

Washington State Department of Transportation

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Edna Lucille Goodrich Building
Tumwater WA
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NATMEC 2016

WSDOT COUNTING TECHNOLOGIES



GO HAWKS!!

Two Field Crew Counting Divisions

- Permanent Counting
- Temporary Counting



SHORT COUNTS

Temporary Counts of Cars & Trucks



Short term counts and classification



Tube sets



Manual Counting Equipment



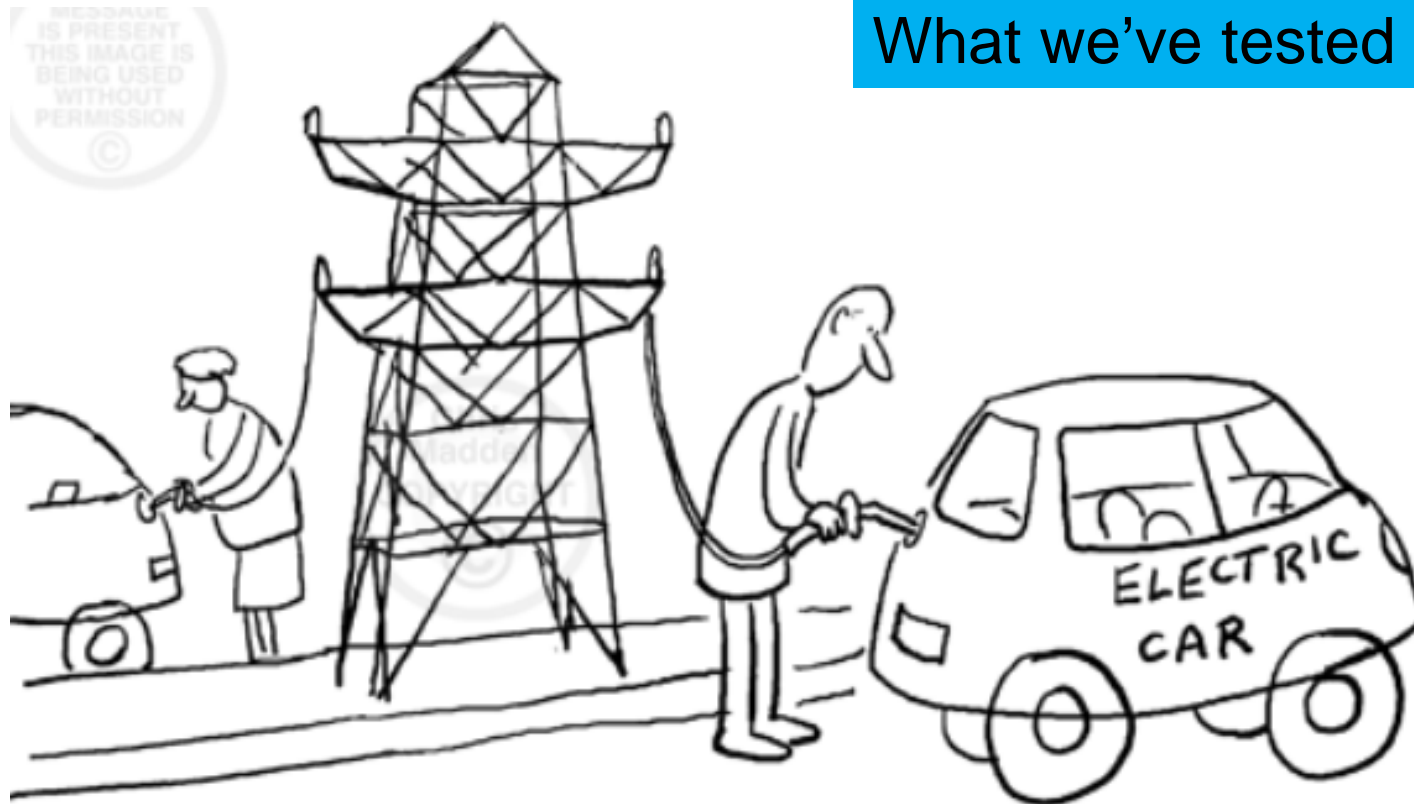
Before/After & Travel Time Studies



- License Plate Reader Cameras
- Bluetooth Reader

Short Count Technologies Tested

What we've tested



Time stamped vehicle collection



Lane Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Volume Mode	Volume Veh.	Axle Class	Speed Class	Length Class	Gap Class	Hdwy Class	Speedx Axle	Speedx Length	SnMs Store	Divide By 2
1.	North		Ax-Ax	4.0ft	6.0ft	Normal	Veh.	X	X							No

