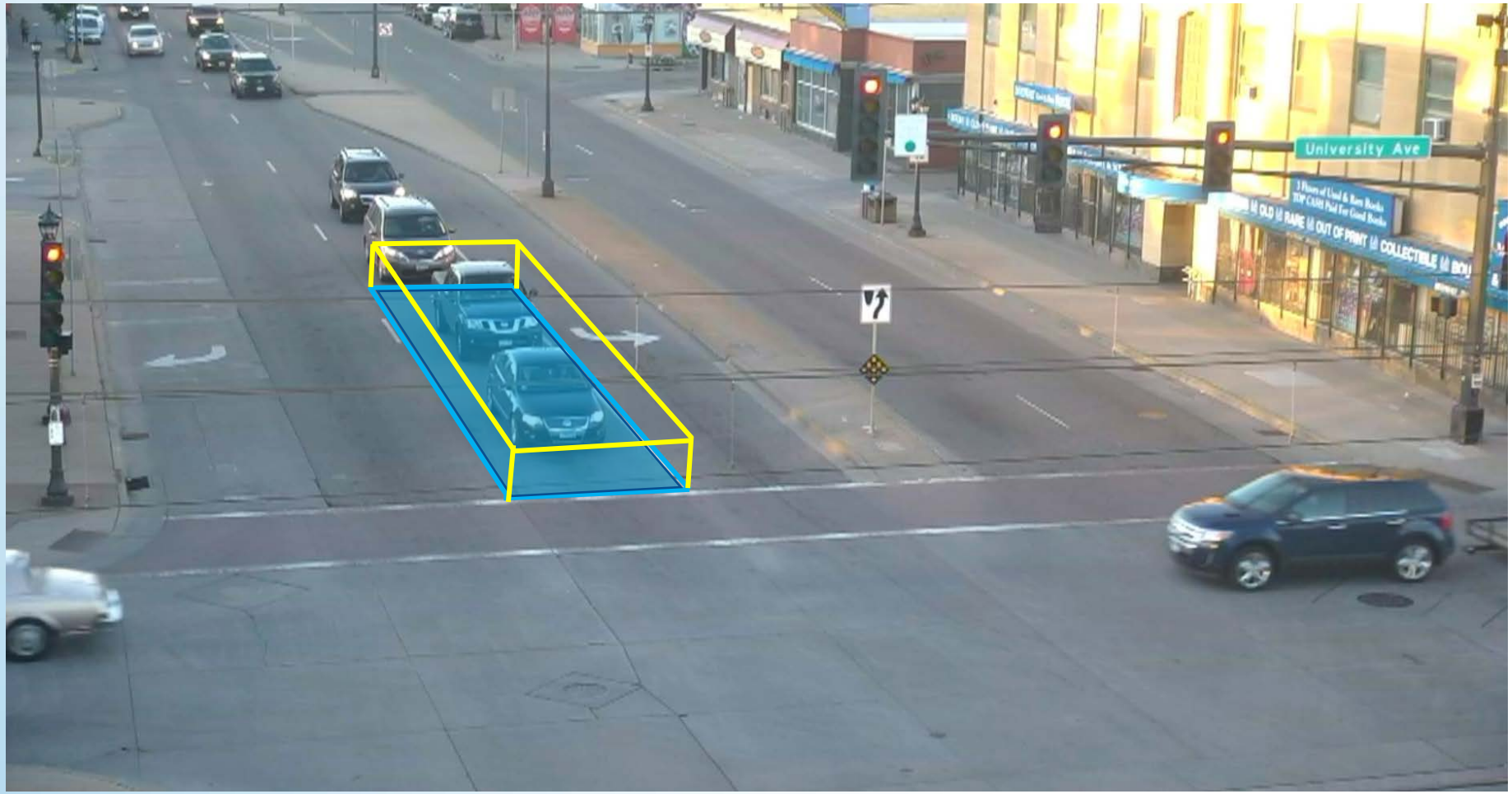
HD – 16:9 Aspect Ratio Detection



Aspect Ratio

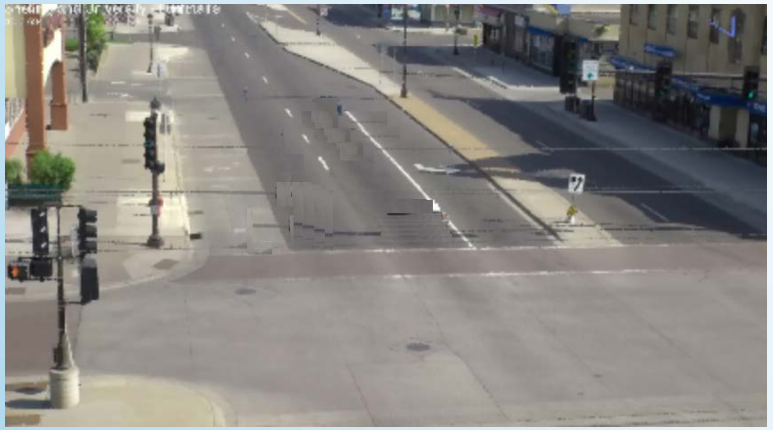


3D/HD Algorithm

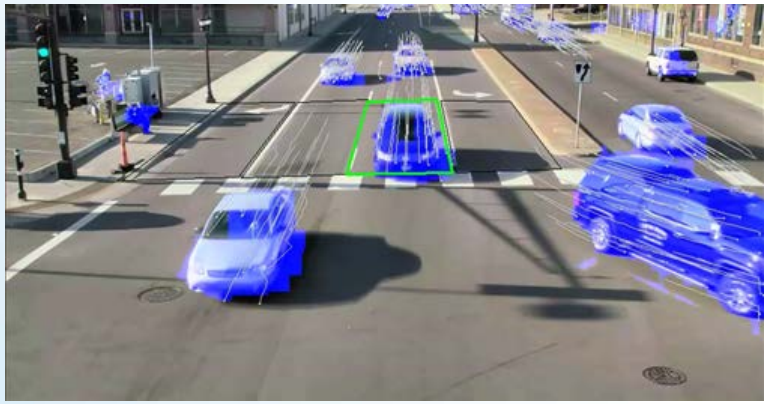


Foreground Extraction

Learned Background



