Motorcycle Data Collection in Montana

A Brief Summary

Motorcycle Data Collection
What Prompted the Movement?

In January 2007 the FHWA issued a memorandum outlining the requirements for motorcycle data collection.

Why the Need?

- Motorcycles in Montana are now registered permanently. The number of registrations were used to compile our motorcycle data. But when compared with fatalities in Montana the data gave a near 100% death rate for motorcycle owners. This was a serious fallout of inaccurate data

- Accurate motorcycle data was a needed to generate accurate motorcycle factors.

The Kick Off

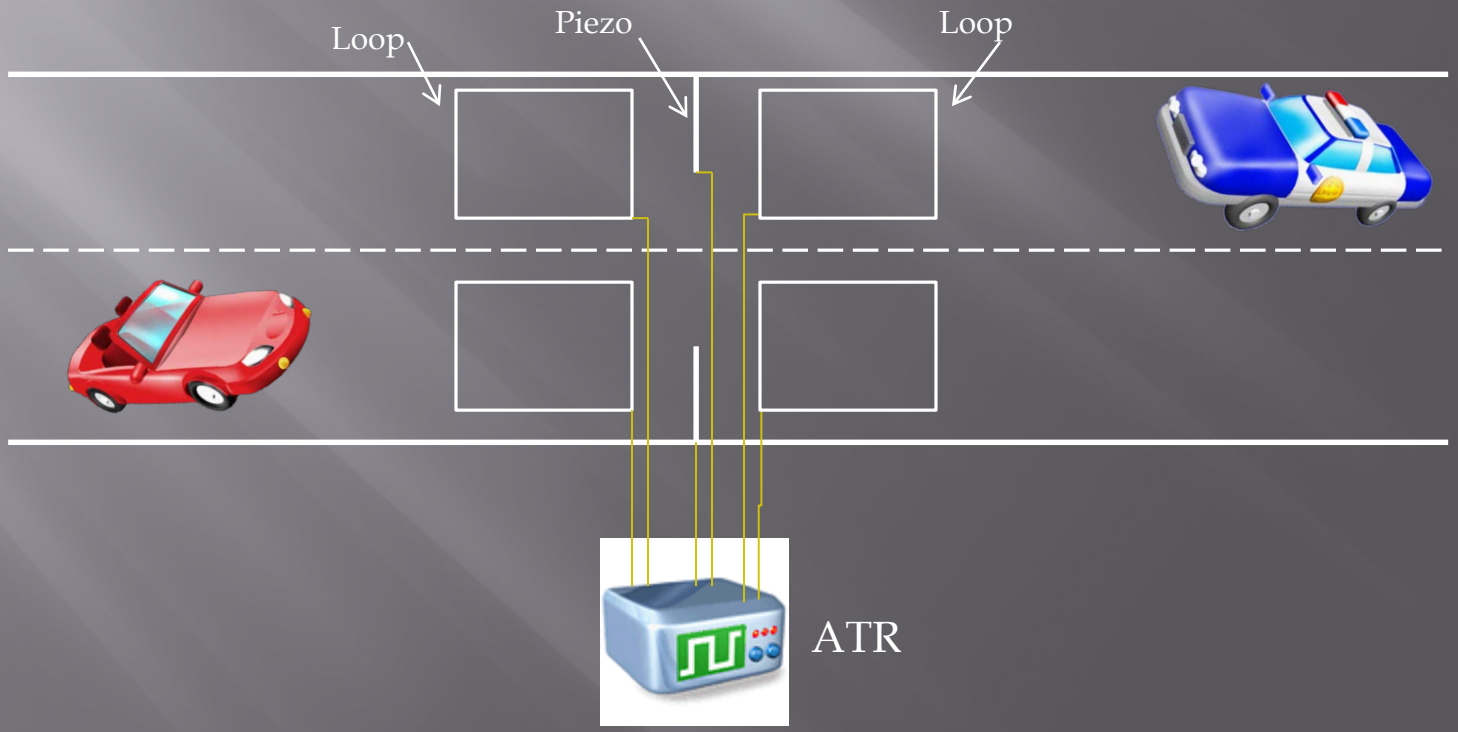
- Designs and testing strategies were begun with an initial focus on portable, temporary solutions

