



**DENVER**  
THE MILE HIGH CITY

# Photo Enforcement Program

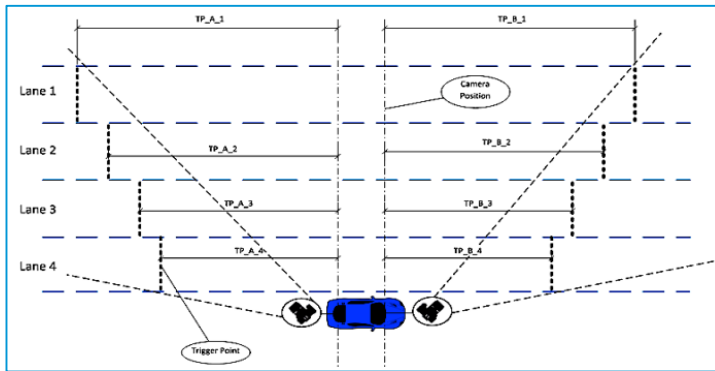
Denver Police Department  
City & County of Denver

FOR CITY SERVICES VISIT | CALL  
**DenverGov.org** | **311**

- **Photo Speed** program started  
in November, 1998
- **Photo Red Light** program started  
in July, 2008

- One Contract = Operational Efficiencies
- New Technology : Better Images for Photo Speed; RADAR vs Embedded Loops for Photo Red Light
- Movable Red Light Technology
- Public Information Campaign

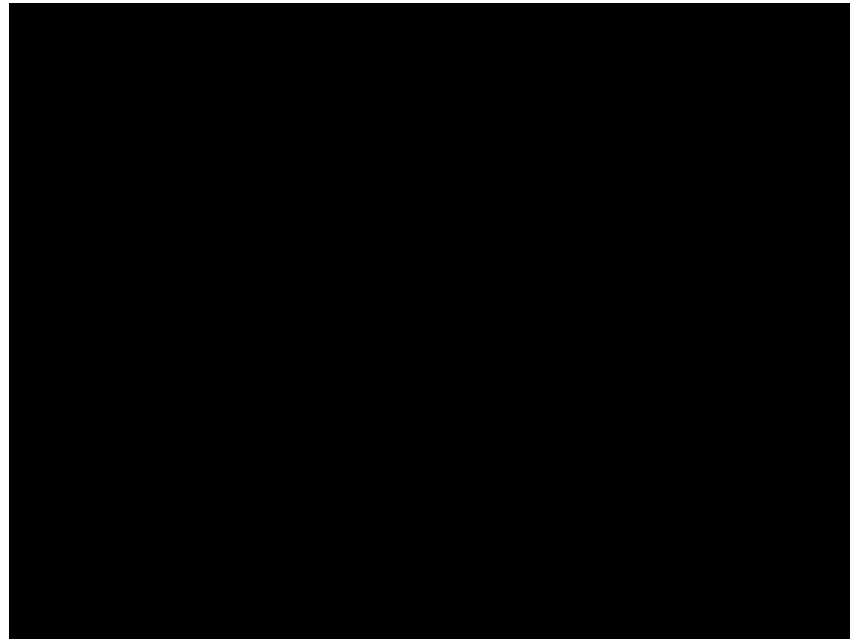
- New Technology : Better images for Photo Speed; LIDAR vs Embedded Loops for Photo Red Light



- Movable Red Light Technology



- Public Information Campaign
  - Engage with the public through multiple mediums, including social media and outdoor advertisement



- **Photo Speed** enforcement operates on a 2-shift, 7-day a week schedule
- 4 **Photo Speed** vans enforcing for each shift during the week;  
2 **Photo Speed** vans enforcing for each shift during the weekend
- Enforcements limited to:
  - Residential 35MPH or less
  - Streets Bordering Parks
  - School Zones
  - Work Zones
- Fines are set by Statute at \$40.00 and \$80.00 in safety zones for fines doubled

- A Photo Enforcement Agent is **ALWAYS** in the van during enforcement
- Photo Radar In Use Sign (PRS) is required 300' from van

