Blind Spot Information Systems

VRU-Proxy June 2018

Washington State Transit Insurance Pool

Presented 6th Session (Available on working group's webpage)

Relevant Effectiveness Trials

In a project involved field testing and evaluation of the NDAS in revenue service over a three-month period: [xii]

- No NDAS (Mobileye's Shield +) equipped buses were involved in any collisions with bicyclists or pedestrians
- For each warning type, there were fewer warnings per 1000 miles for the active fleet compared with the control group.
- The rates for PCW's (and PDZ's were combined to yield 43.32% fewer pedestrian collision warnings.
- The net result was an estimated reduction in vehicular claims of $13.1 million and a reduction in pedestrian claims of $6.9 million. The total reduction of $20.0 million amounted to an estimated 58.5% potential reduction in claims due to collisions for all buses insured by WSTIP.

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Alert Data Analysis

	Number of Indications	Indication Histogram	Relation - Information /TTC	Number of Indications	Indication Histogram	Relation - Information /TTC	Number of Indications	Indication Histogram	Relation - Information /TTC
	Trucks								
	Contry 1			Country 2			Contry 3		
Front - Information	53,722	59%	1%	42,112	60%	2%	58,747	71%	7%
Passenger - Information	17,128	19%	15%	13,924	20%	31%	13,433	16%	12%
Driver - Information	20,264	22%	9%	14,079	20%	10%	10,831	13%	8%
Front - TTC Alert	466	10%		995	15%		4,263	63%	
Passenger - TTC Alert	2,523	53%		4,352	65%		1,659	25%	
Driver - TTC Alert	1,774	37%		1,400	21%		822	12%	

	Number of Indications	Indication Histogram	Relation - Information /TTC	Number of Indications	Indication Histogram	Relation - Information /TTC	Number of Indications	Indication Histogram	Relation - Information /TTC
	Buses / Mixed								
	Conutry 1			Contry 2			Contry 3		
Front - Information	222,675	81%	3%	351,217	57%	5%	720,277	64%	4%
Passenger - Information	40,022	15%	12%	217,348	35%	5%	289,533	26%	1%
Driver - Information	11,484	4%	9%	51,889	8%	11%	116,308	10%	3%
Front - TTC Alert	7,324	56%		18,336	52%		31,497	80%	
Passenger - TTC Alert	4,738	36%		11,399	32%		4,088	10%	
Driver - TTC Alert	1,031	8%		5,705	16%		4,027	10%	

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Alert Data Analysis

Trucks vs. Buses, Western Europe

- Information Analysis:
- Trucks: 60: 20 : 20 Ratio (Front / Passenger / Driver)
- Buses: Lower Driver indication ratio on Driver Side

- TTC Based Alert Analysis:
- Trucks: Substantial TTC impact on passenger side
- Buses: Most Alerts are on the front Side

- Ratio – TTC / Information
- Trucks: 1:10 Ratio in Passenger side
- Lower Ratios on Front and Driver Side

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BSIS with HGVs

Longer Vehicle vs. Passenger

- Longer Vehicles - More Information
- Limited View, Low Mirror View – Limited Decision Making
- All current product offer same HMI for cyclist and pedestrians - Not Scalable
- **So – What is the influx of Information?**

Real Life Scenarios

Right Side traffic, Lateral Distance, Traffic Lights, Multi-agent Scenarios

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Real-Life Scenarios

Right Side traffic, Lateral Distance, Traffic Lights, Multi-agent Scenarios

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Driver Side Multi Cycle Scenario – Straight Movement

- Driver Side: Multiple cyclists, Danger due to parking truck (no ‘almost hit’). Cyclist appear in less than 3 sec difference (see lower right image)

Loc Time	Vehicle Name	Distance In Miles	Address	Speed	Status Name
01/04/2018 10:57:45	Rec 10399	67.1	560 Market St, San Francisco, CA 94104, USA	9	PCW-LR