Motorcycle Data Collection
MDT's Criteria for Implementation

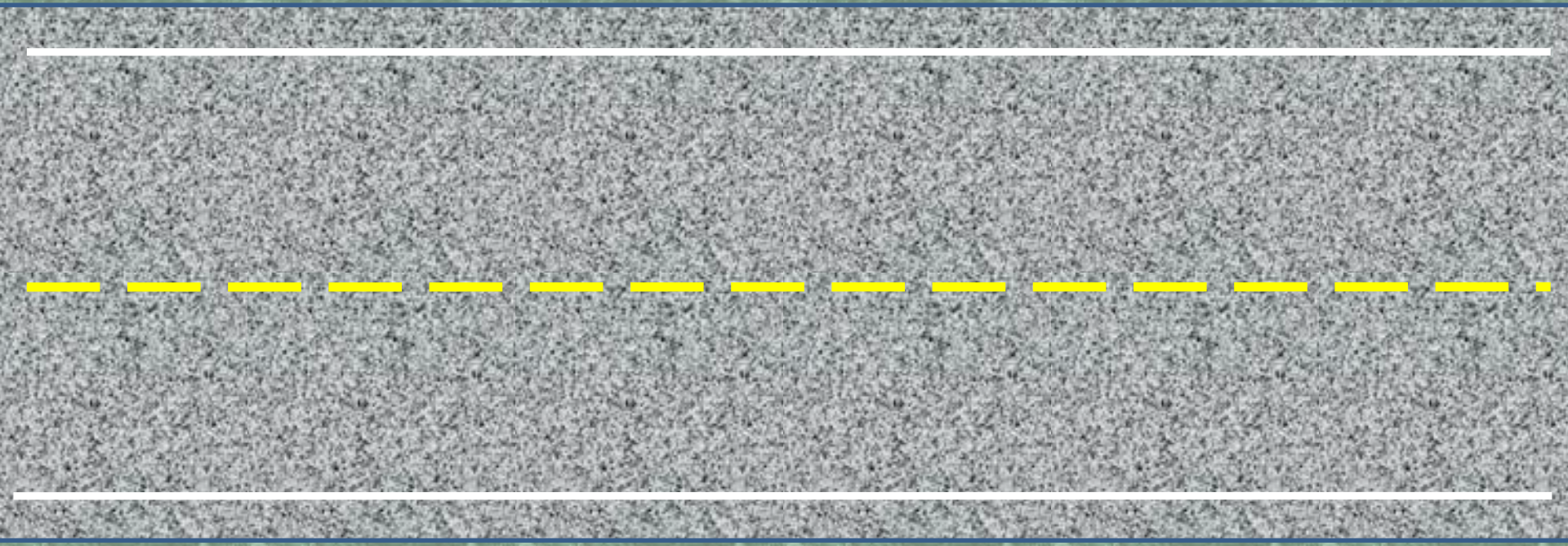
- **Collect motorcycles with the same accuracy other vehicle classes**
- **Use existing data collection equipment.**
- **Use a single implementation**
  (One site collects FWHA types 1-13—no motorcycle-only sites)
- **Accurately count motorcycles riding side-by-side in a lane (legal in Montana).**

Classification Sites

- ATR Class Sites consist of two loops and one Piezo sensor per lane. Class sites can collect class, length, and speed.
- Loops, in most cases, will miss motorcycles so in this case an error is generated



Motorcycle Grouping Patterns in Montana



Motorcycle Data Collection Option One:

Solutions for portable operations were implemented in 2007 and 2008 with mixed results:

- While the accuracy was acceptable,
  - Setup was very time consuming
  - At times difficult to keep intact on the roadway.
  - Portable operations were abandoned prior to 2009.