Vehicles In Database From: 09:42 - 01/21/2015 To: 10:07 - 01/22/2015

Date	Time	Lane	Speed	Axles	Length	Ax Sp	Ln	Gp	Hd	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
01/21/15	09:59:24.31	#1	42.4	2	10.4'	3	6	4	8	8	10.5	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	09:59:31.42	#1	57.8	2	11.2	3	9	4	2	2	11.2	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	09:59:41.27	#1	55.2	6	49.5	10	9	9	2	2	13.0	4.4'	24.1'	4.1'	4.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	09:59:44.31	#1	54.9	2	11.3	3	8	4	1	1	11.3	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:01:01.11	#1	37.6	2	9.5	2	5	3	7	7	9.5	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:01:03.02	#1	36.7	2	8.6	2	5	3	1	1	8.6	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:01:03.22	#1	35.2	2	13.4	3	5	4	1	1	13.4	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:01:20.86	#1	49.2	2	8.8	2	7	3	4	4	8.9	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:01:55.46	#1	55.7	2	11.4	3	9	4	6	6	11.4	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:02:11.05	#1	53.9	6	55.7	10	8	10	4	4	13.0	6.5'	4.6'	27.3'	4.4'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:02:17.14	#1	52.9	2	9.4	2	8	3	2	2	9.4	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:02:19.38	#1	51.8	2	7.8	2	8	3	1	1	7.8	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:02:45.61	#1	50.3	3	34.2	8	8	5	5	12.1	22.1	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:02:50.45	#1	58.5	2	9.2	2	9	3	2	2	9.2	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:03:22.16	#1	54.2	2	14.0	3	8	4	6	6	14.1	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:04:15.69	#1	52.6	8	76.5	13	8	12	6	6	13.4	4.3'	15.0'	4.1'	17.3'	18.1'	4.2'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:04:18.26	#1	54.4	2	12.7	3	8	4	1	1	12.8	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:04:32.55	#1	58.0	2	8.6	2	9	3	3	3	8.6	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:04:37.56	#1	53.3	5	62.7	9	8	11	2	2	18.8	4.4'	34.6'	5.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:04:58.58	#1	51.6	8	81.6	13	8	13	5	5	19.8	4.4'	21.9'	5.2'	5.2'	20.6'	4.4'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:05:01.67	#1	52.3	3	22.6	6	8	6	1	1	18.1	4.6'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:05:30.97	#1	59.1	2	10.1	2	9	4	5	5	10.2	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:06:16.07	#1	56.2	5	61.8	9	9	11	6	6	17.7	4.4'	34.5'	5.2'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:06:17.98	#1	58.9	2	13.2	3	9	4	1	1	13.2	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
01/21/15	10:06:23.79	#1	58.3	2	10.7	3	9	4	2	2	10.7	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'

Centiron Per-Vehicle Data Dump

Printed: 01/29/15

Radar for short term counts



Pros

- Easy set up

Cons

- Unit did not count accurately where required counts were needed

Laser



Pros

- Fairly easy set up
- Doesn't require receiver
- Data stored in standard counter

