FLORIDA INTERNATIONAL UNIVERSITY

TSMO STRATEGIES FOR PEDESTRIAN AND BICYCLE SAFETY

2018 TRANSPORTATION TECHNOLOGY TOURNAMENT

AUGUST 21, 2018

NOCoE National Operations Center of Excellence

FDOT TSM&O Transportation Systems Management & Operations

Presentation Overview

- Description of Problem & Solution
- Scenarios
- Data
- Preliminary Results
- ITS Architecture
- Budget & Timeline
- Potential Benefits

CONOPS

Description of Problem & Solution

Problem

- Over 17% of all traffic fatalities involve pedestrians
- Bicyclists constitute 1% of all trips but 2% of all traffic fatalities

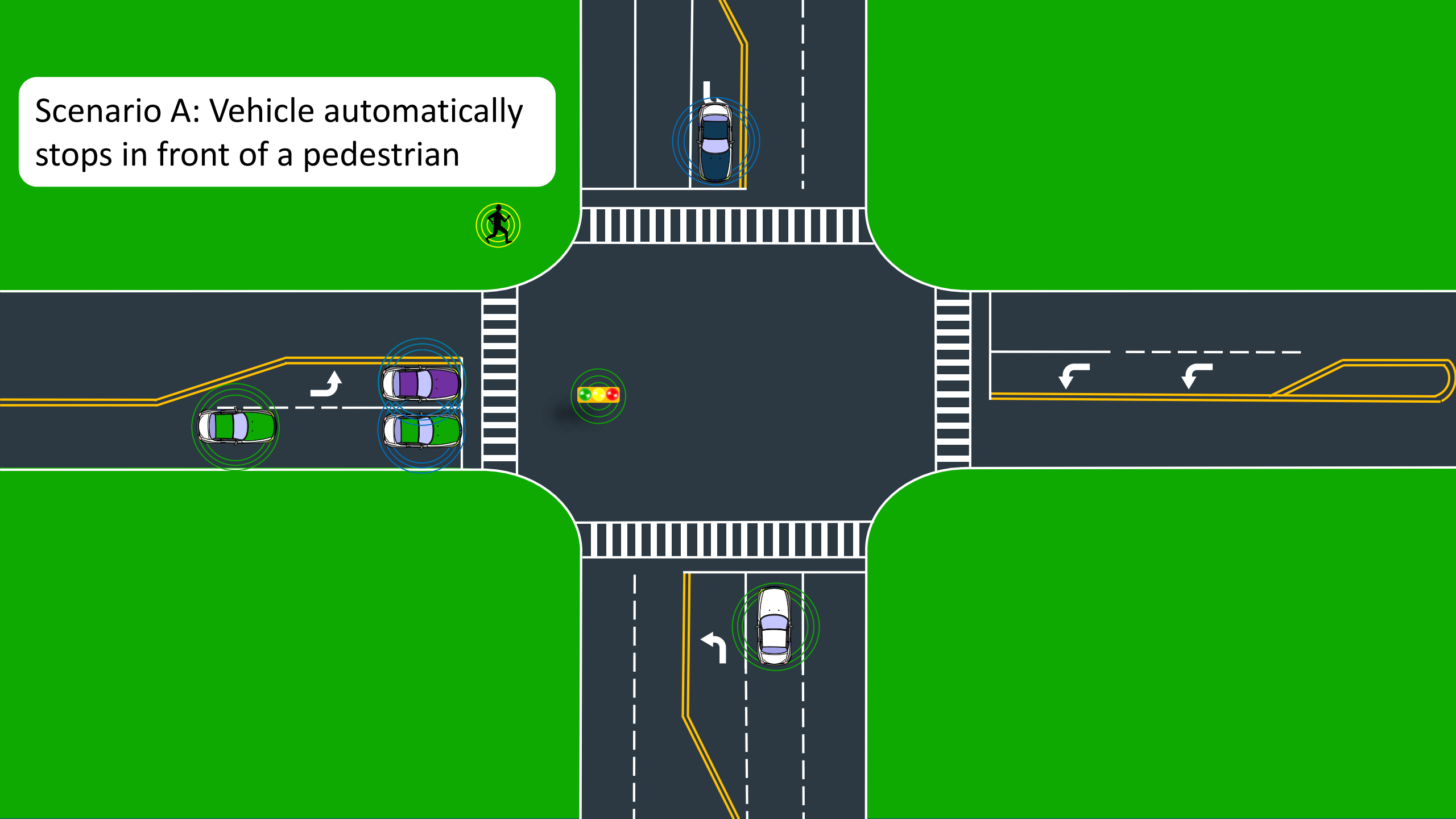
Solution

- Address both safety and mobility issues pertaining to vulnerable road users
- Use connected vehicle and autonomous vehicle technology & smart phone applications