First Portable Tests-Blockers

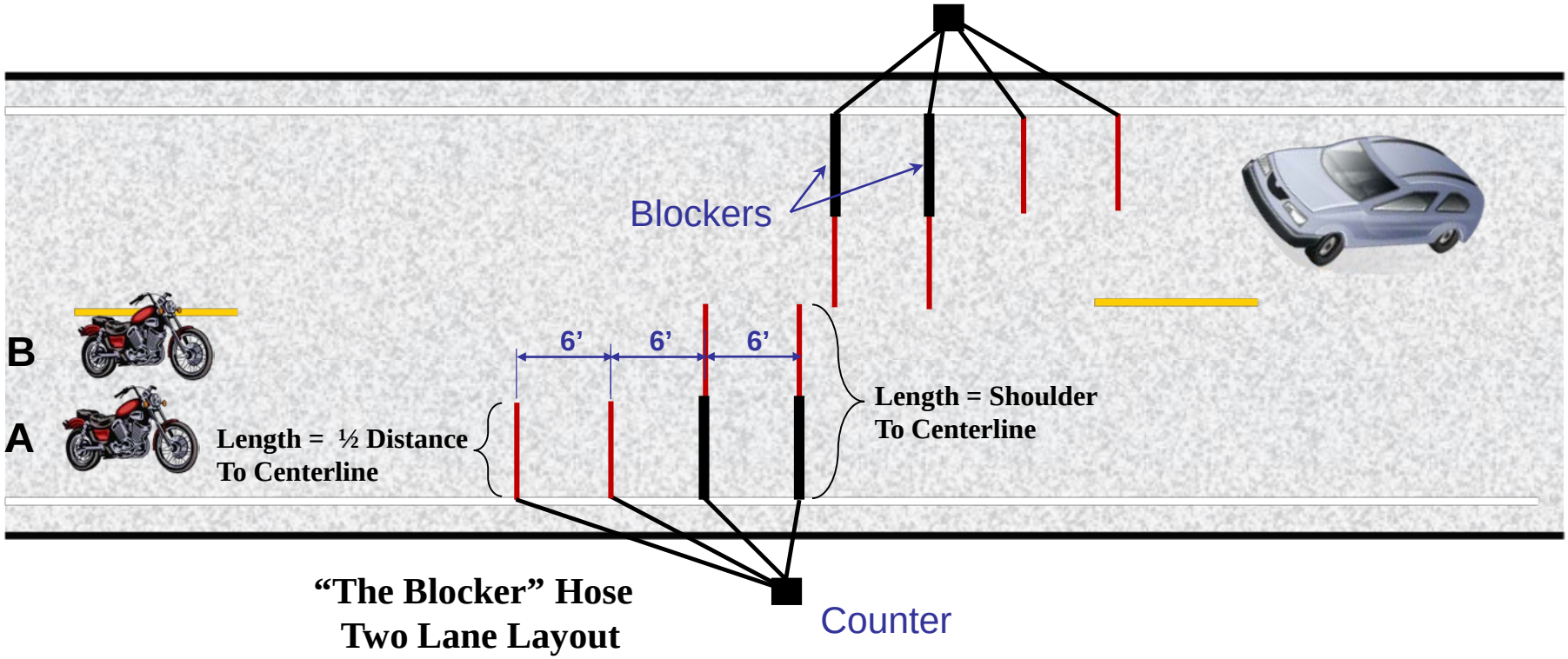
Heavy Modifications to the Blocker had to be implemented.

- Tubing glued in place
- Strapping glued to the bottom
- Retainer straps that where nailed to the pavement
- Highway traffic broke the blockers

Ver. 2.0 Design Change

- Used Stainless Steel Tubing inserted into the hose tube
- Clamped in place
- Easier deployment
- Less “in Traffic” time
- Highway traffic damaged the tubing