Cons

- Expensive

Infrared



Pros

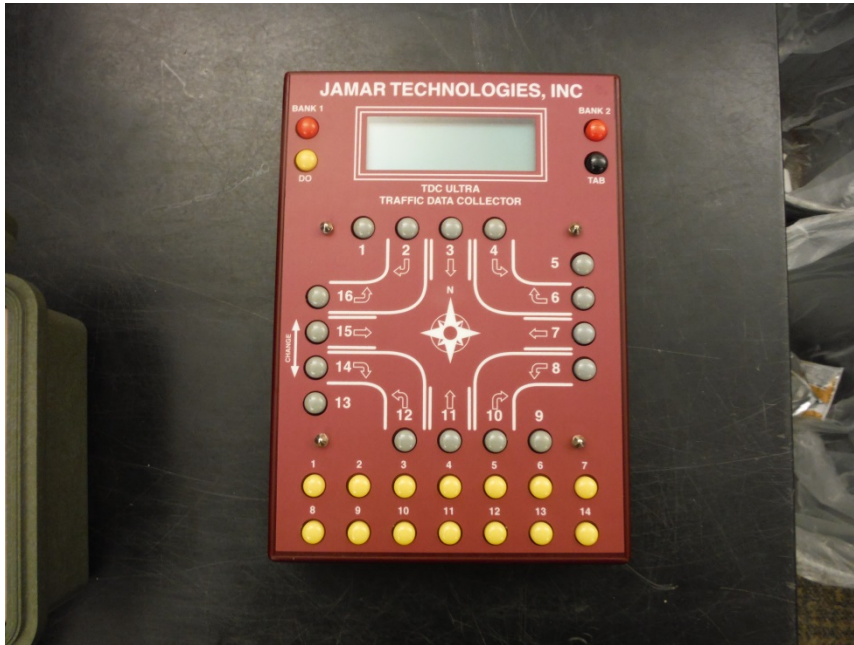
- Accurate

Cons

- Expensive
- Lengthy set up for short term study
- Vendor support??
- Two units required



Manual Count board Tube Count Equipment



Tube Counter/Bluetooth Reader



Permanent Data Collection

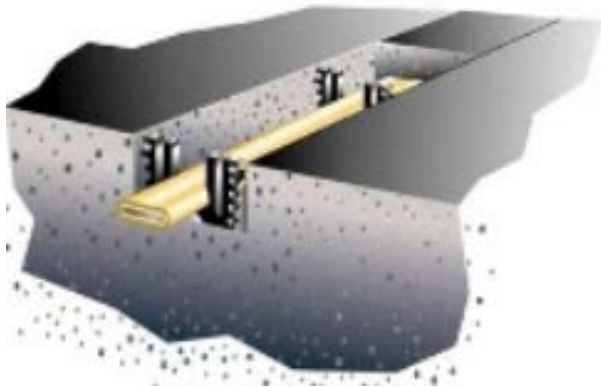
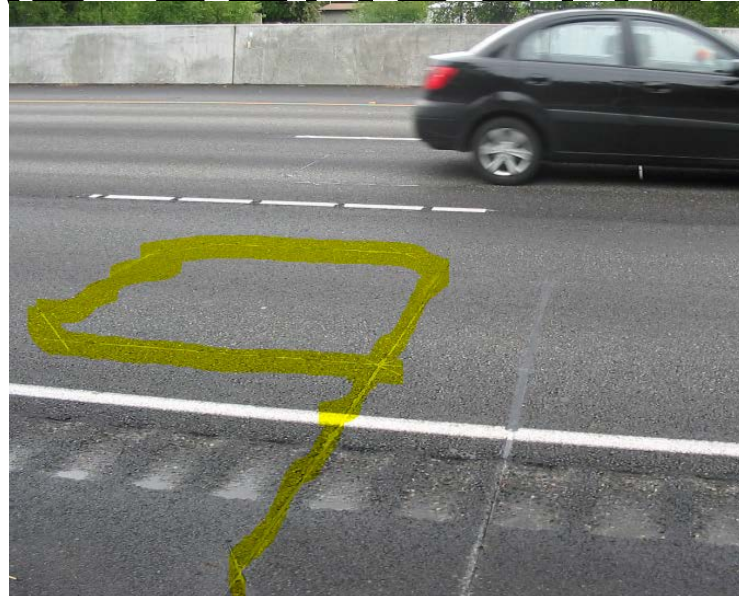


Equipment Used for WIM



WIM ROAD SENSORS

- Loops
- MSI BL Piezos
- Kistler Quartz

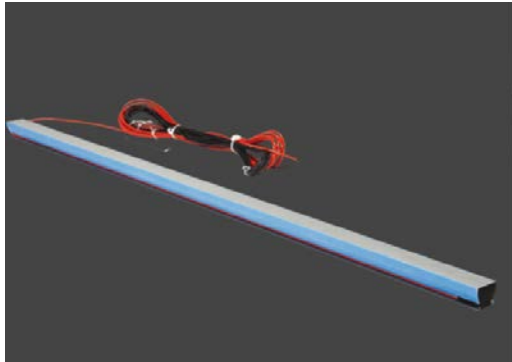


First WIM Equipment Bending Plate Philips Sensor



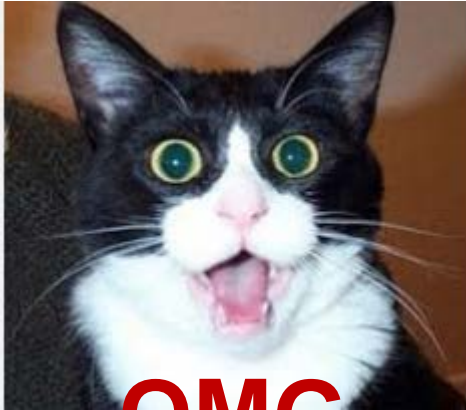
Kistler WIM

Kistler Quartz??