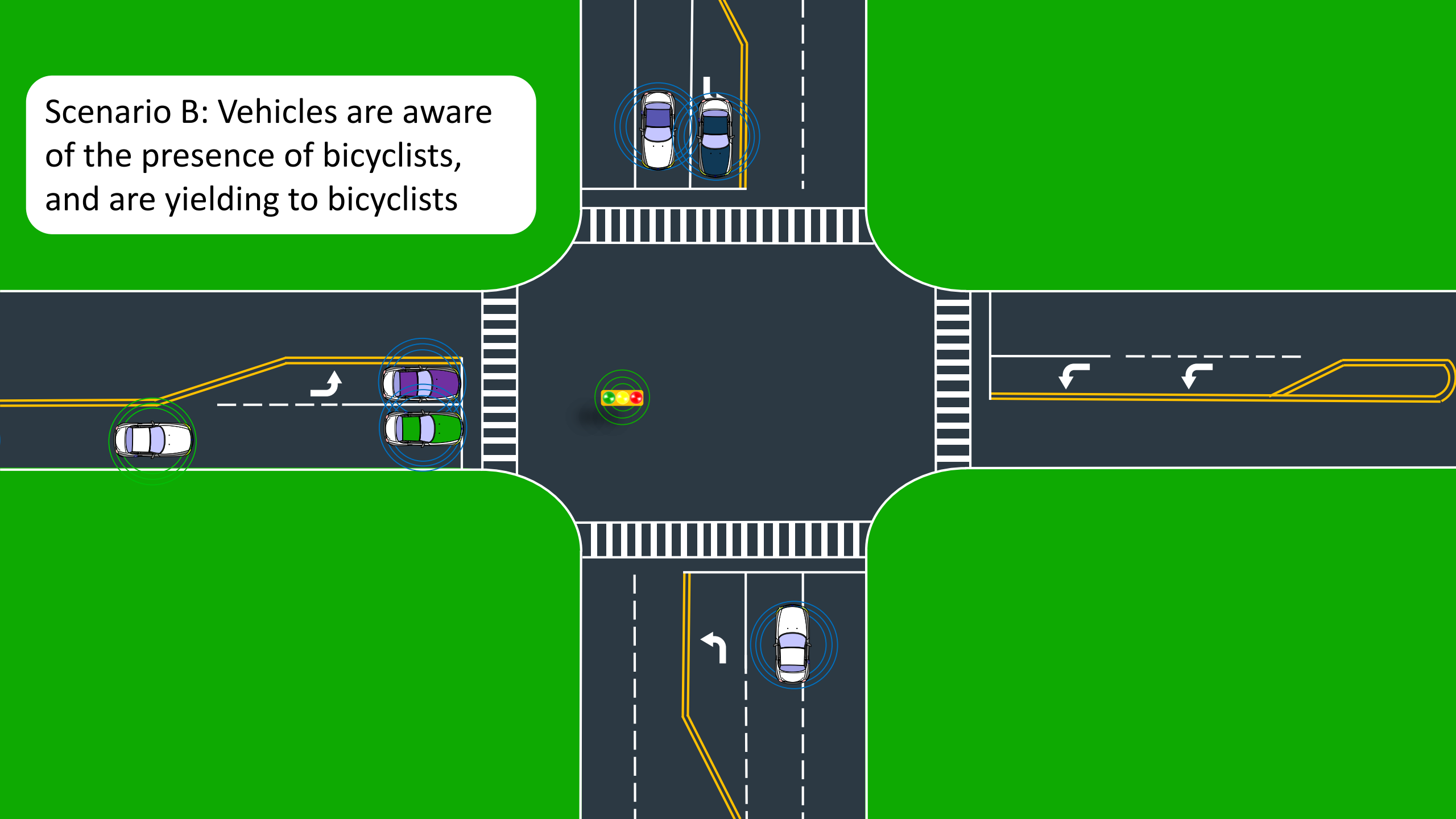
Feasibility for Adoption

- Aligns with the Florida's existing Pedestrian and Bicyclist Strategic Safety Plan
- Generic enough to be adopted by agencies within and outside Florida

