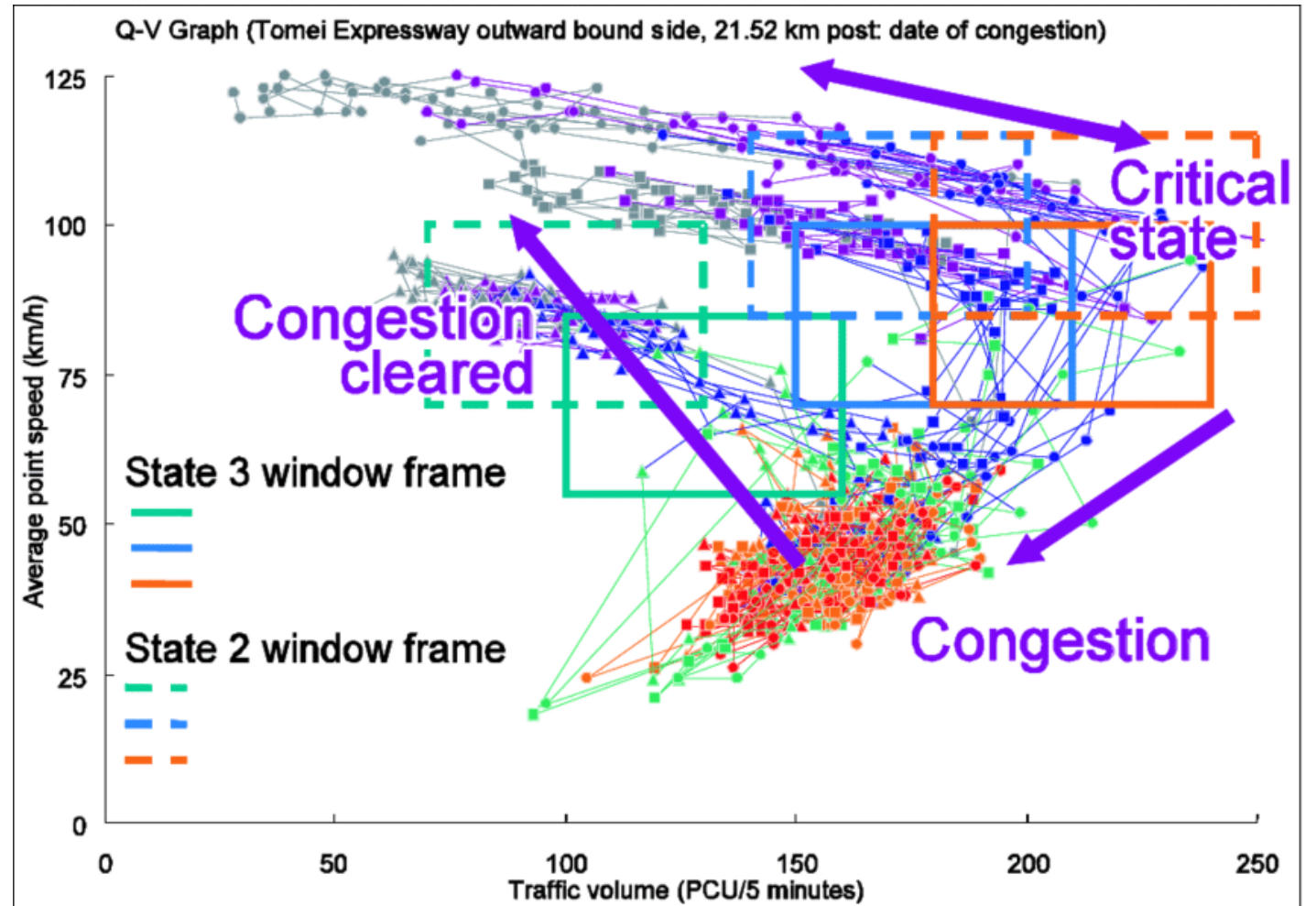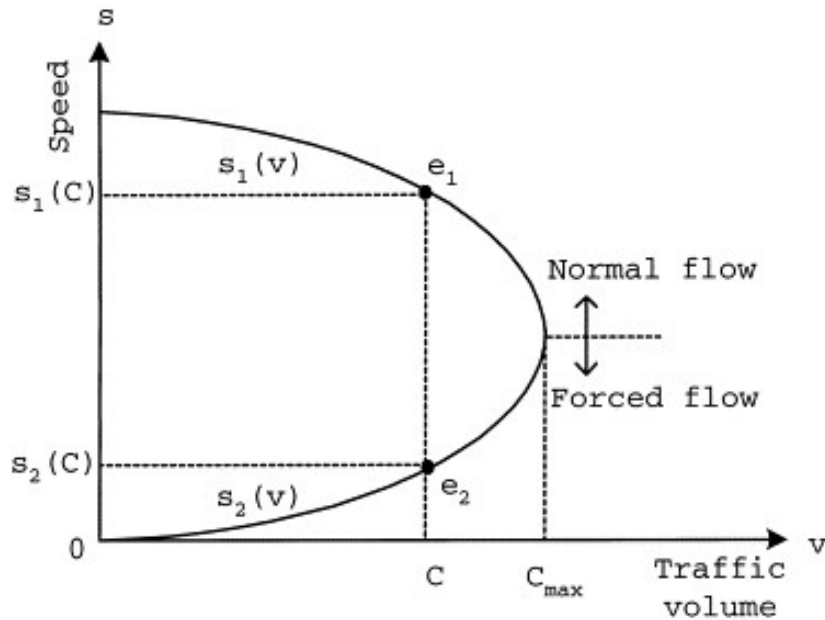# Ramp Metering