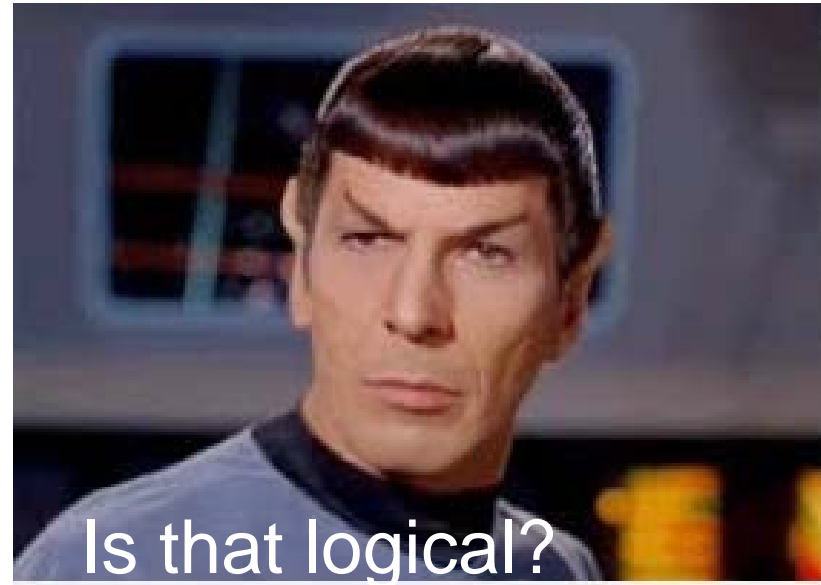


- Accuracy
- Temperature compensation
- Expensive as compared to MSI BL

Kistler Sensor in Asphalt!?



OMG



- P22 Oroville WIM site – Kistler sensors installed September 2007
- P17 Prosser WIM site – Kistler sensors installed June 2007

MSI BL Sensors



WSDOT Interagency Communications??



Current WSP/WSDOT Project

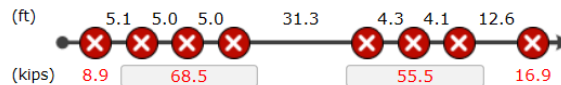
- Virtual WIM

Display Results



Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)	Max GVW (lb)
3919	10	8	74.6	53	149,782	104,500

Max GVW (%)
143



⚠️ overweight, over GVW

2016-04-20 11:36:53 AM PDT
Westbound
Washington Demo VWS

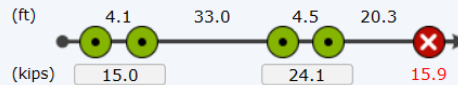


fail



Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)	Max GVW (lb)
3914	9	5	66.7	55	55,012	86,000

Max GVW (%)
64



⚠️ overweight

2016-04-20 11:36:17 AM PDT
Westbound
Washington Demo VWS



fail



Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)	Max GVW (lb)
3905	6	3	28.7	57	48,376	51,000