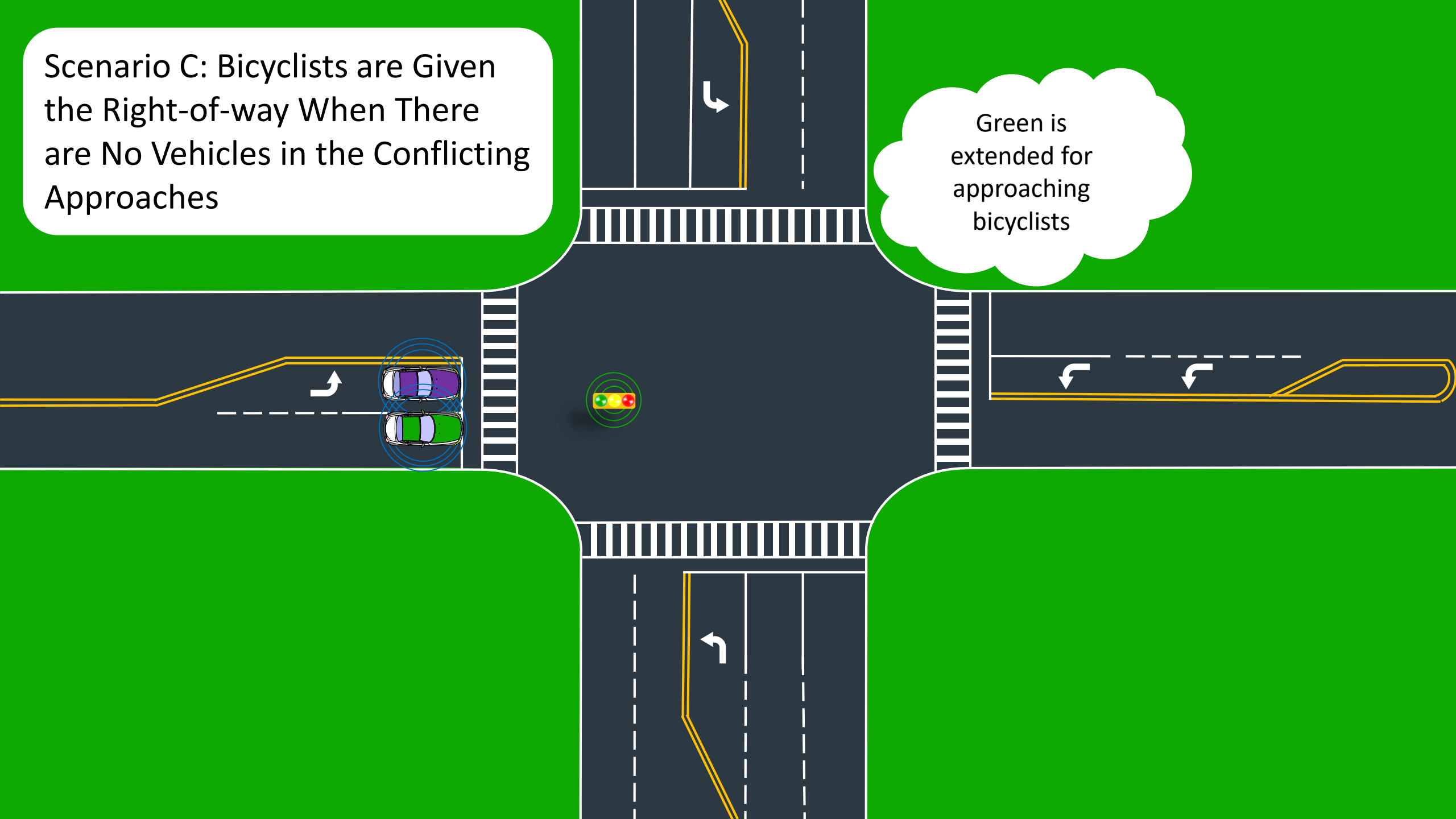
Scenario A: Vehicle automatically stops in front of a pedestrian