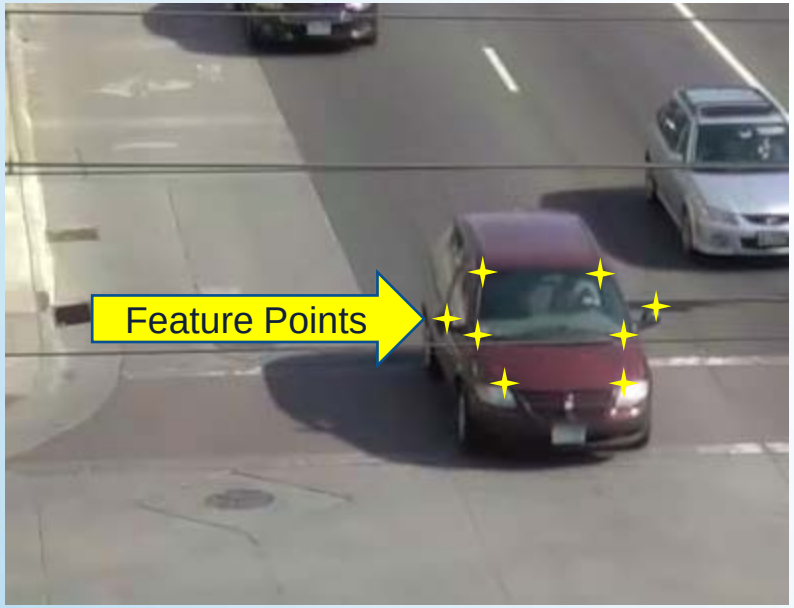
Frame with Traffic



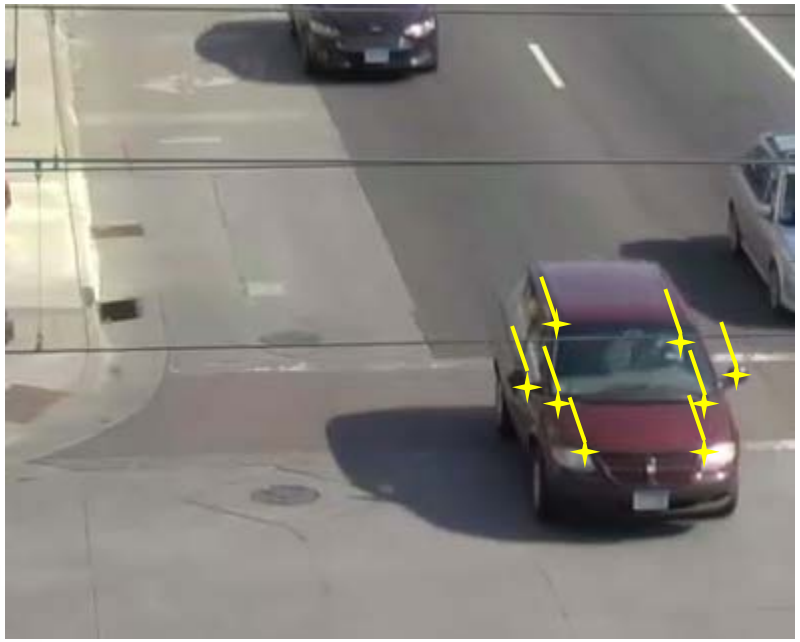
Foreground Extraction

HD Algorithm

Feature Points



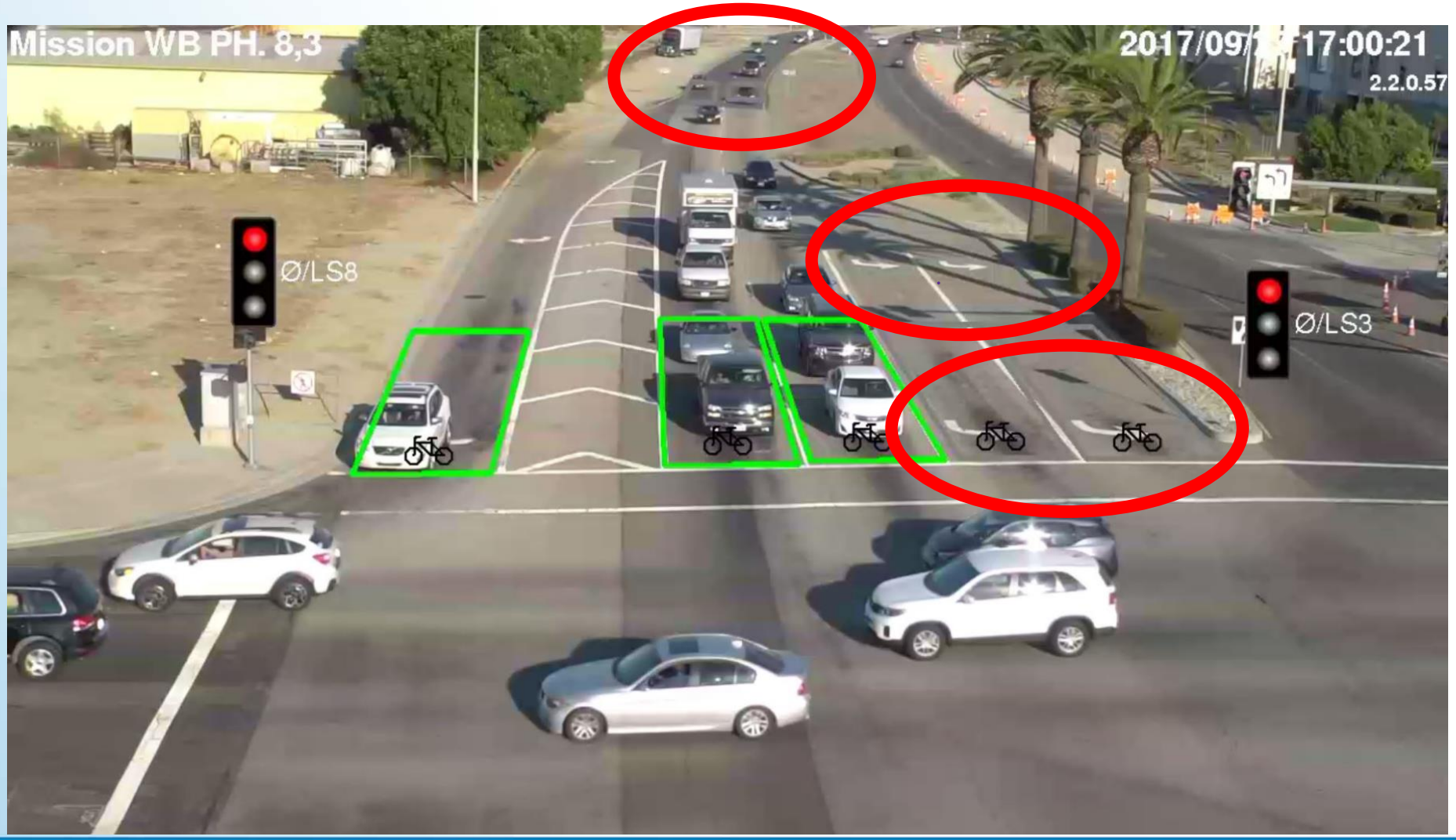
Movement



Speed Detection

- Above, Below, or In Between Speed Thresholds
- Traffic Calming
- Red Extend

Permissive LT – Lead/Lag – FYA



Departure Detection

- Platoon Detection
- Delay
- Counts

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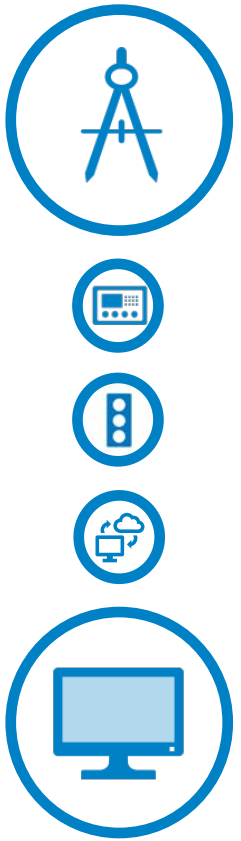