Max GVW (%)
95



⚠️ overweight

2016-04-20 11:34:46 AM PDT
Westbound
Washington Demo VWS



fail

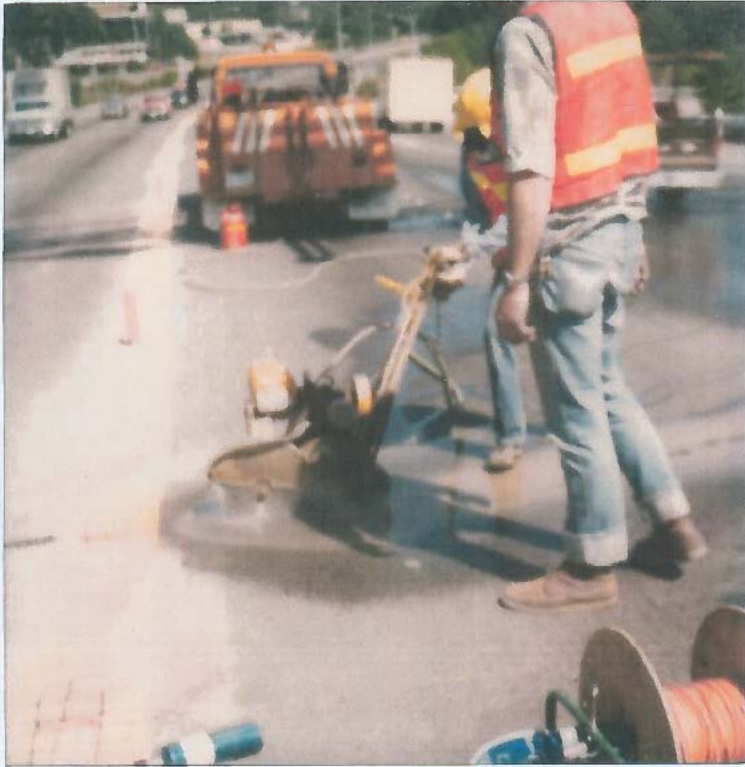
Permanent Classification Site Locations

- Traffic volume, speed, and classification



The Early Years

Today



NARROWS BR. PTR W. END
Steve Schindler



Cabinet Equipment

Traffic Counting 1980's



Traffic Counting Today



Field Data Retrieval



IP Modems



Microwave comms



Low power landline Modem



Ethernet Switch (fiber Optic)