Jeremy Dilmore, P.E.
FDOT District Five – TSM&O Engineer

Ramp Signaling in FL

- CO –RSS Warrant Study (2012); TSM&O Strategic Plan (2013);
  RSS Implementation Guide (2017);
- D4 - I-95 Managed Lane Phase 3 (**54 RS**)
  - Phase 3A (**29 RS**)– design/construction, Operation 2019
  - Phase 3B (**15 RS**)– design, Operation 2023
  - Phase 3C (**10 RS**)– Procurement, Operation 2024
- D5 - I-4 Managed Lanes (**11 RS**) - under construction, Operation 2021
- D6 - I-95 Managed Lane Phase 1 (**22 RS**) - Operation since 2009
  SR-826 Managed Lanes (**19 RS**) – construction, Operation 2019
- D7 - TBX is evaluating RSS feasibility
- FTE – Completed evaluation and future deployment

Why Ramp Meters

Q-V Graph (Tomei Expressway outward bound side, 21.52 km post: date of congestion)
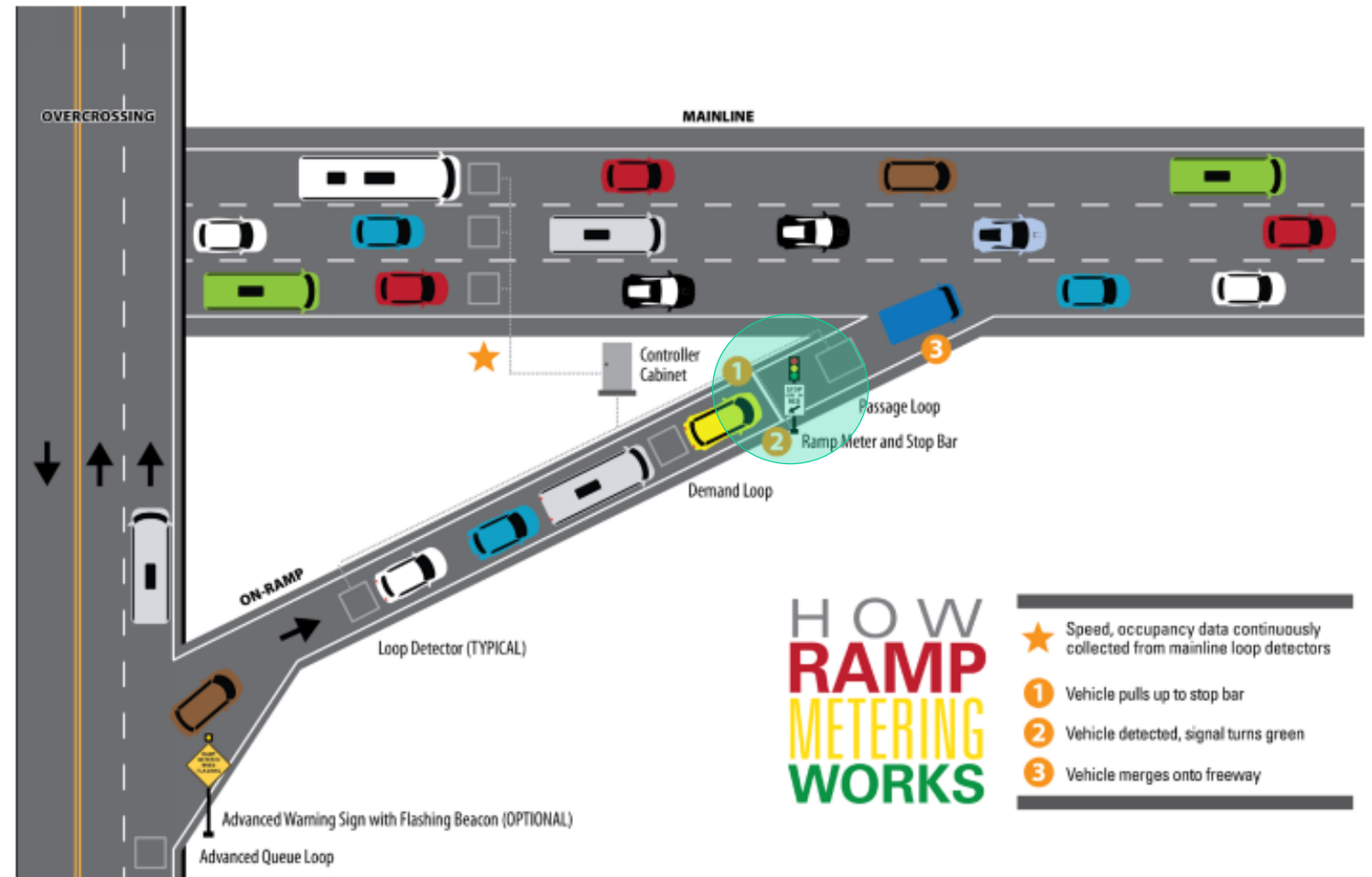
Introduction