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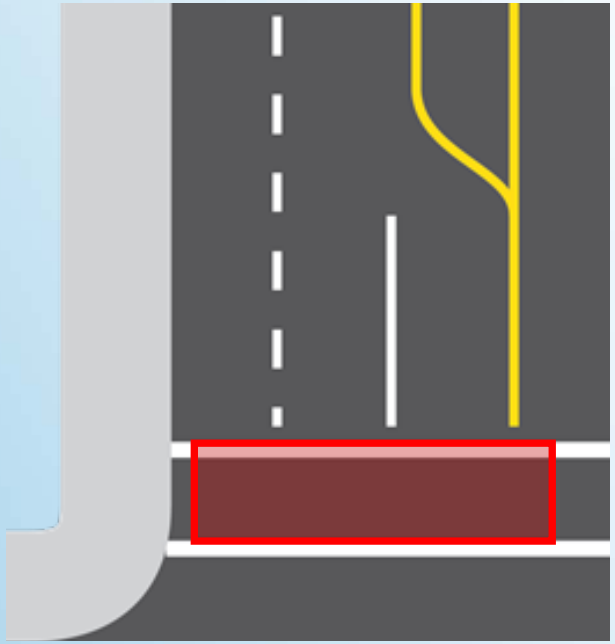
Pedestrian Detection

Standard Pedestrian Detection



4:3 Aspect Ratio Detection

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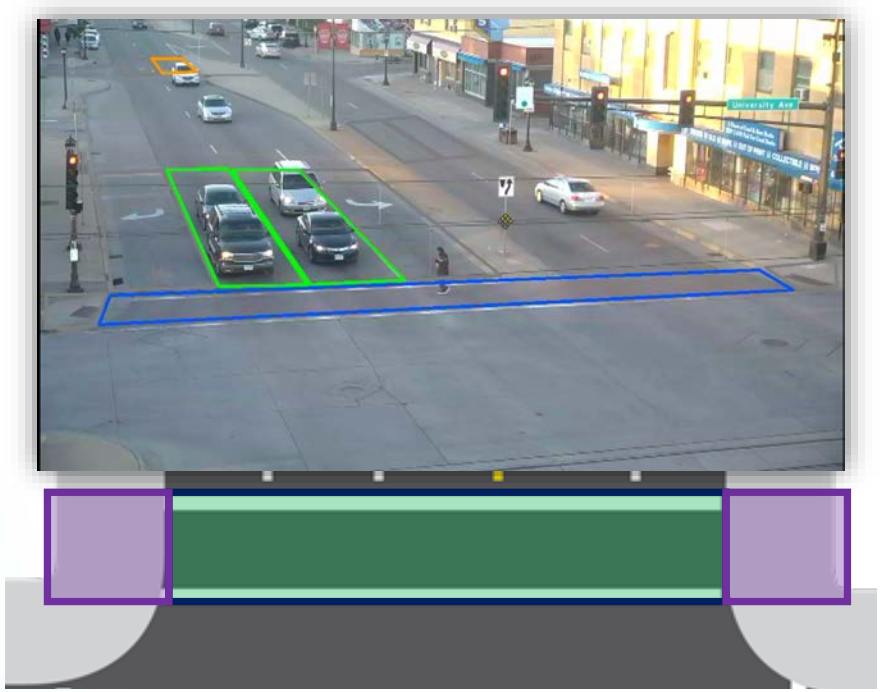
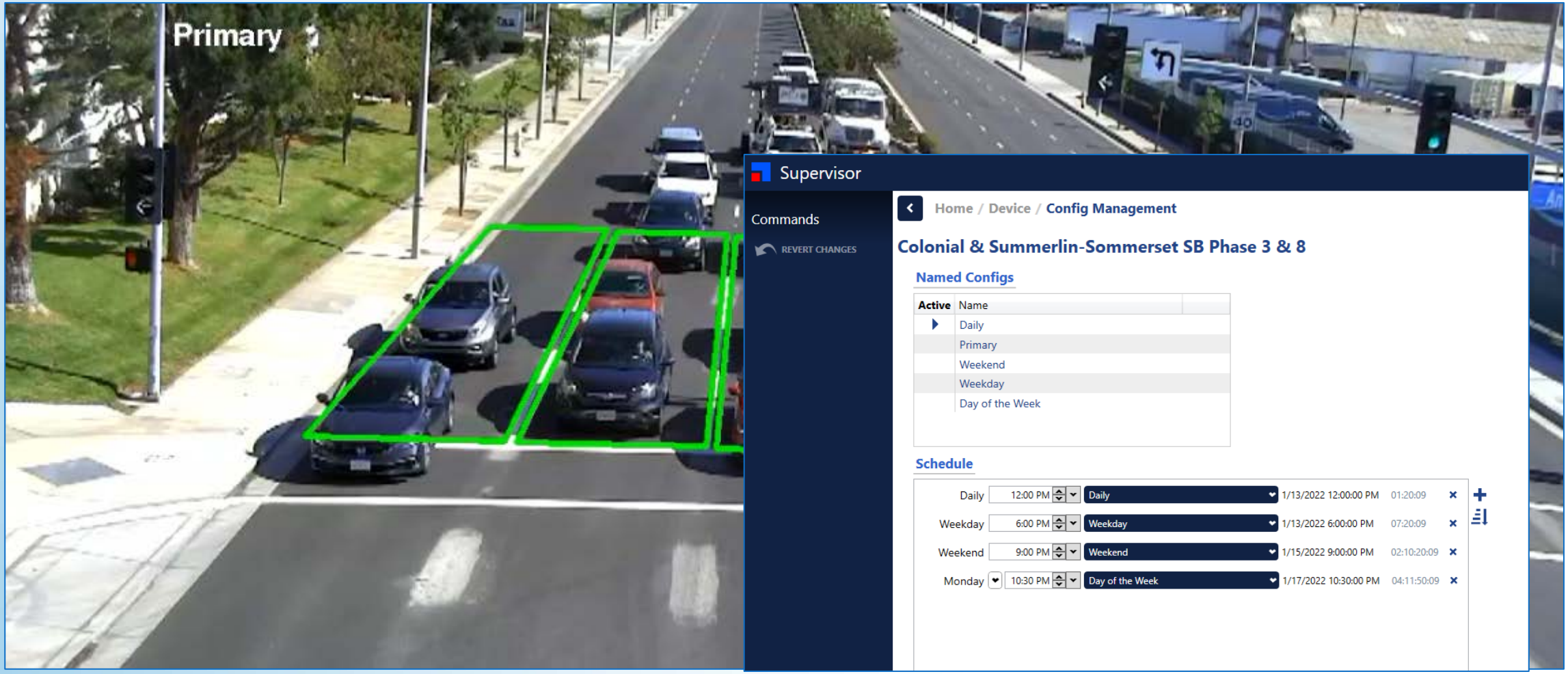