Landline modem

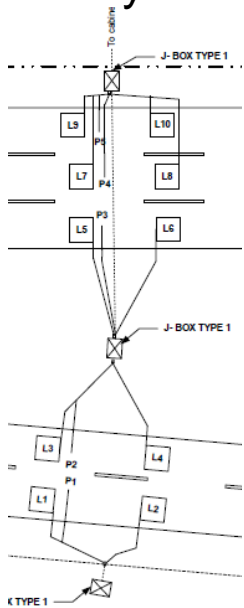


WSDOT Radio
700MHZ

Data Sharing



Roadway sensors



Historical data collector



ITS data collector

Equipment Tested

- Some we have kept
- Some we have tossed



Currently Testing

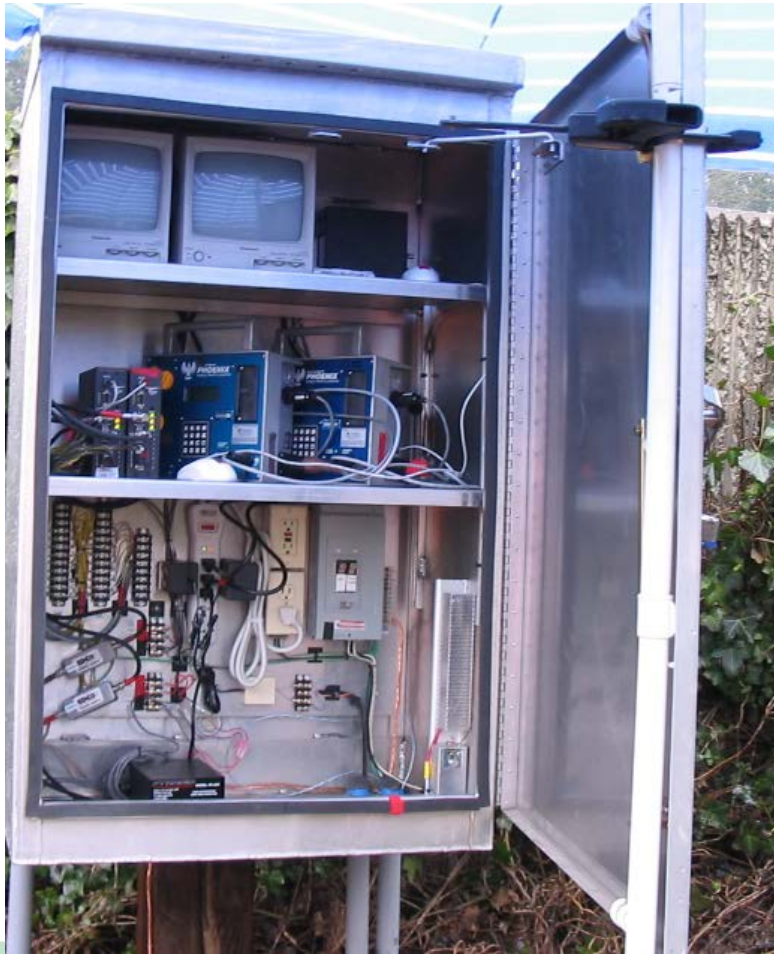
Motorized Traffic Counters



Bike/Pedestrian Counters



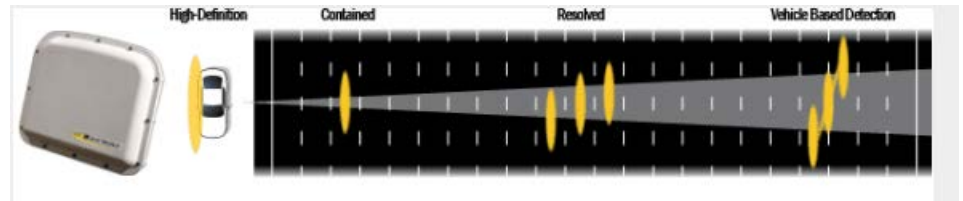
Video Traffic Counting



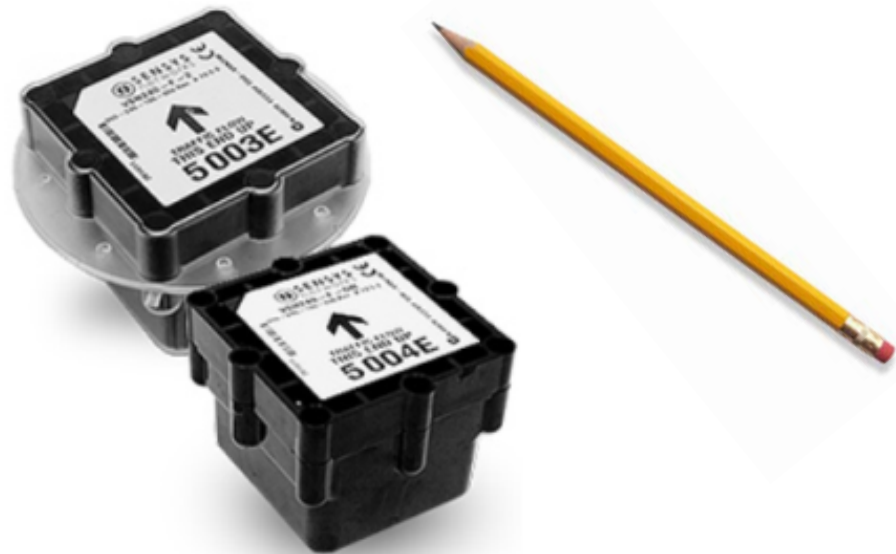