Ramp Metering

- Red/Green traffic signals at freeway on-ramps
- Control the rate at which vehicles enter the freeway
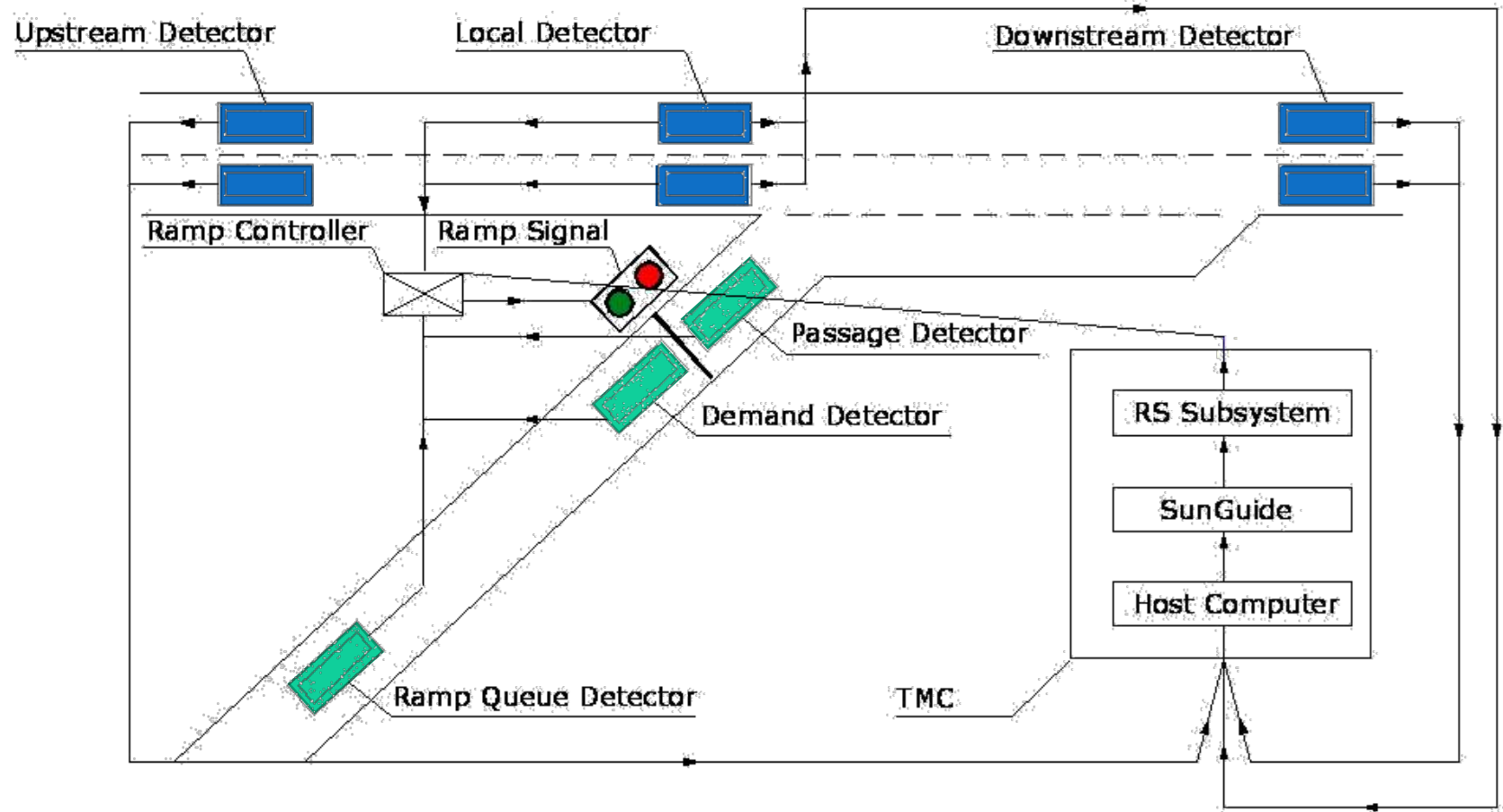- Regulate traffic flow