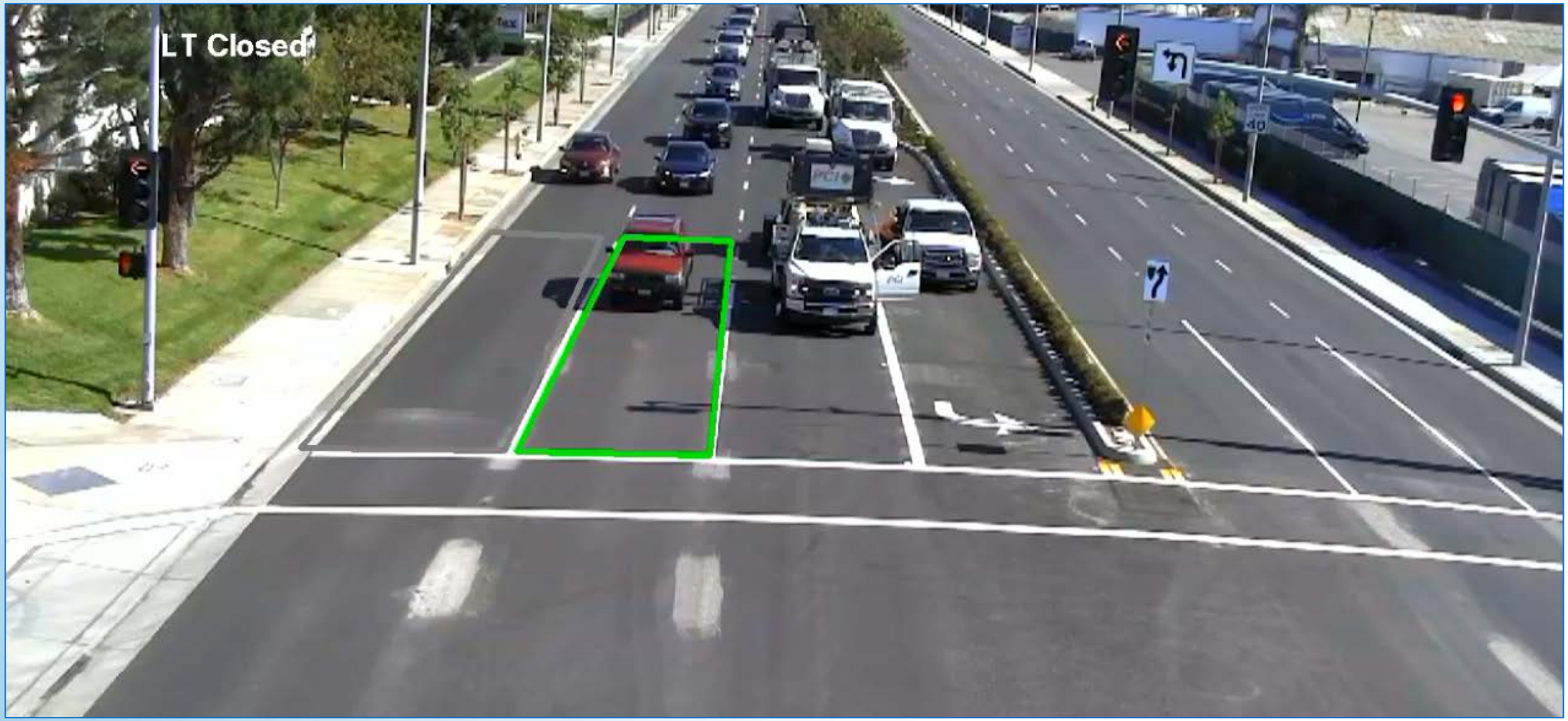
16:9 Aspect Ratio Detection

Entire Pedestrian Area

Robust Scheduler



Left Lanes Closed



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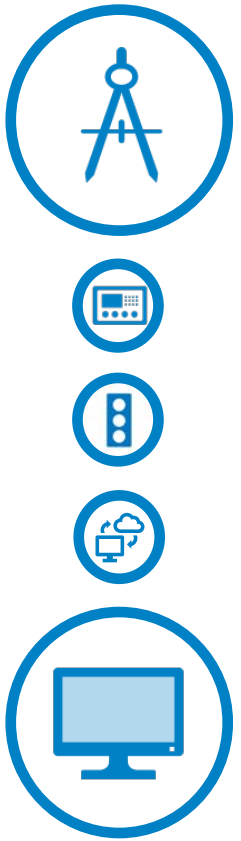