Multi Cycle Scenario – Straight Movement

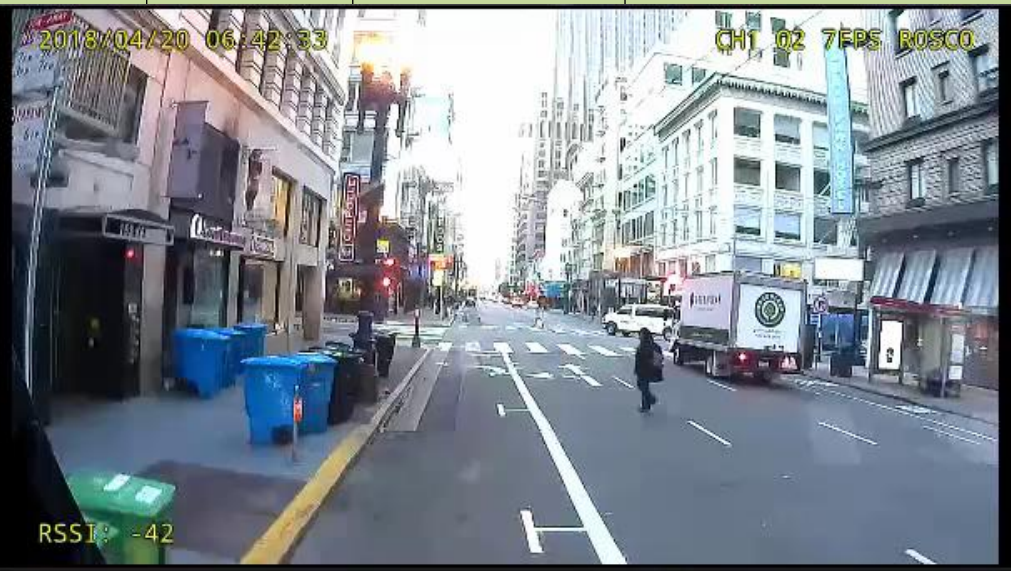
- Another example - Passenger Side: Cyclist and motor appear in less than 3 sec difference (see lower right image)
  - Lack of differentiation by the driver
- Driver Side: Danger due to parking truck and lane differentiation.

Loc Time	Vehicle Name	Distance In Miles	Address	Speed	Status Name
03/08/2018 20:45:51	MCI-LA DOT 17404	62.9	815 7th St, Los Angeles, CA 90017, USA	-	PCW-LR
03/08/2018 20:45:54	MCI-LA DOT 17404	62.9	815 7th St, Los Angeles, CA 90017, USA	-	PCW-LR

Multi Cycle Scenario – One Sided Traffic

- Multi cycle Scenario – the driver might not wait 3 secs.
- (look at upper and lower right cameras)

Loc Time	Vehicle Name	Distance In Miles	Address	Speed	Status Name
04/20/2018 06:42:38	Rec 14489	102.2	175 Sutter St, San Francisco, CA 94104, USA	-	PCW-RR



Bypassing Cyclists – Straight Movement

- Another example with driver side movement.

Loc Time	Vehicle Name	Distance In Miles	Address	Speed	Status Name
01/20/2018 17:05:07	MD MTA 13003	997.4	48-70 S Charles St, Baltimore, MD 21201, USA	-	PCW-LR

Opposite Traffic Scenario - Turning

- Bicycle travelling on passenger side approaching the vehicle from the opposite – No Alert (no visual – compare upper and lower cameras)
  - Driver won't identify and not be notified – prevented with dual coverage.

Loc Time	Vehicle Name	Distance In Miles	Address	Speed	Status Name
04/17/2018 07:50:21	Rec 14444	1.6	1695-1699 North Point St, San Francisco, CA 94123, USA	-	PCW-LR

TTC Based Additional Layer of Alert

- On straight movement the TTC needs to be no more than 1 sec
- On turnings movement the TTC needs to be 2.5 sec.

Smart talking bus

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system is able to warn the driver of a collision and in addition automatically initiates partial braking at the same time. This enables the driver to avoid a collision by means of maximum full-stop braking or a steering manoeuvre. The driver can additionally warn pedestrians in danger by sounding the horn.

Active Brake Assist 4 is tuned precisely to the challenges of deploying vehicles in urban traffic conditions: the system is able to detect moving

Drive Safely