Benefits

- Reduce Crashes
- Break up Platoons
- Divert Traffic
- Increase Vehicle Throughput
- Cost-Effective

https://www.fdot.gov/traffic/Ramp-Signaling

RSS Design - Component

- Controller
- Signal
- Detectors
- Cabinet
- Flashers
- Signing
- CCTV
- TMC
- Power
- Communication

RSS Design – Detectors

- Freeway Detection
  - Upstream detector – MVDS, configurable, existing or new
  - Downstream detector – MVDS, configurable, existing or new, depending on bottleneck locations
  - Mainline – MVDS, immediate downstream of gore, fed to controller directly

- Ramp Detection
  - Demand – typically loop, presence detection
  - Passage – typically loop, presence detection
  - Queue loop – typically dual loops, queue detection
    - < 50 ft from intersection, if ramp <1320 ft,
    - < 1200 ft from signal ,if ramp > 1320 ft
  - Intermediate Loop - Optional
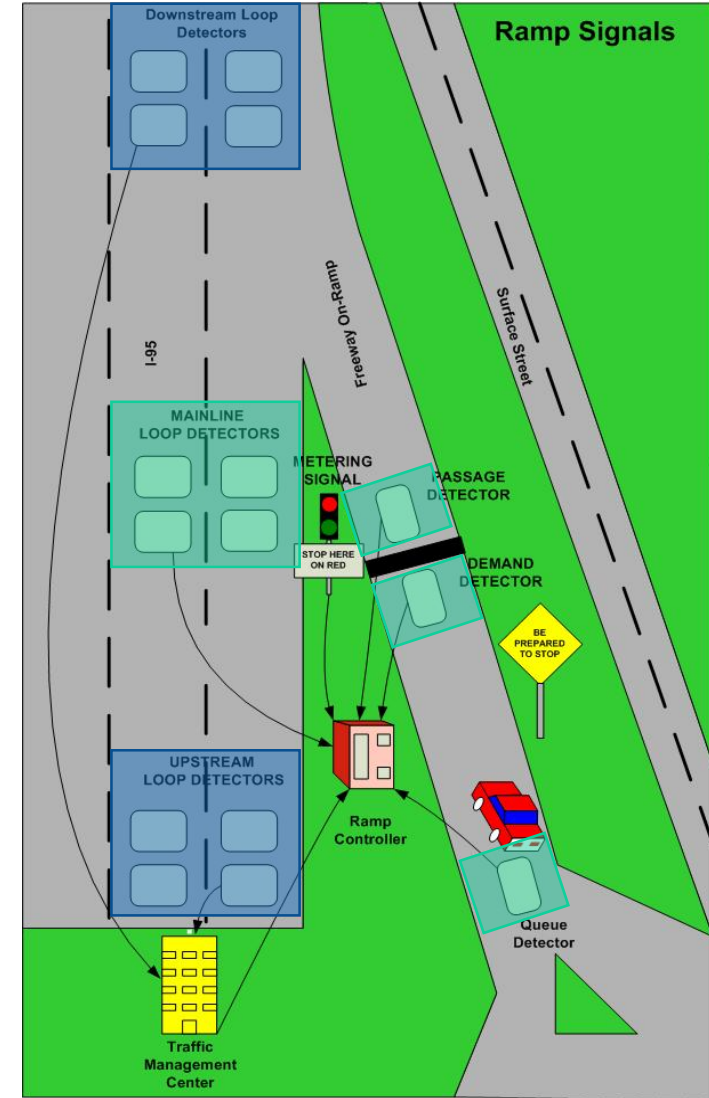
RSS Design – Stop Bar and Regulatory Signs

