Improve Intersection Safety
Enhanced Red Light Violation Enforcement

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Outline

• Project Background
• System Components
• System Operations
• System Installation
• Violation Video Clip
• Applications
• Lessons Learned
• What’s Next
Project Background

- Red Light Violations
- Court Contest
- Visual Evidence
- Right angle Collisions
- Safety Concern
- Historical Crash Data
Goals

- Monitor and report real-time violations in the field
- Provide real-time visual evidence for law enforcement
- Enhance safety of law enforcement officers
- Provide surrogate crash data
- Provide flexible system installation and deployment.
- Enhance intersection safety
System Components

- Toroid
- Radio Transmitter
- Laser Sensor
- Antenna
- Central Unit
- Radio Receiver
- Pic-Pic Video Inserter
- DVR & Logic
- Cameras
- Tablet Computer
- Toroid
- Video Inserter
- Pic-Pic
- DVR
System Operations

- Signal Control Cabinet
- Central Unit - DVR
- Laser
- Stop Bar Camera View
- Signal Head Camera View
- Red Phase
- Cellular Network
- Wireless Network
- Tablet Computer
- Live Stream
- Playback Violation
- Poison Vehicle Zone
- Live Stream
- Playback Violation
Violation Detection and Recording Logic

- Red Phase Detection (Toroid)
- Vehicle Detection (Laser)

Red Light Violation:
- Early Enter: Not a Red Light Violation
- Late Leave: Not a Red Light Violation

Contact Closure Pulse:
- Pre Trigger Time: 5 sec
- Post Trigger Time: 5 sec
- Trigger Time
System Installation

• Recommend two people for installation (2-4 hours)
• Requires DOT staff to assist installation
  ♦ Electrician for power connection
  ♦ Traffic engineer to identify red phase cable
  ♦ Bucket truck may be needed
• Simple Hand Tools Needed
System Installation
Violation Sample Video
Violation Sample Video 2
Remote Access
Applications

• Onsite Violation Monitoring at High Crash Rate Sites
• Routine Violation Performance Metrics
• Diagnosis of Problematic Locations
Lessons Learned

- Protocol works effectively
- Accurate vehicle detection
- Cost-effective red phase detection
- Effective violation reporting
- Effective visual evidence and playback
Lessons Learned

- Sensor calibration procedure
- Pedestrians can cause false calls
- Some occlusions occurred
What’s Next

- Minor changes to the unit closure
- Simplify the interface software
- Use Sensys Wireless Sensors to eliminate occlusions at permanent sites
- Produce a complementary red/yellow phase handheld device
- Test at Other Locations
- Potential Operational Issues
  - Institutional Agreements
  - Data ownership and usage
Contact

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Thank You!