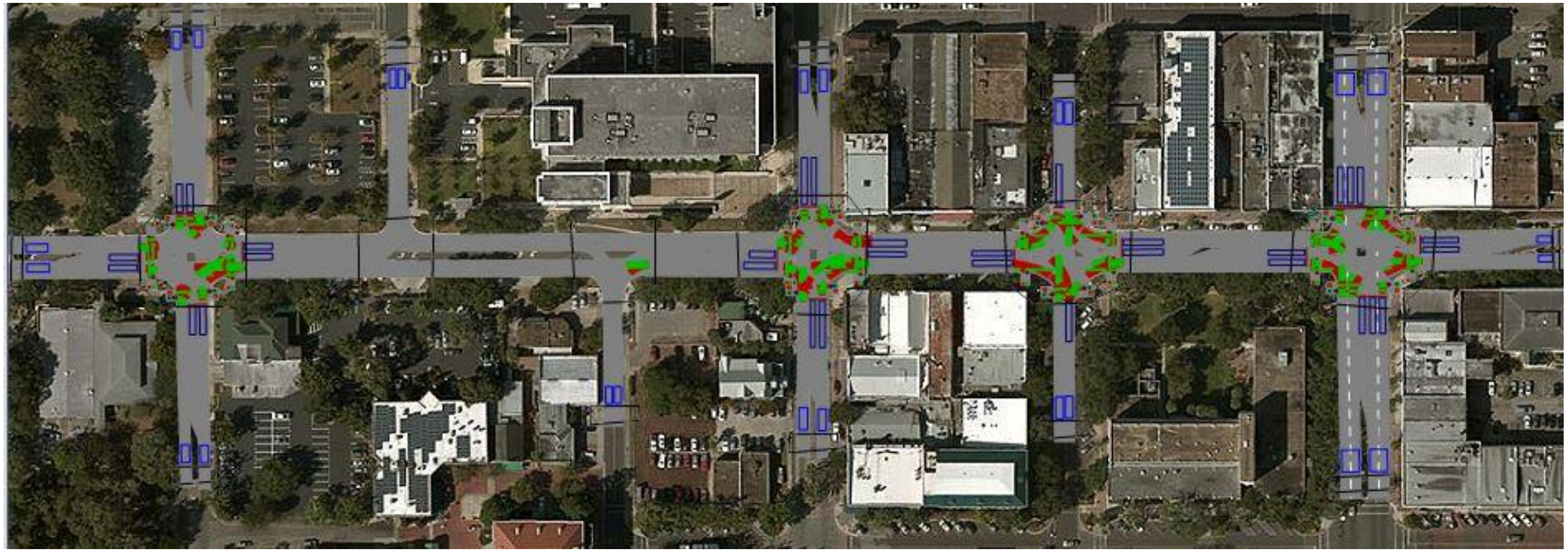
Scenario B: Vehicles are aware of the presence of bicyclists, and are yielding to bicyclists



Scenario C: Bicyclists are Given the Right-of-way When There are No Vehicles in the Conflicting Approaches

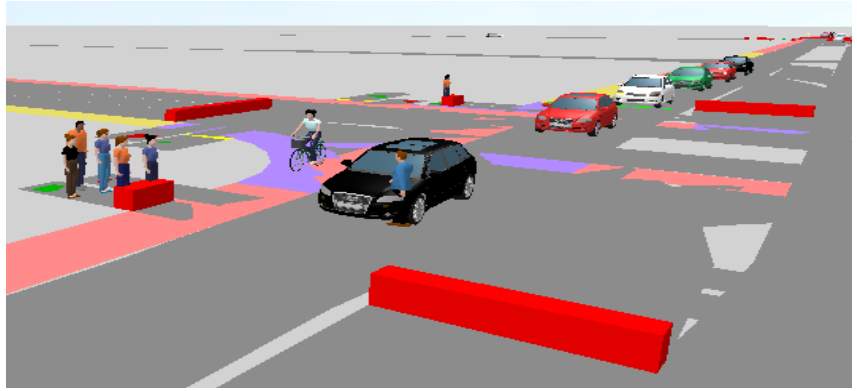


Data from City of Gainesville



- Ped, Bike, & Vehicle Volume Data from Vantage Live
- Vehicle Speed Data from Waze
- Signal Timing Plans from the City of Gainesville

Preliminary Results for Scenario A Involving a Distracted Ped.