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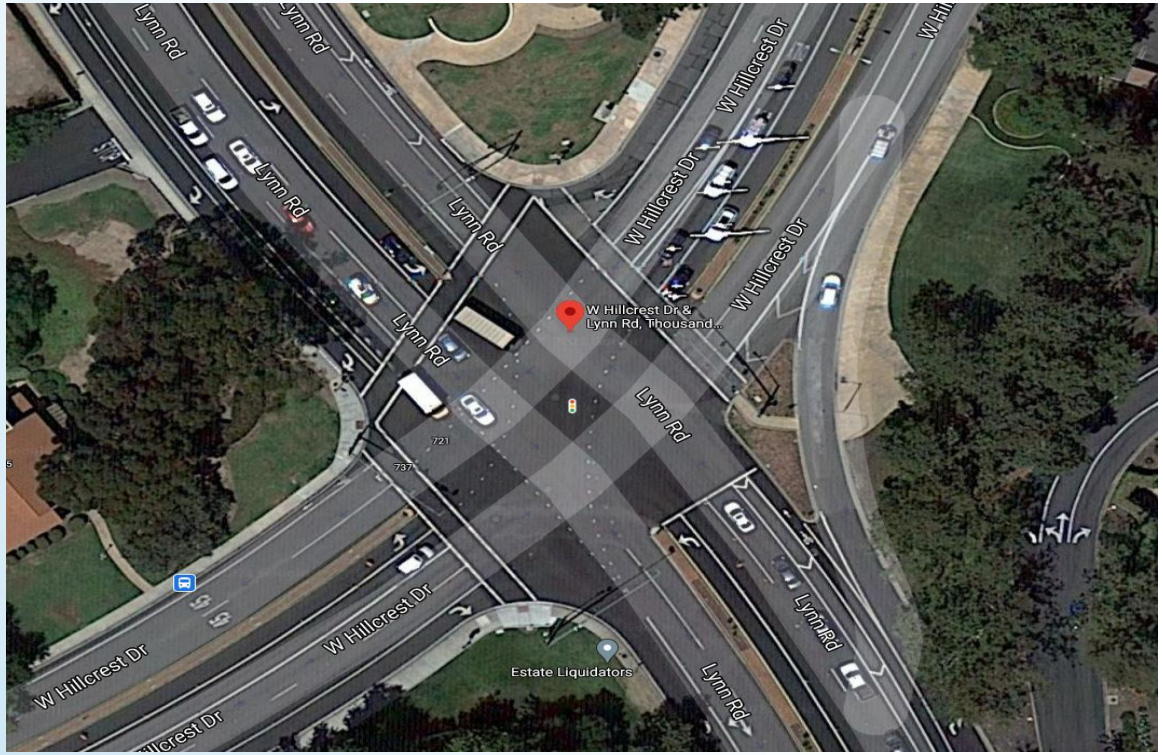
Intersection Visual

- Pilot location - Intersection of Lynn Rd and Hillcrest Blvd
- Thousand Oaks, CA