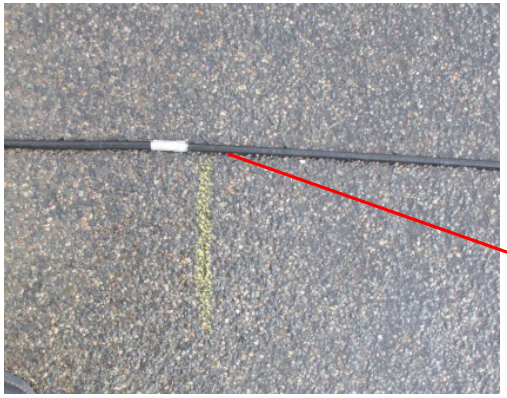
Temporary Motorcycle Class Layout



How the Motorcycle Vehicle Class Works

- Each Direction of travel is divided into two "Virtual" lanes or "Channels," effectively "two lanes" per one actually lane of traffic.
- Motorcycle A traveling in shoulder wheel path, "virtual lane," will cross and compress the hoses that extend only halfway into the lane and be counted while being "blocked" from being counted by the second set of hoses.
- Motorcycle B traveling in the centerline wheel path, "virtual lane," will compress the longer hoses and be counted.
- ALL motorcycle data from both virtual lanes are compiled to create the traffic count for the entire lane of travel

Setting Out Traffic Hoses for a Motorcycle Class Count



Motorcycle Data Collection Second Option: Cameras

- **Miovision optical data collection was implemented in 2008:**
  - Accuracy for motorcycles in daylight (or well-lit streets at night) is 90%+/- using proprietary software to extract traffic data from digital video.
  - Nighttime collection is inaccurate in low light conditions.
  - Used only in urban areas where there is light.
  - Miovision processing is relatively expensive.

Motorcycle Data Collection Option Three: Permanent Solutions

Temporary installations provided "Proof of Concept "