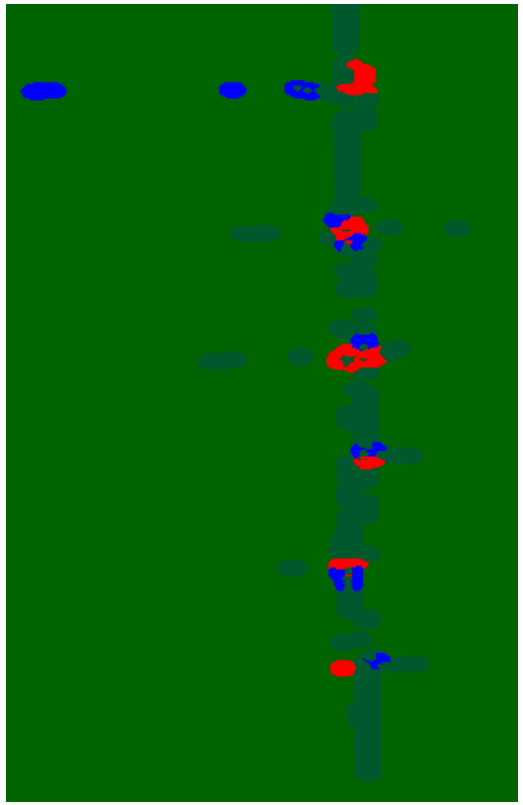


Case 1: Conventional Vehicles

Case 2: AV with APCAS

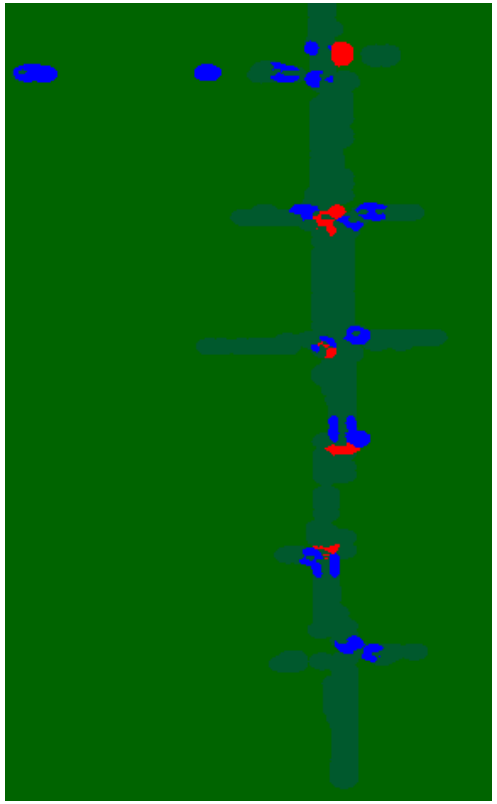
Conflict Analysis Results

Case 1
(241 Conflicts)



64%

Case 2
(87 Conflicts)



Proposed Deployment Location

6 Signalized Intersections along US Hwy 1 in the City of Miami Beach

ITS Architecture: Physical View

ITS Roadway Equipment

- CCTV Cameras
- Detection (Video, LiDAR)
- RSUs
- Communication (DSRC, Cell)