- Stop Bar – must be properly located
  - Meet acceleration length requirement
  - Provide adequate storage on ramp
- Stop Bar Sign
  - R10-6x
  - Post mounted on signal pole
- X Vehicles Per Green
  - R10-28/R10-29
  - Flow control strategy determined by ramp volume analysis
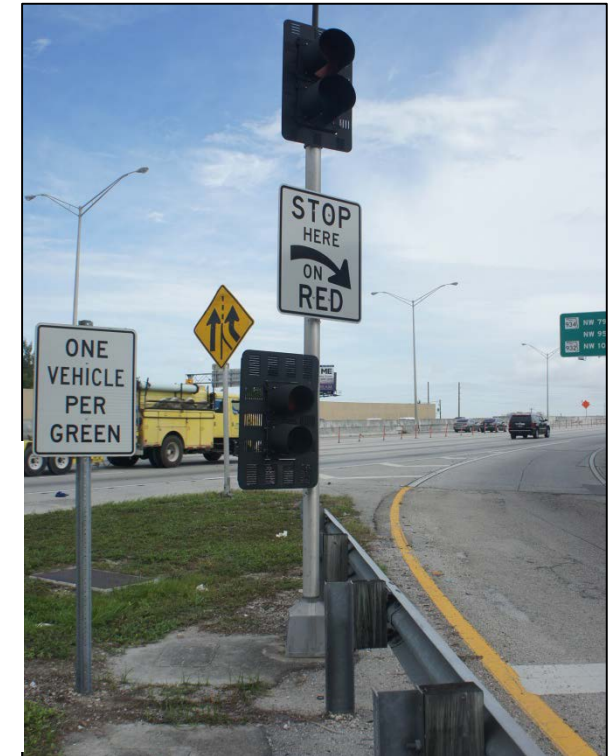 - Post mounted adjacent to signal pole

STOP HERE ON RED
R10-6

STOP HERE ON RED
R10-6a

ONE VEHICLE PER GREEN
R10-28

1 VEHICLE PER GREEN EACH LANE
R10-29

RTMC Readiness

- Software development acquisition
- Hardware Acquisition
- SOG Development
- Operations Staff Training
- Maintenance Staff Training
- Workstation Configuration & Setup

RSS Operation – Operation Mode

	Pre-Timed	Traffic Responsive
Local	• No real-time data is needed • Requires periodic manual update • Appropriate for localized issues • Less effective for non-static conditions	• Vehicle detection is needed • Appropriate for localized issues • Higher capital and maintenance costs than pre-timed systems • Greater benefits
System-Wide	• Appropriate for widespread issues • Vehicle detection is not needed • Rarely used, as compared to system-wide traffic responsive systems	• Vehicle detection is needed • Appropriate for localized issues • Most useful for corridor, system-wide applications • Greatest capital and maintenance costs, but yields most benefits

RSS Operation – D5 Operations Plan

- We have watched D6; going to observe D4
- Fully Automated Activation & Deactivation Process
  - Traffic Data Triggered
  - SunGuide Event Creation Triggered
  - ICMS refinement
- Operators to observe critical intersections
  - Michigan Ave / Kaley St
  - South St
  - John Young Pkwy

Incident Management

- Existing Incident Management resources will be sufficient to cover metered ramps

- Coordinate with FHP
  - Initial DEPLOYMENT /ACTIVATION enforcement saturation
  - Periodic FHP targeted metered ramp enforcement
    - (District 6 methodology)

For more information:
www.CFLSmartRoads.com

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