



miOVision

**ITE Hawaii Sections Transportation
Solutions Event - May 18th, 2022**

Joel Quigley

Detection and Counts

Teaching a Computer to See

Video Archive from 2005 - Billions of Vehicles, Ped/Bike, in over 70 Countries

Detection (8.7.2)

Stopbar, Advanced Pulse

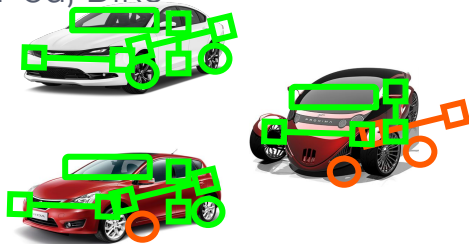
Vehicles + Bike + Pedestrians

100+ Zones, up to 9 Dedicated Approach Views

Counting

Collects traffic data 24/7, **True Multi-Modal**
Turning Counts, Lane By Lane

6 Classes- Single Unit, Articulated, Bus,
Light, Ped, Bike



Miovision CORE® DCM



Miovision CORE® DCM

- Roadside video analysis for vehicle detection, traffic counts, and event alerts
- Plug-and-play upgrade from Miovision Core



TrafficLink Antenna

- WiFi Mac address capture for point-to-point travel time



Miovision SmartView 360™

- Captures video for monitoring, detection, and analytics

Miovision SmartView Approach Hardware Specifications

****Pending NYSDOT APL APPROVAL**



The Miovision SmartView Approach® is a full HD bullet camera that can expand the use of your Miovision Detection solution to detect vehicles as they approach intersections from up to 500 feet.

Configure multiple detection zones with single or multilane detection over four lanes and build responsive control schemes and measure free-flow traffic to understand how effectively you are servicing demand.

Contents

| | |
|--------------|--|
| Kit contents | 1 x Miovision SmartView 360 Camera 1 x Pole Mount 1 x Power Supply |
|--------------|--|

Device weight (not including cables)

| | |
|-------------------------------|--|
| Miovision® SmartView Approach | 1.9 lbs (860 g) when using attachment plate 2.87 lbs (1.3 kg) when using base bracket |
|-------------------------------|--|

Power

| | |
|-------------------|--|
| Power adapter | PoE DC 48 V: 270 mA/ Approx. 12.95 W (Class 0 device) |
| Power consumption | Approx 10.6 W |

Operating conditions

| | |
|----------------|--------------------------------|
| Operating temp | -29°F to 165°F (-34°C to 74°C) |
| Humidity | 5% - 95% RH non-condensing |

Lens

| | |
|---------------------------|------------------------------------|
| Focal length | 1.4 mm (1/16 inches) |
| Angular field of view | Horizontal : 183° Vertical : 183° |
| Maximum aperture ratio | 1 : 1.9 |
| Digital (electronic) zoom | Choose from 3 levels of x1, x2, x4 |
| Focus range | 0.5 m (19-11/16 inches) - infinity |

Camera

| | |
|------------------|---|
| Image sensor | 1/2 type MOS image sensor, built-in primary color filter |
| Effective pixels | 9 megapixel |

| | |
|------------------------|---|
| Minimum illumination | Color : 0.4 lx (0.02787 footcandle) (F1.9, Maximum shutter: Off (1/30 s), AGC: 11) 0.03 lx (0.00186 footcandle) (F1.9, Maximum shutter: max. 16/30 s, AGC: 11)* BW : 0.05 lx (0.0372 footcandle) (F1.9, Maximum shutter: Off (1/30 s), AGC: 11) 0.004 lx (0.00023 footcandle) (F1.9, Maximum shutter: max. 16/30 s, AGC: 11)* * Converted value |
| Image Settings | Gain (AGC), White balance |
| Image Compensation | Adaptive black stretch, Back light compensation (BLC), Fog compensation, High light compensation (HLC), Digital noise reduction |
| Maximum shutter | Max.16/30s to Max. 1/10000s |
| Wide dynamic range | On/Off |
| Adaptive Black Stretch | On/Off (only when Wide Dynamic range: Off) |
| Super Dynamic*2 | On / Off, the level can be set in the range of 0 to 31 |
| Day & Night (ICR) | Off/On / Auto!(Normal) |
| Back focus | Auto back focus/ Focus/ Adjusting method (Auto/ Preset/ Fix) |

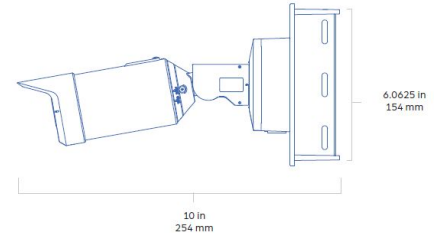
Network

| | |
|--------------------|--|
| Network IF | 10Base-T / 100Base-TX, RJ45 connector |
| Resolution | H.264, H.265, MJPEG Fisheye mode (max.30 fps): 2992x2992 / 2192x2192 / 1280x1280 / 640x640 / 320x320 |
| Transmission mode | Constant bit rate / VBR / Frame rate / Best effort / Advanced VBR |
| Supported protocol | IPv6 : TCP/IP, UDP/IP, HTTP, HTTPS, FTP, SMTP, DNS, NTP, SNMP, DHCPv6, RTP, MLD, ICMP, ARP, IEEE 802.1X, DiffServ IPv4 : TCP/IP, UDP/IP, HTTP, HTTPS, RTSP, RTP, RTDP/RTCP, FTP, SMTP, DHCP, DNS, DDNS, NTP, SNMP, UDpP, IGMP, ICMP, ARP, IEEE 802.1X, DiffServ |