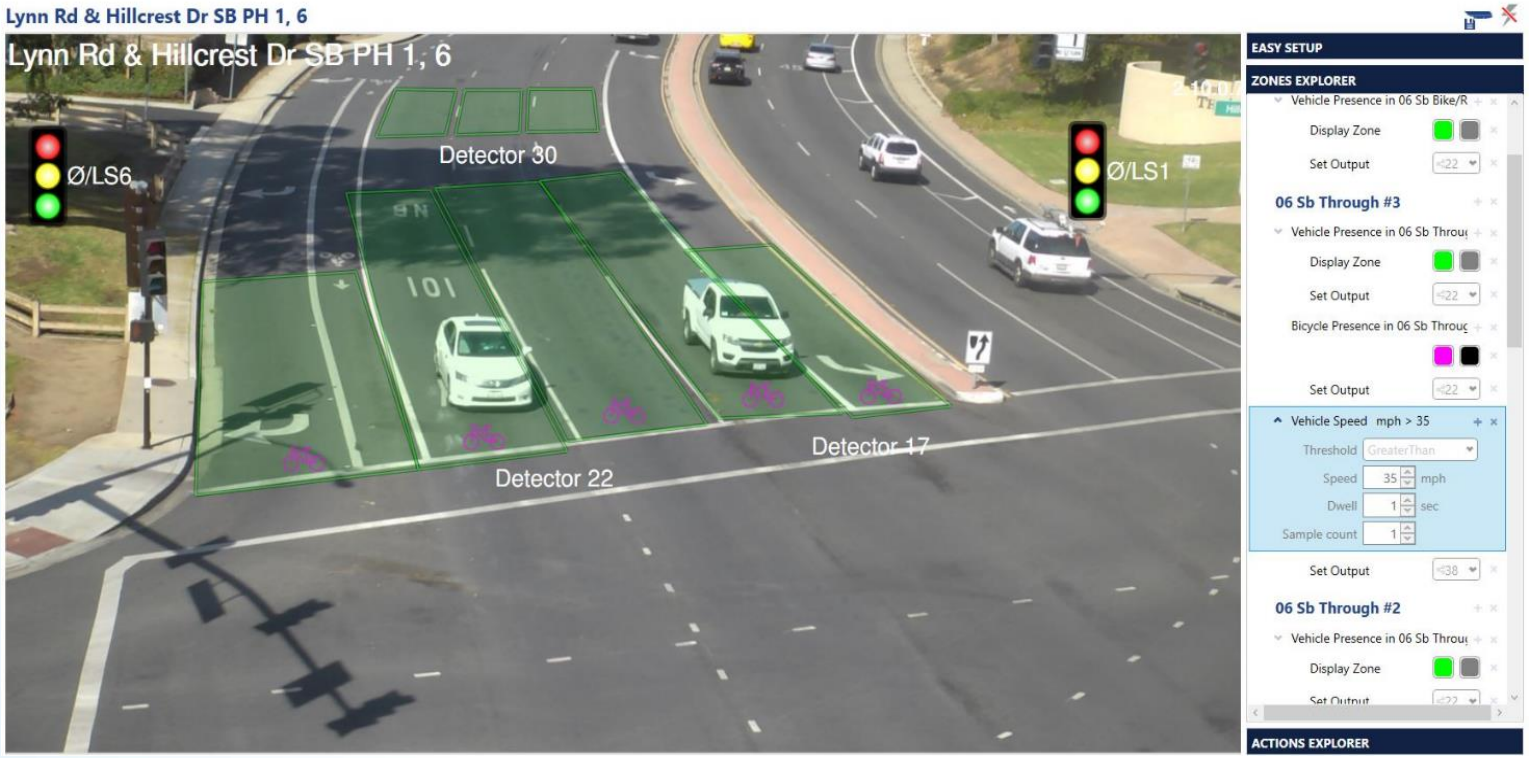
Intersection Overview

- Approach speeds from all directions - 45 MPH
- All main phase yellow timings set to 4.5 seconds
- Intersection roughly 150’ from stop bar to intersection exit in all directions