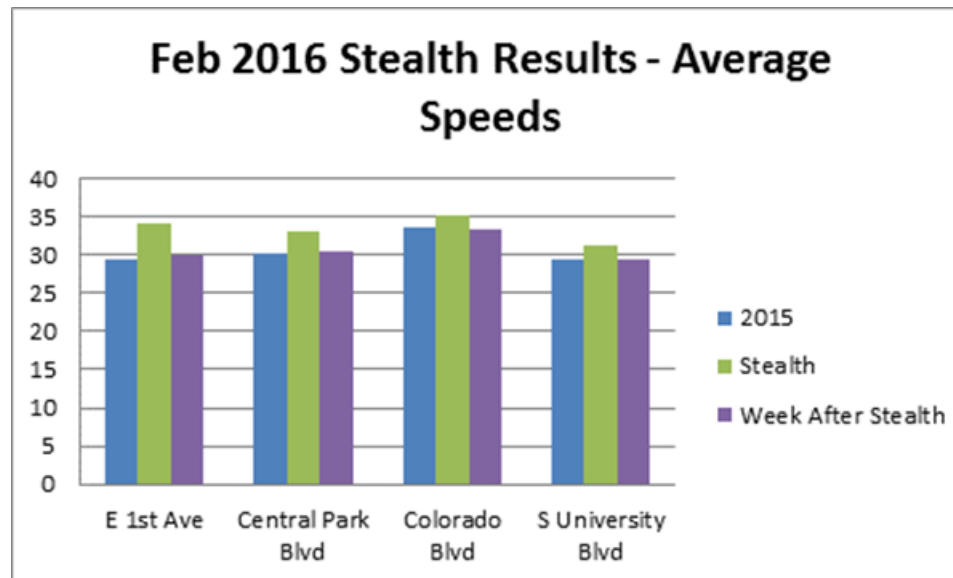




- RADAR equipment is calibrated annually and tested for accuracy before and after each enforcement
- Citations are issued to only 1 vehicle at a time
- 808 possible enforcement locations; about 150 locations are actively enforced
- Reactive to citizen complaints & proactive at new locations
- Coordinate enforcement efforts with Neighborhood Enforcement Team (NET) and District Stations
- WORK ZONE enforcements are coordinated with construction companies and CDOT
- Always enforcing at SCHOOL ZONES when school is in session

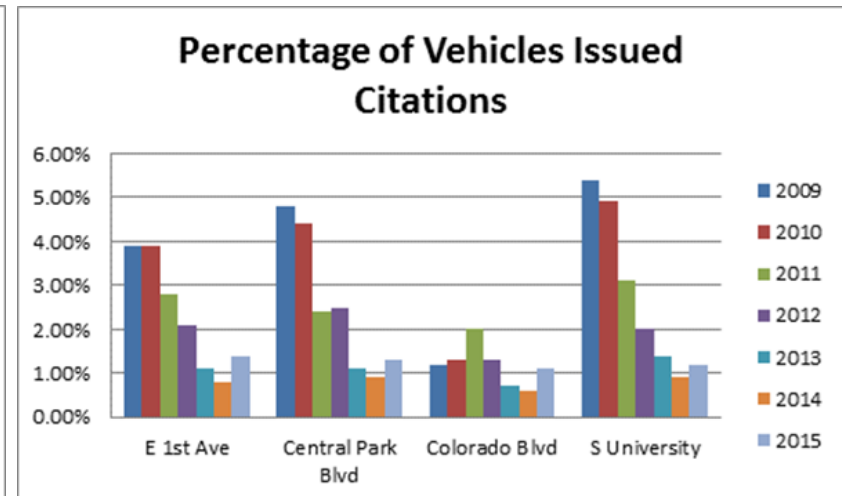
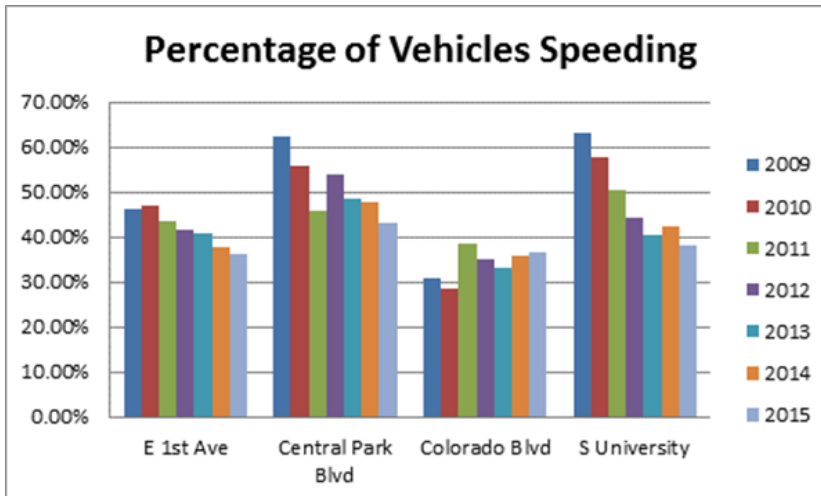
## STEALTH STUDY (Winter 2016)

- **8.65% INCREASE** in average speeds after 4 weeks of van absence
- **7.62% DECREASE** in average speeds 1 week after van presence