Radar



RTMS (Remote Traffic Microwave Sensor) radar

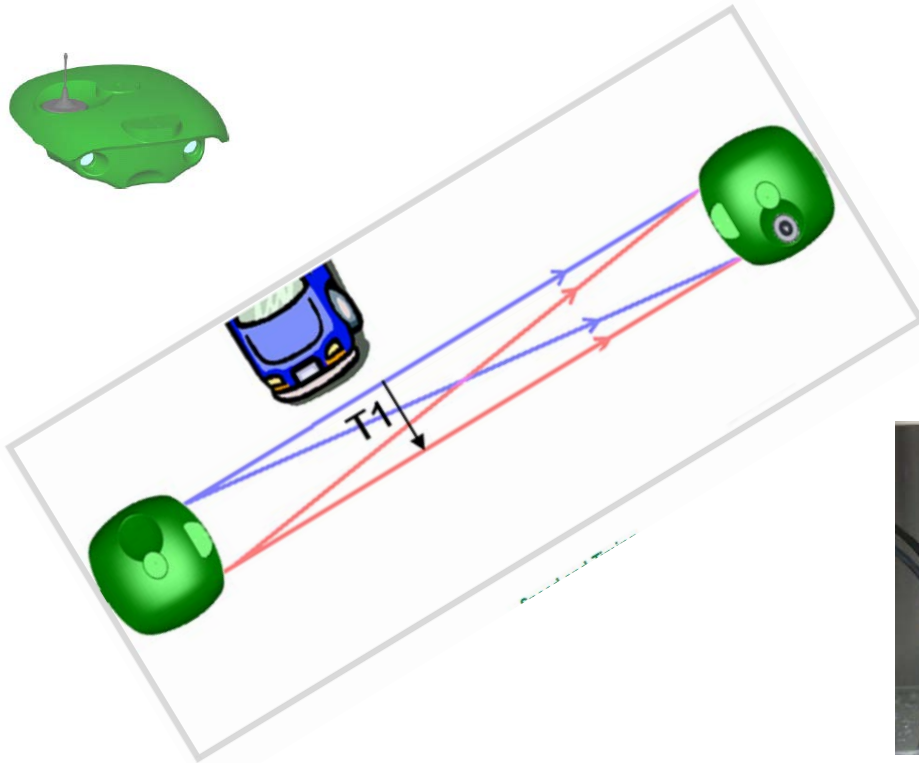


Magnetometer Technology



The Infra-red Traffic Logger

TIRTL



Our Biggest Obstacle

Data Processing



Electronics Team- Other projects

AIRS (Automated Infrared Roadside Screening) project

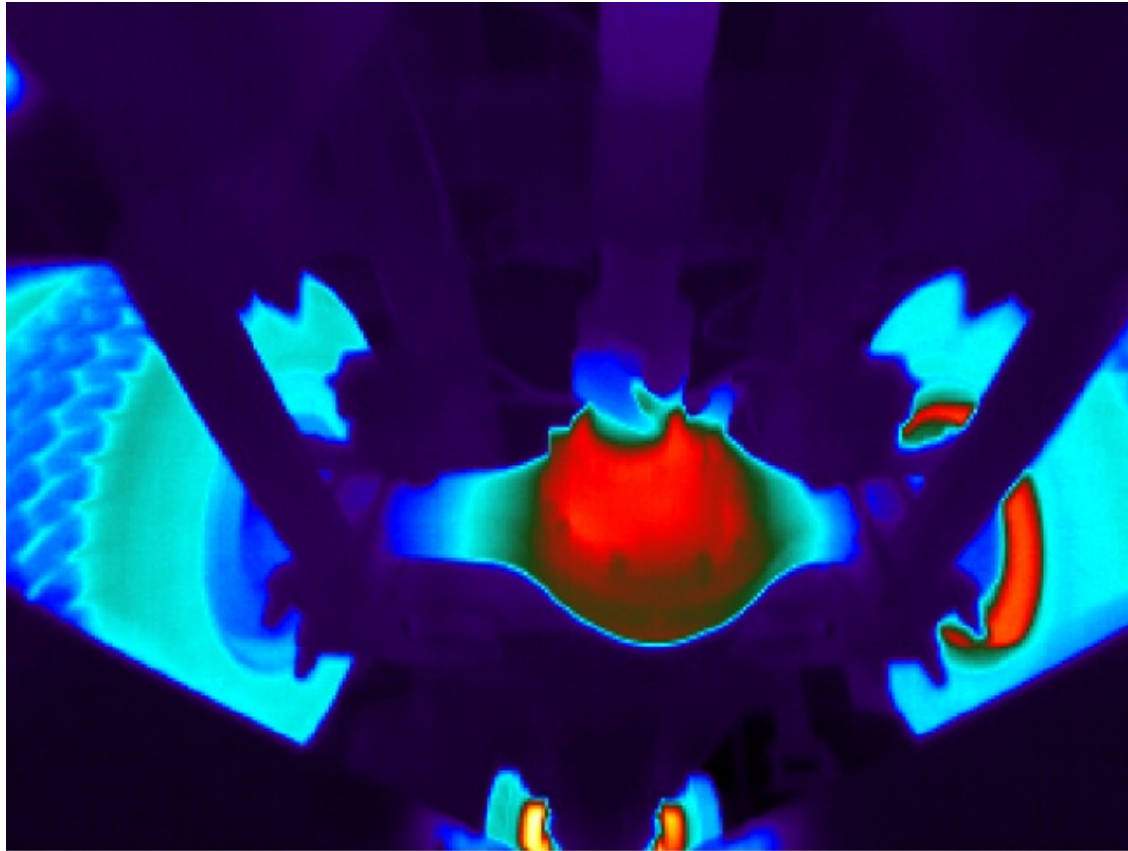


Installing
camera jbox



AIRS camera
in road

Electronics Team



Infrared picture of warm and cold brakes

The End?