Vehicles

- OBUs
- APCAS

Personal Information Device

- Smartphone with Apps for ped/bike safety

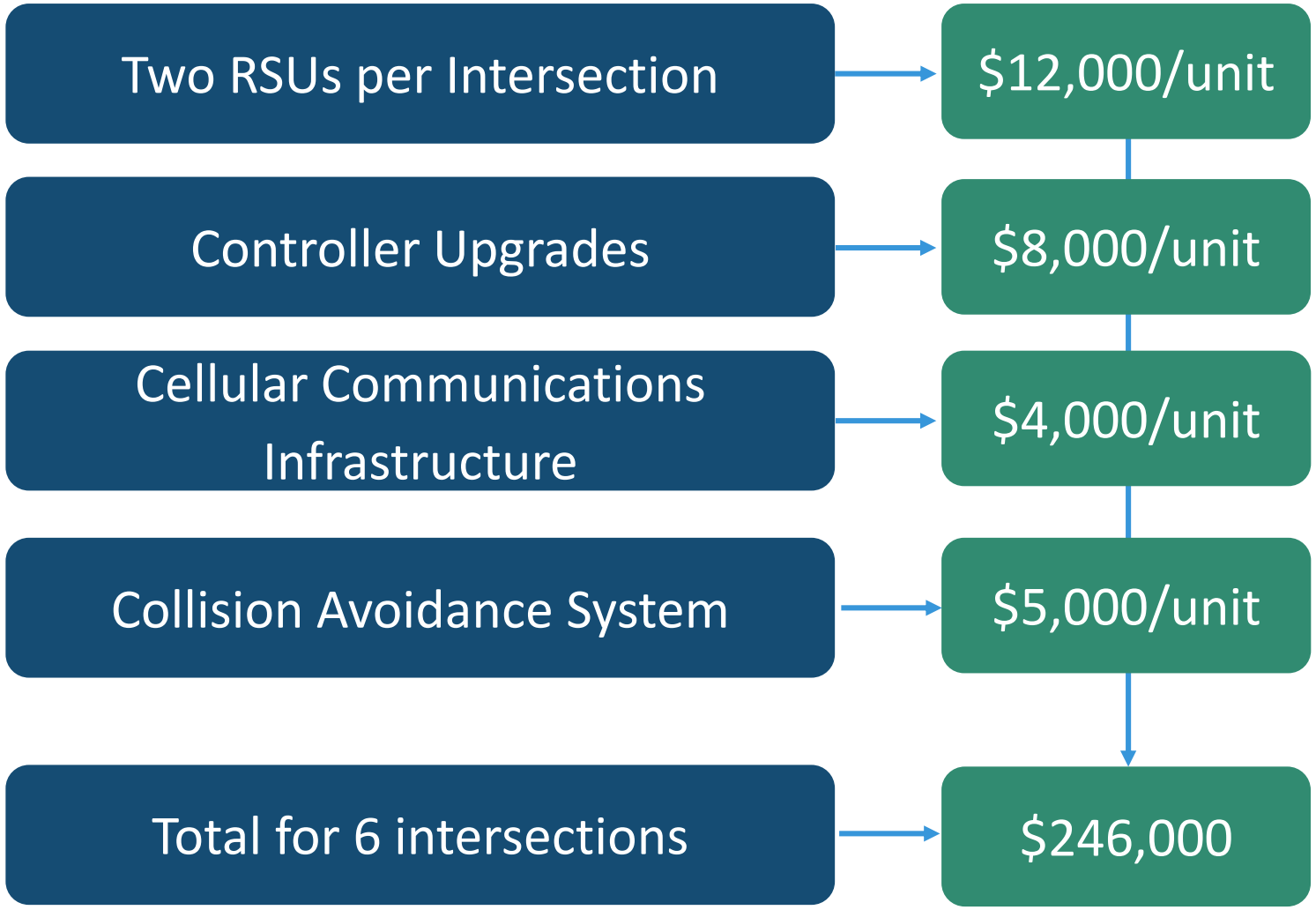
Centers

- RTMC
- TMC
- Central signal control systems

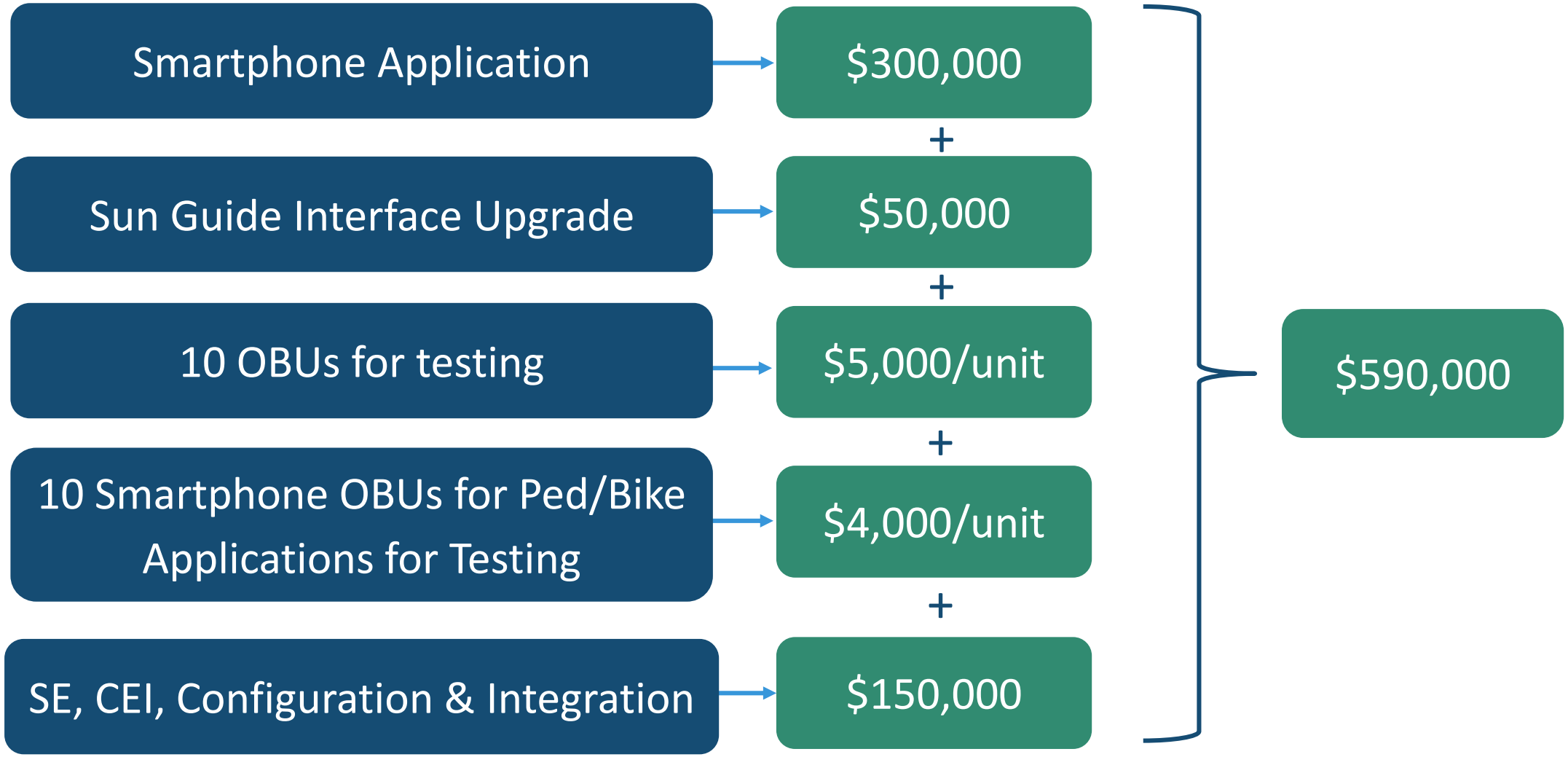
Proposed: Roadway S&PM

- High contrast and wider, closely spaced markings
- Technology enabled signs

Intersection-level Deployment Costs



System-level Deployment Costs



Total Cost

Intersection-level Deployment Cost	$246,000
	+
System-level Deployment Cost	$590,000
	+
Contingency @12%	$100,000
	=
TOTAL COST	$936,000

Timeline

3 Months
- Stakeholder Consultation and Needs Assessment

6 Months
- ConOps Document, System Engineering Management Plan, RFP Preparation, and Preliminary Engineering

4 Months
- Procurement Process

8 Months
- Design-Build for Implementation

- The deployment of the proposed system is anticipated to take 21 months.
- The Design-build phase includes FIITT:
  - Furnish
  - Install
  - Integrate
  - Test
  - Train

Potential Benefits

Safety

- Improved pedestrian/bicyclist detection, verification, validation, and response.
- Fewer pedestrian and bicycle crashes at signalized intersections.
- Reduce red-light violations.
- Help proactively prioritize locations for safety improvements based on conflict analysis.

Mobility

- Maximizing the available green time and signal phases to accommodate all modes.
- Reduced delay and number of stops for bicyclists.
- Increasing the throughput of bicycles and vehicles due to advanced detection.
- Accommodating higher pedestrian volume particularly in downtown.

Enforcement

- Future enhancement: An additional detection system that will determine the at-fault road user and issue a ticket.

Thank You!

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