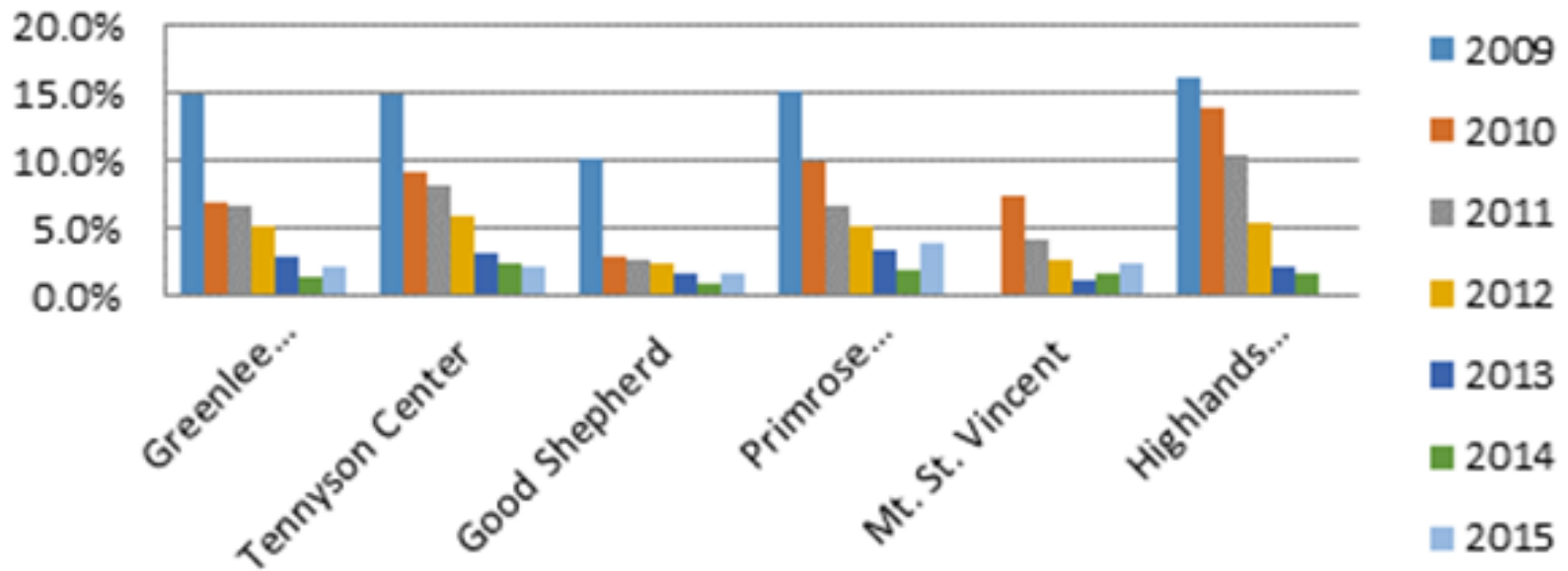


- DECREASE in % of Vehicles Speeding & % of Citations Issued  
2200-1300 E 1<sup>st</sup> Avenue (West Bound)

<b>2009</b>	46.1%	3.9%
<b>2012</b>	41.8%	2.1%
<b>2015</b>	36.3%	1.4%



## School Zone Percent of Vehicles Issued Citations



## 4 Photo Red Light Intersections\*

- E 6<sup>th</sup> Avenue & Kalamath Street E/B
  - E 6<sup>th</sup> Avenue & Lincoln Street E/B
- W 8<sup>th</sup> Avenue & Speer Boulevard W/B
- E 36<sup>th</sup> Avenue & Quebec Street N/B

\* Incidents detected 24/7

- Fines are set by Statute at \$40.00 for stop-bar violations and \$75.00 for through violations.

# Turning Off Red Light Cameras Cost Lives, New Research Shows

In cities that **turned on** red light cameras  
**21% fewer** fatal red light running  
crashes per capita

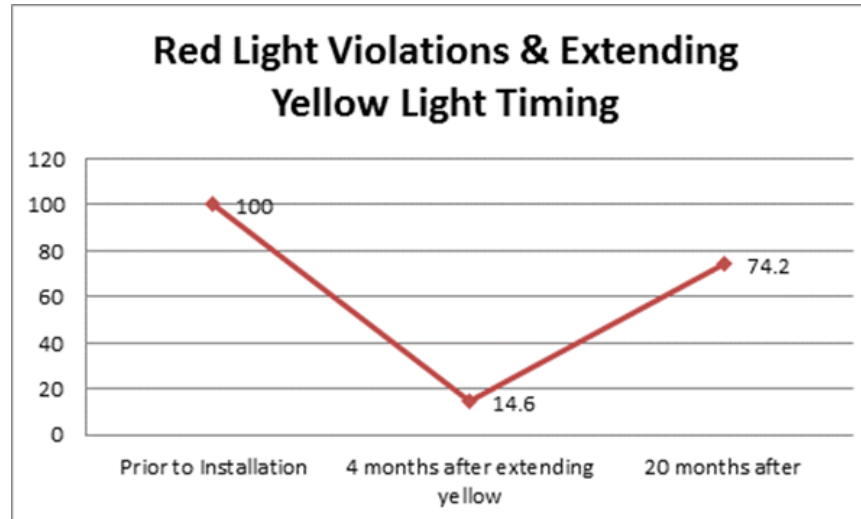
14% fewer fatal crashes of all types per capita at signalized intersections  
than would have occurred with cameras

In cities that **turned off** red light cameras  
**30% more** fatal red light running  
crashes per capita

16% more fatal crashes of all types per capita at signalized intersections  
than would have occurred with cameras

\* Statistic information from the Insurance Institute for Highway Safety, July 2016

- Based on 9 approaches studied, red light running violations decreased after the first 4 months of extending the yellow light by 85.4%
- After 20 months, violations decreased on red light running by only 25.8% before the change. In some cases, the violations increased by 61%.
- This shows that in time, drivers become acclimated to the change.



\* Provided by URS/All Traffic Data based on video survey conducted on 06-10-08, 10-07-08 & 02-17-10.