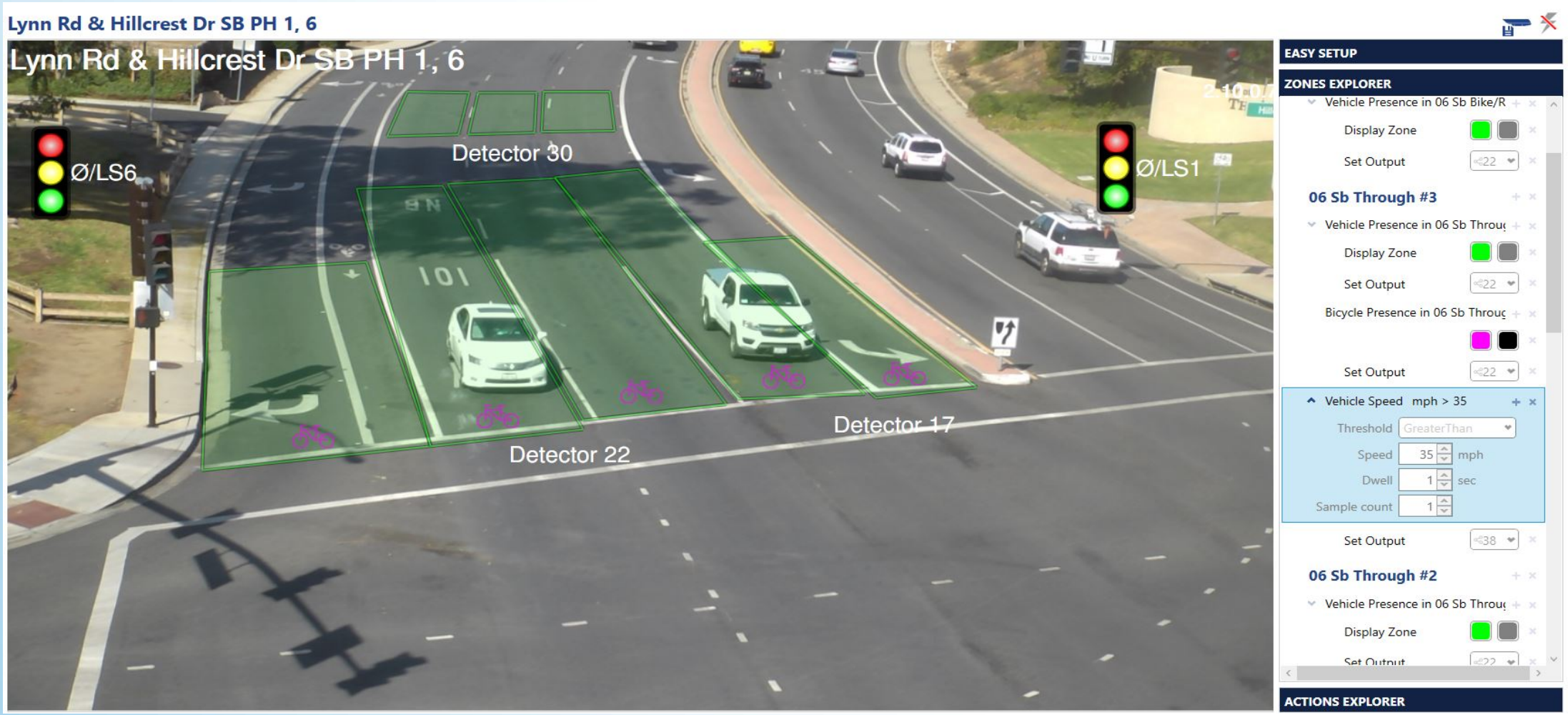
Autoscope Vision Set Up

- Each Phase approach has an associated Speed Detector

- Speed Detectors activate any time a vehicle traveling over the threshold is detected in the detection zone



Autoscope Vision Set Up



EOS Controller Software Set-Up

- All Red Extension Timing
- Speed Detectors and Red Extension Detectors
- Logic Statements

EOS Controller Software Set-Up: All-Red Extension Timing

- All-Red Extension Timing should be programmed to provide enough time for a vehicle to clear the intersection after exiting the Dilemma Zone

- At this location, the All-Red Extension for each phase was set to 3.0 seconds

TIMING PLAN [1] >

CLEARANCE

PHASE	1	2	3	4	5	6	7	8
PRECLEAR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YELLOW	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5
RED	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
REVERT	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

MAX EXTENSION

PHASE	1	2	3	4	5	6	7	8
RED	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0

EOS Controller Software Set-Up: Detector Set Up

- Two Detectors (1 Speed / 1 Red Extension) will be required for each approaching Phase
- Although the Speed Detector will not call a phase, we can use logic to associate it with the Red Extension Detector during the last moments of the yellow interval and throughout the phase red clearance

Speed

```
      VEH DETECTOR [34]  PLAN [ 1]
        DET PH  12345678 90123456
        34    2 ........ ........

LOCK IN         NONE DELAY TIME       0.0
EXT OPTION      NONE DELAY MODE   RED/YEL
CALL OPTION       NO
BIKE CALL         NO
RED EXTEND        NO CROSS SWITCH PH    0
TS2 DET          YES ADDED INITIAL     NO
```

Red Extension

```
      VEH DETECTOR [42]  PLAN [ 1]
        DET PH  12345678 90123456
        42    2 ........ ........

LOCK IN         NONE DELAY TIME       0.0
EXT OPTION   PASSAGE DELAY MODE   RED/YEL
CALL OPTION      YES EXTEND TIME      3.5
BIKE CALL         NO DISCONNECT TIME    0
RED EXTEND       YES CROSS SWITCH PH    0
TS2 DET          YES ADDED INITIAL     NO
```

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Thank You!

Jason Kohl – jkohl@econolite.com
Vikas Manocha – vmanocha@econolite.com

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