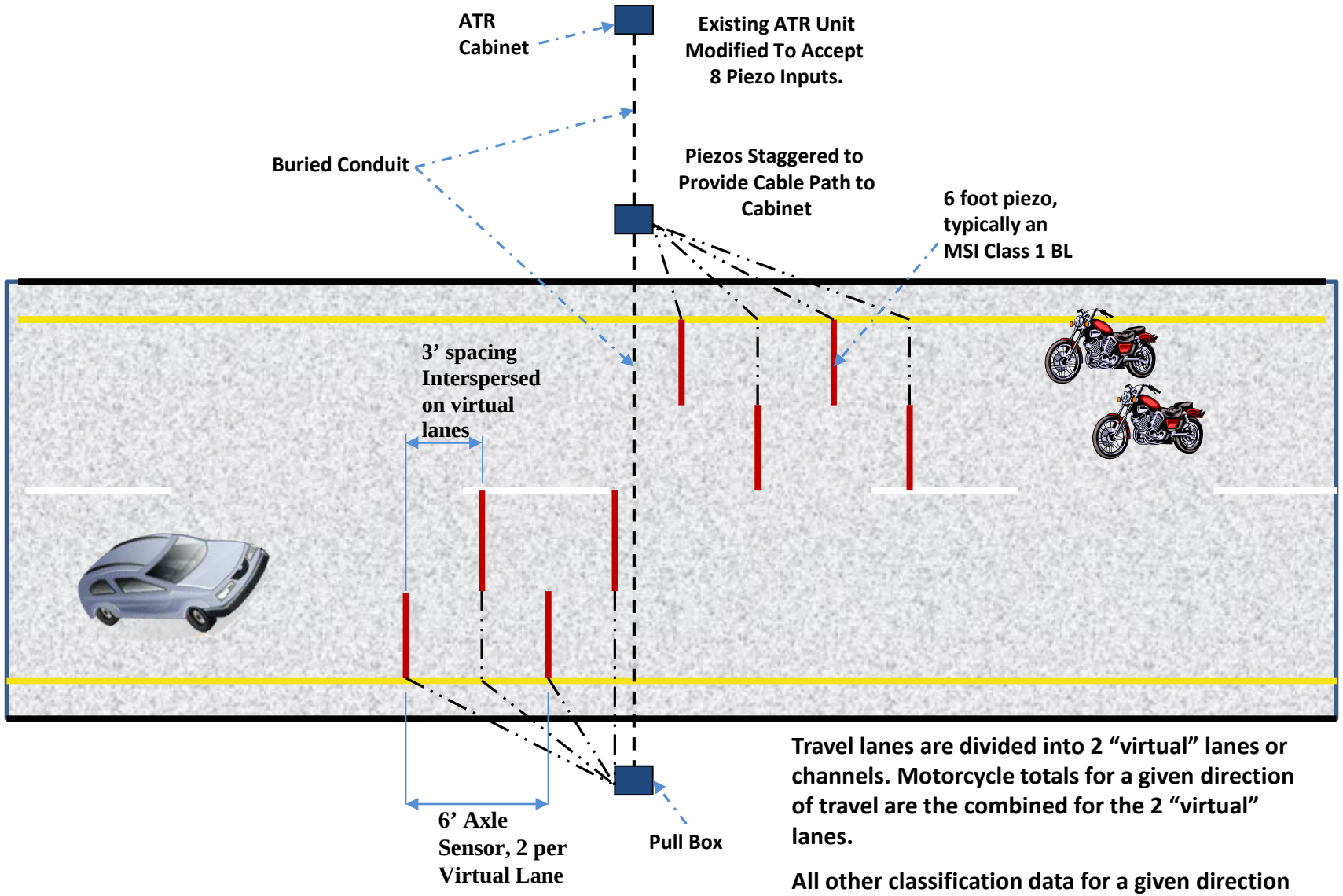
On to a permanent configuration

Criteria for Implementation

- **Collect motorcycles with the same accuracy as all other vehicle classes**
- **Use existing data collection equipment.**
- **Use a single implementation, i.e. (One site collects FWHA types 1-13—no motorcycle-only sites)**
- **Accurately count motorcycles riding side-by-side in a single lane (legal in Montana).**

Permanent Site Counter Modified for 4 Virtual lanes (8 sensor input)

Motorcycle Classification
Typical Permanent Layout for Rural ATR



Travel lanes are divided into 2 "virtual" lanes or channels. Motorcycle totals for a given direction of travel are the combined for the 2 "virtual" lanes.

All other classification data for a given direction of travel is taken from the shoulder line "virtual" lane

Motorcycle Capable Site

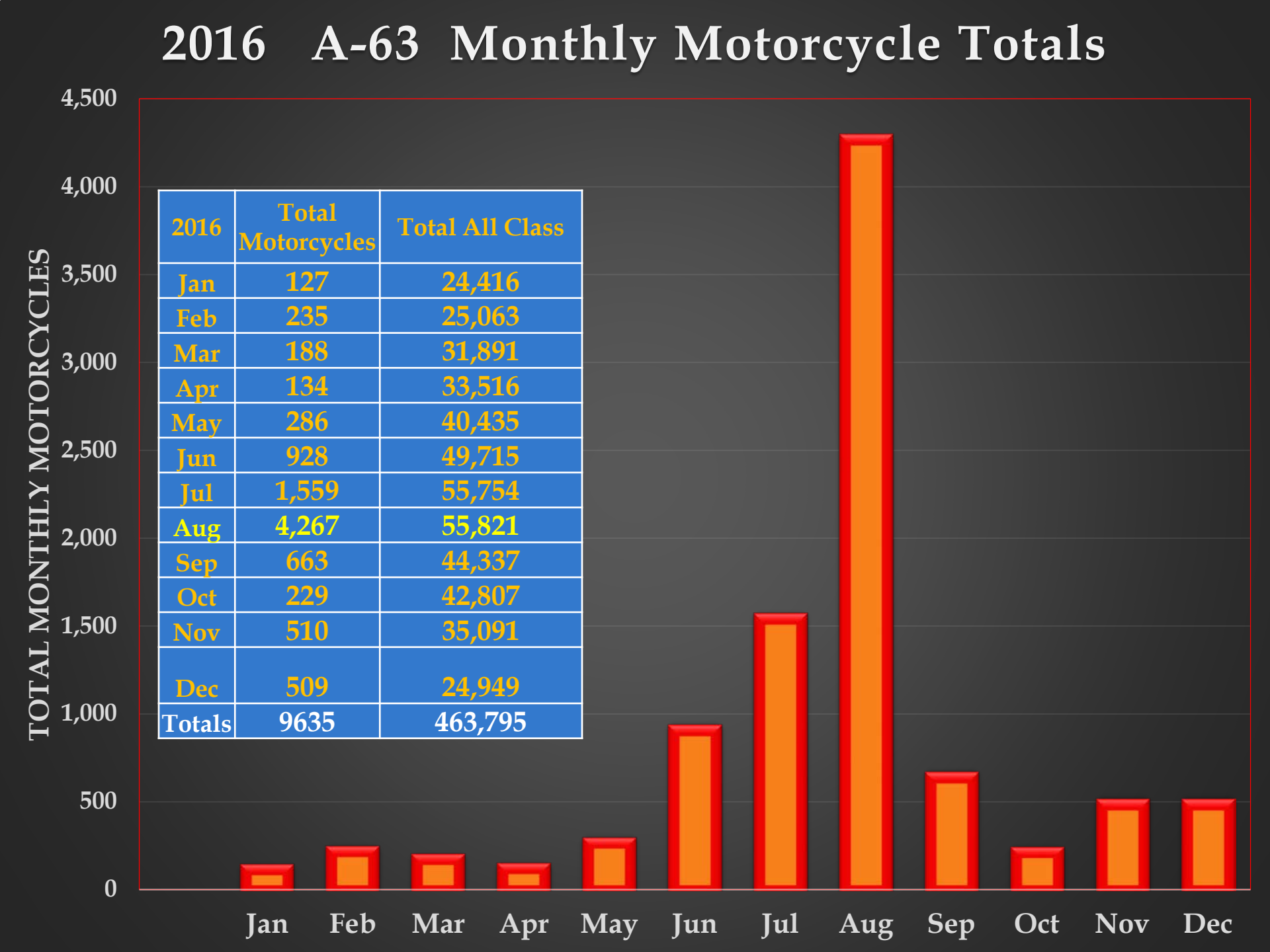
Pros Of This Design:

- Tested and verified accuracy is 97% for motorcycle detection. Montana currently operates 18 motorcycle capable sites, all of which are checked for accuracy 4 times per year (once per quarter).
  - Note: All of Montana's ATR and WIM sites (100+) are checked for accuracy once per quarter.
- Two channels per lane gives accurate detection of motorcycles riding side by side in the lane. Montana state law allows this practice on all roadways.
- No loops. Eliminates the fickle properties of using loops to detect motorcycles.
- Configuration allows collection of all FHWA classes—not just motorcycles.
- 6 ft. sensor spacing/9 ft. array spacing allows possible placement of array between transverse cracks in roadway, dependent on transverse crack spacing.
- Can be installed in roads with ruts due to the flexible nature of the BL sensor.
- 9 ft. array size minimizes errors due to motorcycles (or any vehicle) passing or changing travel paths while passing over the array.

Cons Of This Design:

- This design cannot be used in areas where traffic does not flow freely.
- This design cannot be used in areas where traffic regularly tailgates closer than 40 feet apart.
- Multiple cuts in the road in close proximity of each other can cause issues of pavement deterioration if the pavement is of poor quality.
- Sensor cuts of depths 1.25 to 1.5 inches can lead to cracking in thin pavements. Minimum pavement thickness of 3 inches is necessary to minimize these effects.
- All epoxy in travel lanes (and shoulders if possible) must be ground or sanded flat with the contours of the road in order to minimize epoxy damage due to traffic.

2016 A-63 Monthly Motorcycle Totals



2016	Total Motorcycles	Total All Class
Jan	127	24,416
Feb	235	25,063
Mar	188	31,891
Apr	134	33,516
May	286	40,435
Jun	928	49,715
Jul	1,559	55,754
Aug	4,267	55,821
Sep	663	44,337
Oct	229	42,807
Nov	510	35,091
Dec	509	24,949
Totals	9635	463,795

Montana's Motorcycle Data Collection End Results

- ✓ **Montana currently has 18 permanent motorcycle sites.**
- ✓ **Use only existing equipment (slightly modified)**
- ✓ **Class data from types 1 through 13 are collected from each site.**
- ✓ **Data is used to determine much more accurate factors for motorcycles in Montana.**
- ✓ **Currently used ONLY on two lane, rural roads**
- ✓ **Plans for Interstate use are awaiting updates in equipment.**

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MDT's white paper on motorcycle data collection is available through Steven Jessburger.