# Pedestrian “Close Calls”



- We have reduced incidents of Red Light violations at each of our 4 enforced intersections since the program started :
  - **61% decrease** at E 6<sup>th</sup> Avenue & Lincoln Street
  - **54% decrease** at E 36<sup>th</sup> Avenue & Quebec Street
  - **39% decrease** at E 6<sup>th</sup> Avenue & Kalamath Street
  - **6% decrease** at W 8<sup>th</sup> Avenue & Speer Boulevard

## Transportation and Mobility Vision Zero

GOAL : Reduce fatal and serious injury traffic crashes every year!

- Mayoral announcement – Feb 2016
- Action plan open house – Oct 20<sup>th</sup>, 2016 PPA Event Center
- Action plan completion – Summer 2017

## Transportation and Mobility Vision Zero

- Data and Evaluation
  - Education
  - Engineering
  - Enforcement

Car crashes rank among the leading causes of death in the United States

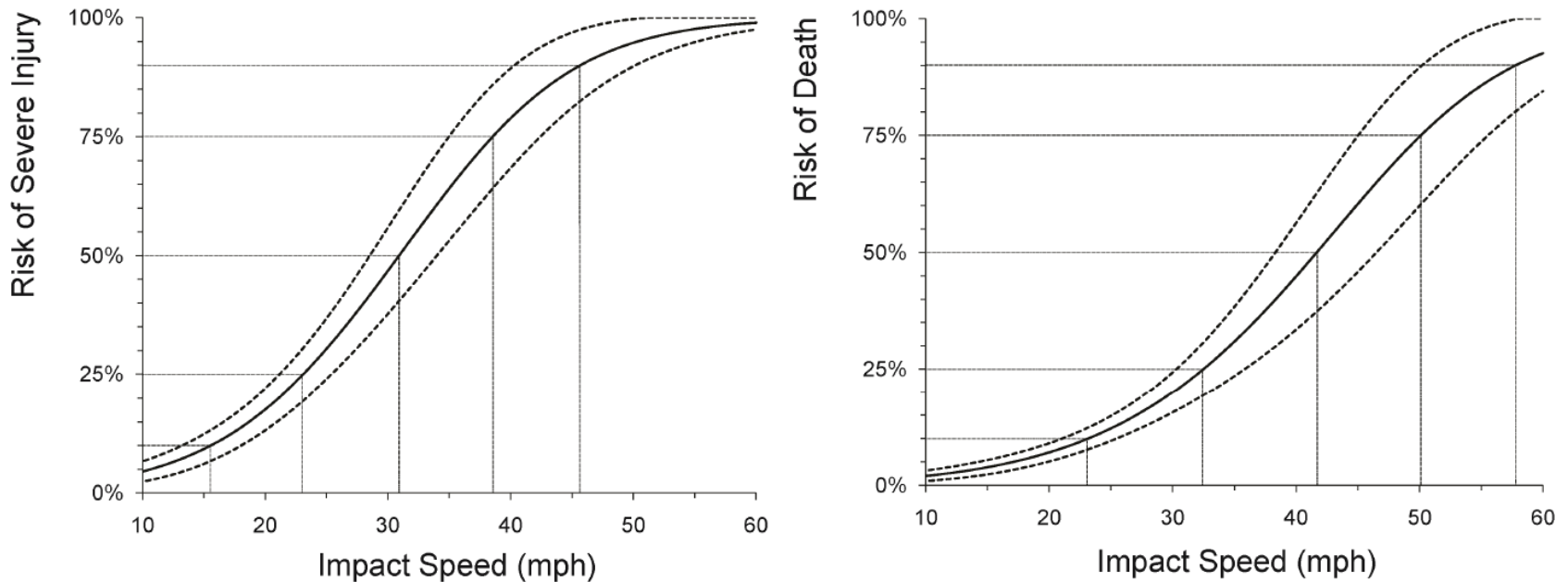


## Impact Speed and a Pedestrian's Risk of Severe Injury or Death

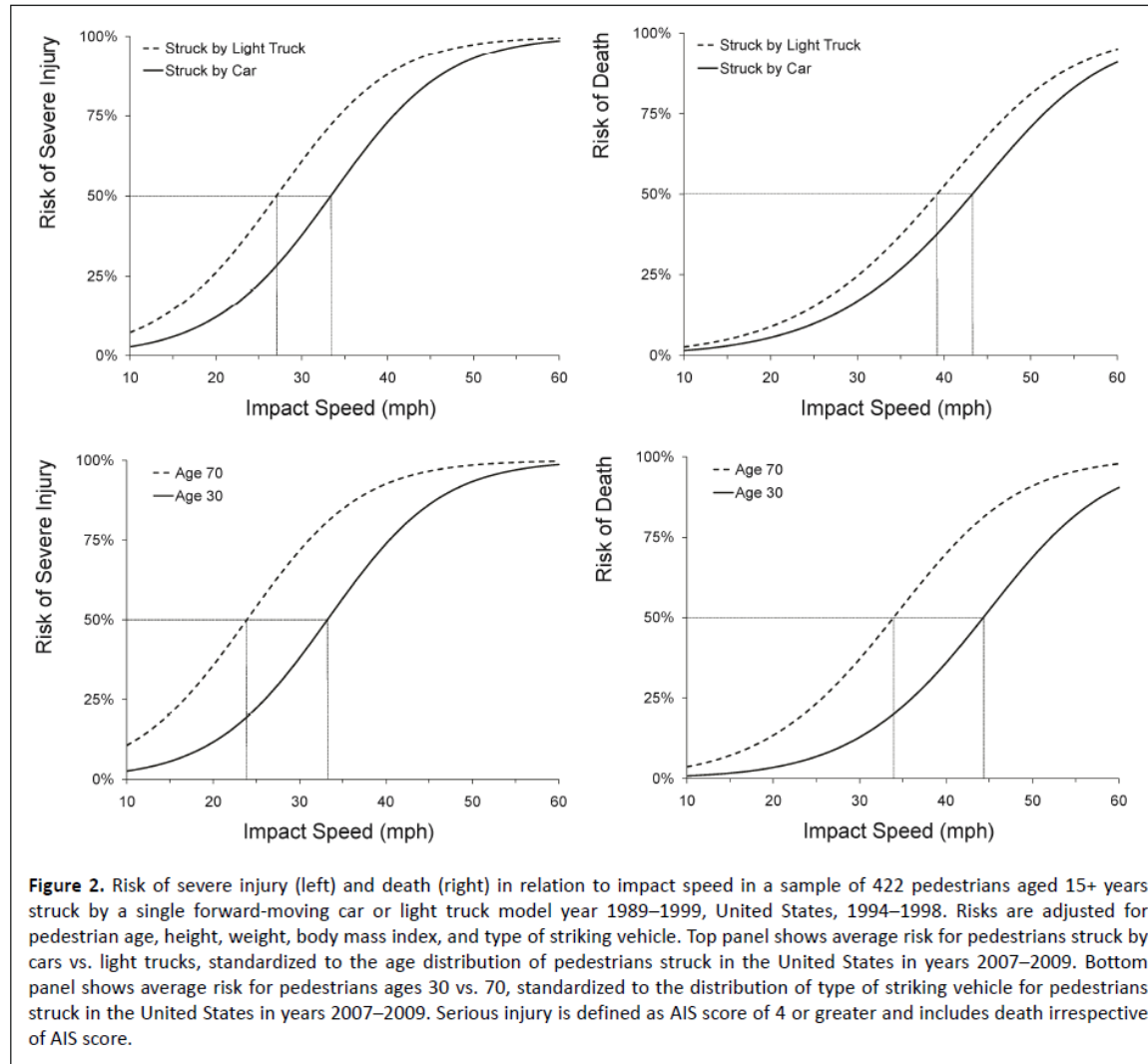
September 2011



607 14th Street, NW, Suite 201 | Washington, DC 20005 | [AAAFoundation.org](http://AAAFoundation.org) | 202-638-5944



**Figure 1.** Risk of severe injury (left) and death (right) in relation to impact speed in a sample of 422 pedestrians aged 15+ years struck by a single forward-moving car or light truck model year 1989–1999, United States, 1994–1998. Risks are adjusted for pedestrian age, height, weight, body mass index, and type of striking vehicle, and standardized to the distribution of pedestrian age and type of striking vehicle for pedestrians struck in the United States in years 2007–2009. Dotted lines represent point-wise 95% confidence intervals. Serious injury is defined as AIS score of 4 or greater and includes death irrespective of AIS score.





## Engineering Countermeasures to Reduce Red-Light Running

### Red-Light Running Defined

There is no simple or single reason to explain why drivers run red lights, but beginning with a definition will provide a framework for discussion. The simplest definition of red-light running (RLR) is the act of entering, and proceeding through, a signalized intersection after the traffic signal has turned red. According to the Uniform Vehicle Code (UVC)<sup>1</sup>, a motorist "...facing a steady circular red signal shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or if none, then before entering the intersection and shall remain standing until an indication to proceed is shown..." (§11-202). An intersection is defined in the UVC as "...the area embraced within the prolongation or connection of the lateral curb lines, or if none, then the lateral boundary lines of the roadways of two highways which join one another at, or approximately at right angles, or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict" (§1-132). See Figure 1.

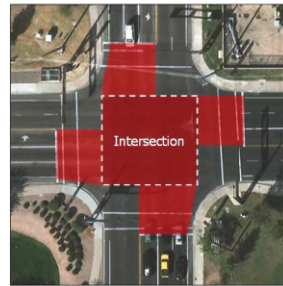


Figure 1: Diagram of UVC definition of an intersection

### Red-Light Running Fatalities

FHWA identified the following four elements from the Fatality Analysis Reporting System that provide a consistent definition of red-light running fatalities.

- The crash occurred at an intersection or was intersection-related;
- The intersection was controlled by an active traffic signal;
- A driver was charged with either failing to stop for a red signal or failing to obey a traffic control device; and
- A driver was going straight at the time of collision.

On average, during the 2000 to 2007 period, 916 annual RLR fatalities have resulted. In 2007, 883 RLR fatalities have occurred. This represents a reduction of 33 RLR fatalities or approximately 3.5 percent as compared to the most recent five-year average. A chart illustrating the RLR fatalities between 2000 and 2007 is shown in Figure 2.

1. National Committee on Uniform Traffic Laws and Ordinances (NCUTLO). *Uniform Vehicle Code*. 2000.

Engineering Counter measures:

- Increase Signal Visibility
  - Modify placement of signal heads
  - Increase size of signal displays
  - Install visors
  - Install LEDs
- Remove reasons for intentional violations
  - Adjust yellow change interval
  - Provide all-red clearance interval
  - Adjust signal cycle length
  - Provide dilemma zone protection with advance vehicle detection





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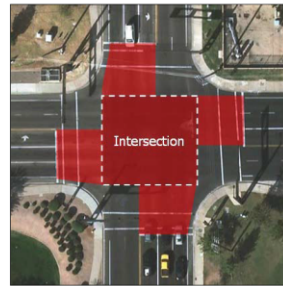


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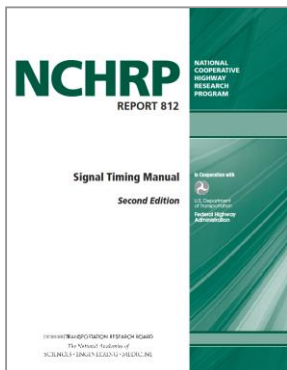
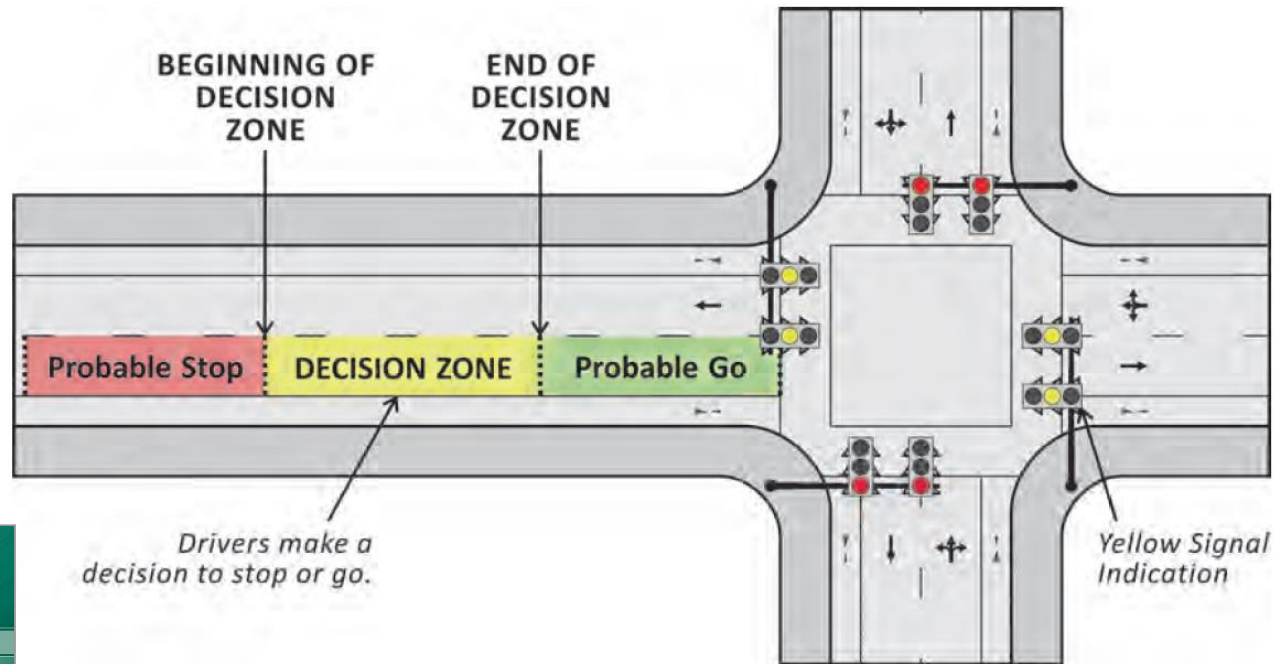
1. National Committee on Uniform Traffic Laws and Ordinances (NCUTLO). *Uniform Vehicle Code*. 2000.

- Eliminate the need to stop
  - Modify placement of signal heads
  - Increase size of signal displays
  - Install visors
  - Install LEDs

Notify drivers that:

- The green has ended
- The red is about to be displayed
- The cross-street is about to display green

## The Dilemma Zone





## Yellow Light Time in Denver A Quick History

- ??? to 2008
  - Yellow = 3.0 sec
  - All Red = 2.0 sec
- 2008 – Photo Enforcement Installed

## Yellow Light Time in Denver A Quick History ~ Continued

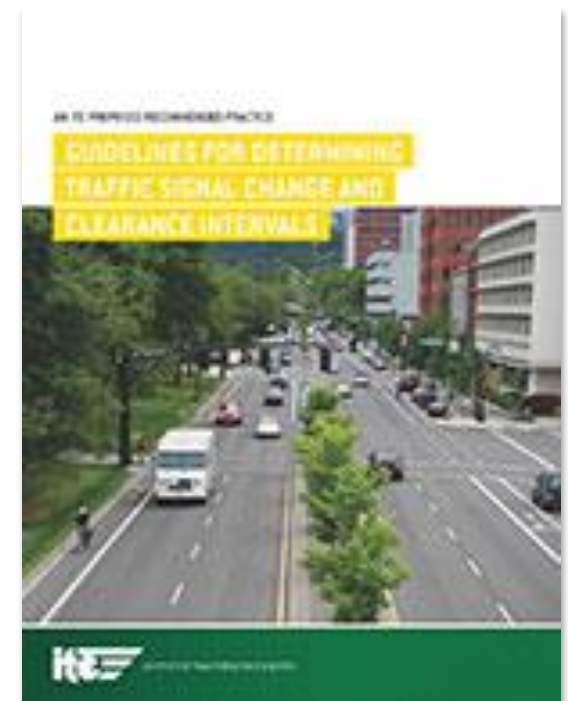
- 2008
  - Photo enforced locations and handful of control locations updated to 1985 ITE recommended practice
- 2011 – Present
  - All new, rebuilt and retimed traffic signals updated to 1985 using posted speed limit



2012



2014



2015

## **NCHRP** REPORT 731

### **Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections**

NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

Recommendations match formula of 1985 ITE methodology with exception to vehicle speed.

Option 1 – Use 85<sup>th</sup> Percentile vehicle speed.

Option 2 – Approximate 85<sup>th</sup> Percentile speed by adding 7 mph to posted speed.



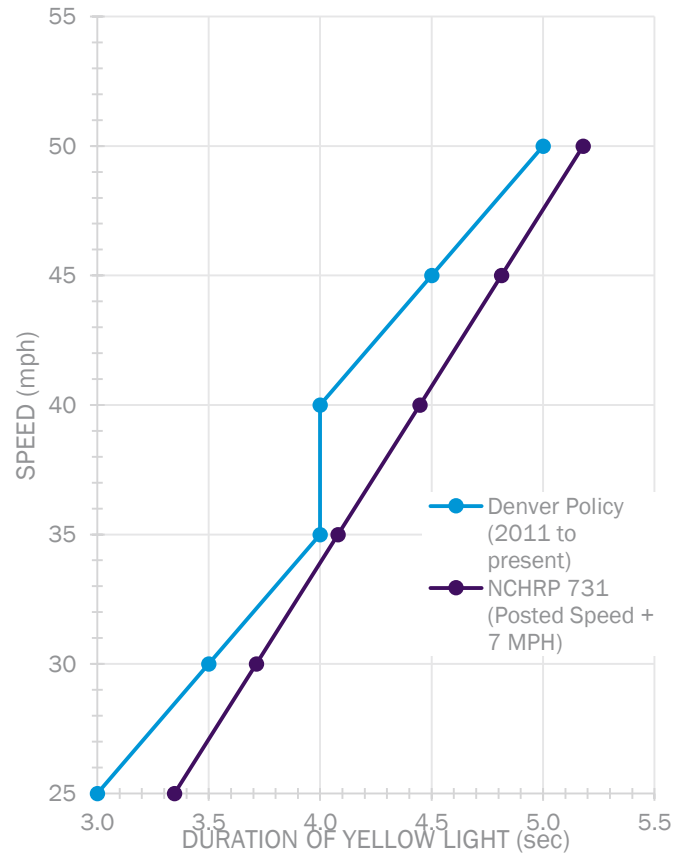
## NCHRP REPORT 731

NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

### Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

YELLOW TIME CALCULATION

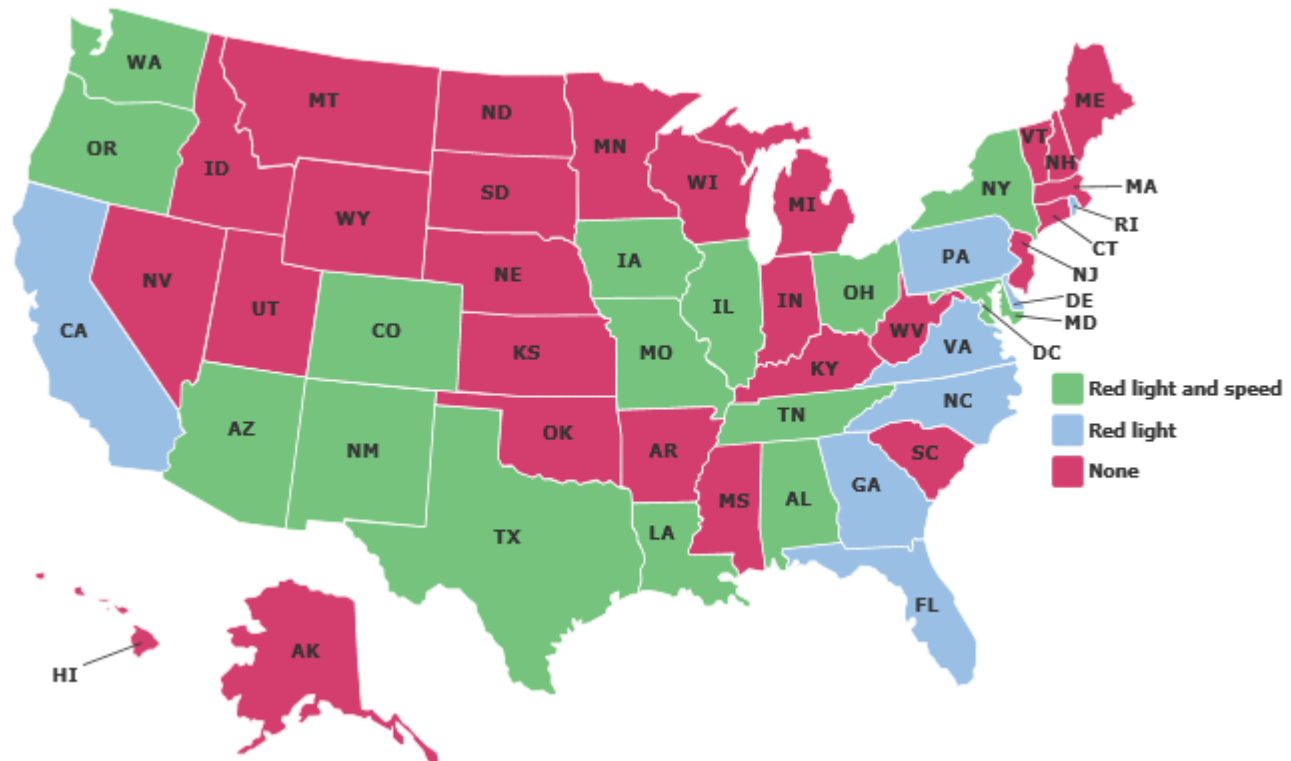


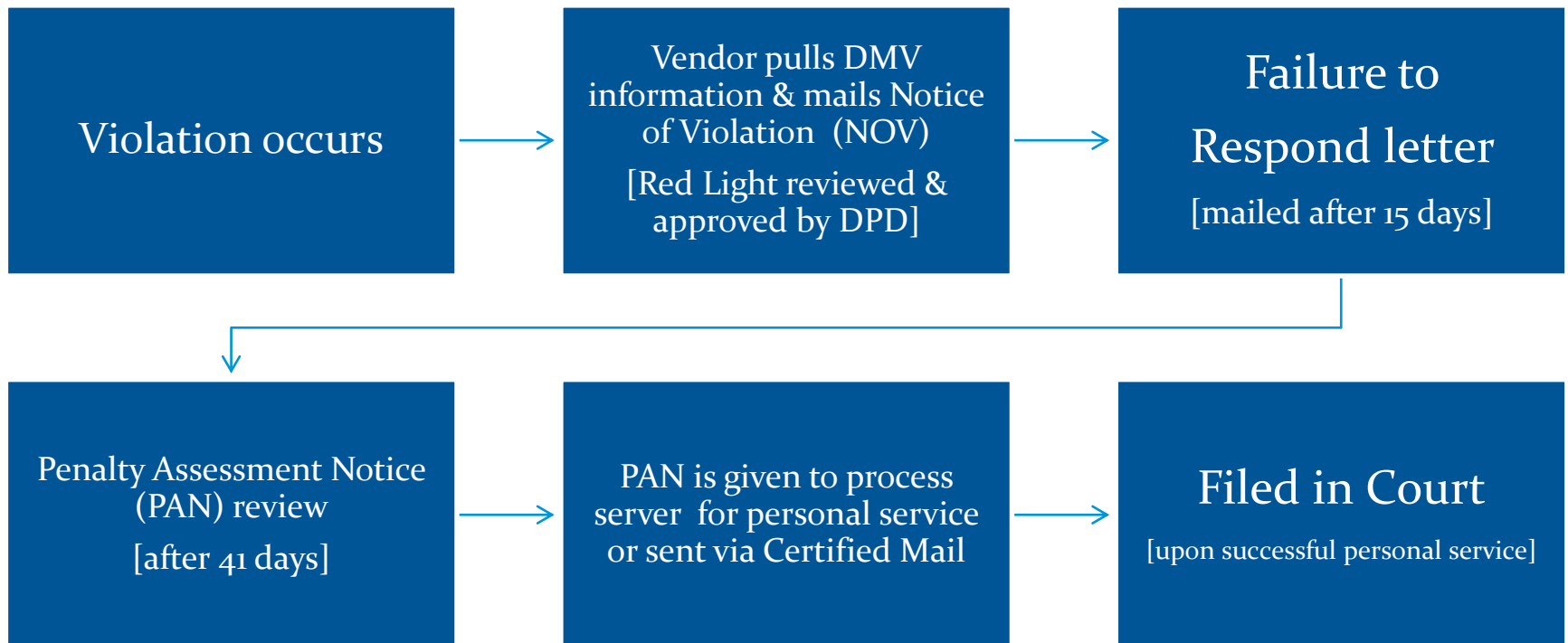
- A multi-national road traffic safety project that aims to achieve a highway system with no fatalities or serious injuries in road traffic.
- Denver's Vision Zero commitment seeks to reduce fatal crashes consistently year-over-year.
- Specific action plans involving Photo Enforcement:
  - Provide enforcement programs
  - Provide pedestrian safety efforts
  - Provide committed speed enforcement in school zones

**VISION ZERO**



- 430 communities have red light camera programs as of August 2016.
- 142 communities have speed camera programs as of August 2016. This includes statewide work zone programs in Illinois, Maryland and Oregon.





- Photo Enforcement has been used to help solve violent crimes across the State.
- Our program is used as a standard for other cities across the Country.
- We are the only city in Colorado that provides their own customer service to the citizens.
- We have changed the driving habits of citizens in key locations including Sheridan Blvd., Monaco Pkwy., Quebec St., Colorado Blvd. & Lincoln St.

*Thank you.*