General

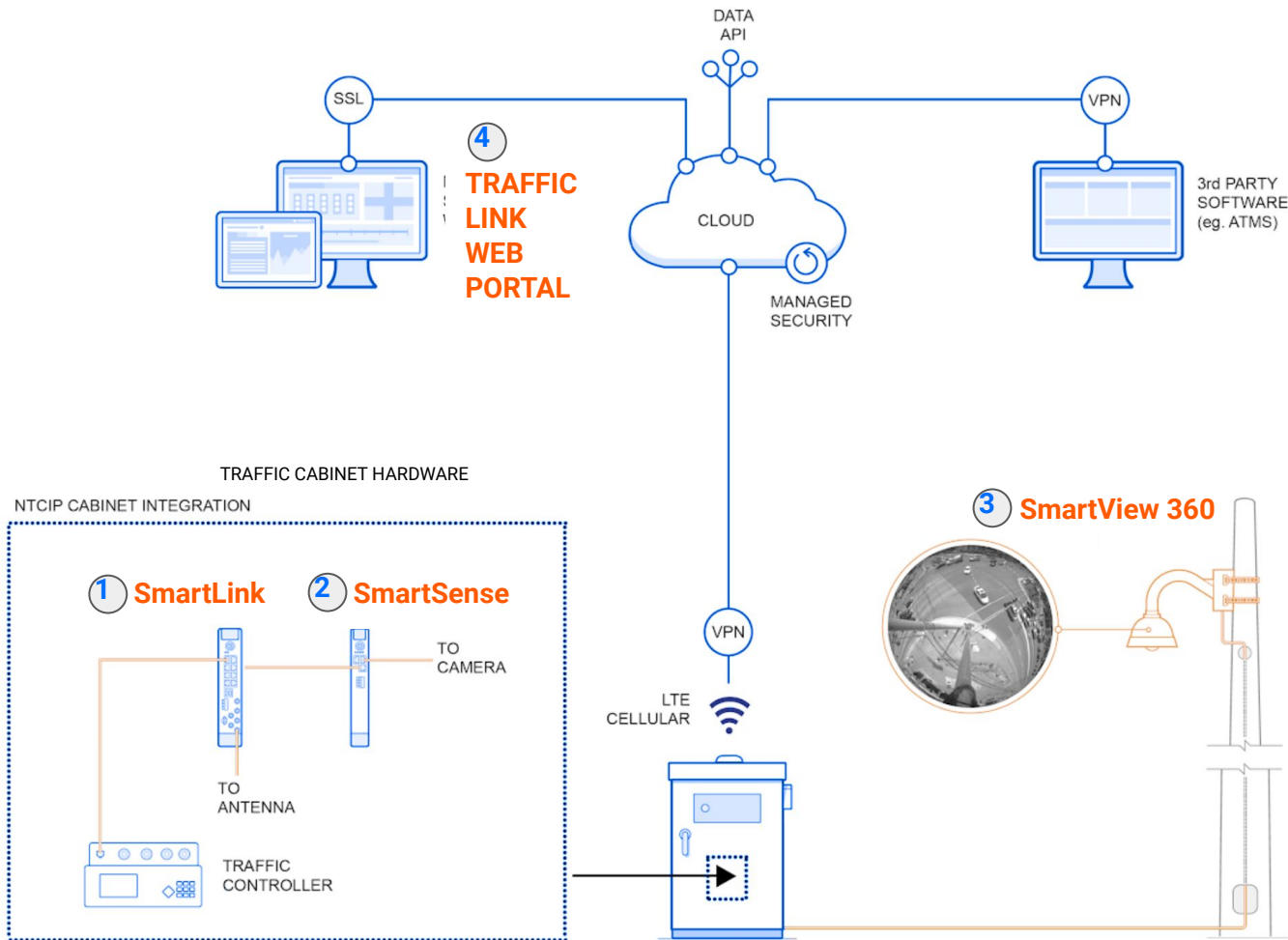
| | |
|-------------------------------|--|
| Mounting method | Pole mount and mast arm |
| Safety | UL (UL60950-1), C-UL (CAN/CSA C22.2 No.60950-1), CE, IEC60950-1 |
| EMC | FCC (Part15 ClassA), ICES003 ClassA, EN55022 ClassB, EN55024, ECE-R10, EN50498 compliant, EN50121 |
| Ambient operating temperature | -34°C to +74°C (-29°F to 165°F) |
| Ambient operating humidity | 10% to 90% (non-condensing) |
| Water and dust resistance *6 | IP66, IEC60529 measuring standard compatible, Type 4X(UL50), NEMA 4X compliant |
| Shock resistance | Compliant with 50 J (IEC 60068-2-75 / IK10 (IEC 62262), NEMA 2,2.9 Compliant (10g pulse) |
| Dimensions | When using the attachment plate: 154 mm × 60.5 mm (H) (6-1/16 inches × 2-3/8 inches (H)) Dome radius 35 mm (1-3/8 inches) When using the base bracket: 164 mm × 96.5 mm (H) (6-15/32 inches × 3-13/16 inches (H))Dome radius 35 mm (1-3/8 inches) |
| Finish | Main body: Aluminum die cast, light gray Dome section: Clear polycarbonate resin |
| Camera Heater | Thermostatically controlled. Operates with standard PoE |

Dimensions



TrafficLink

Full Architecture



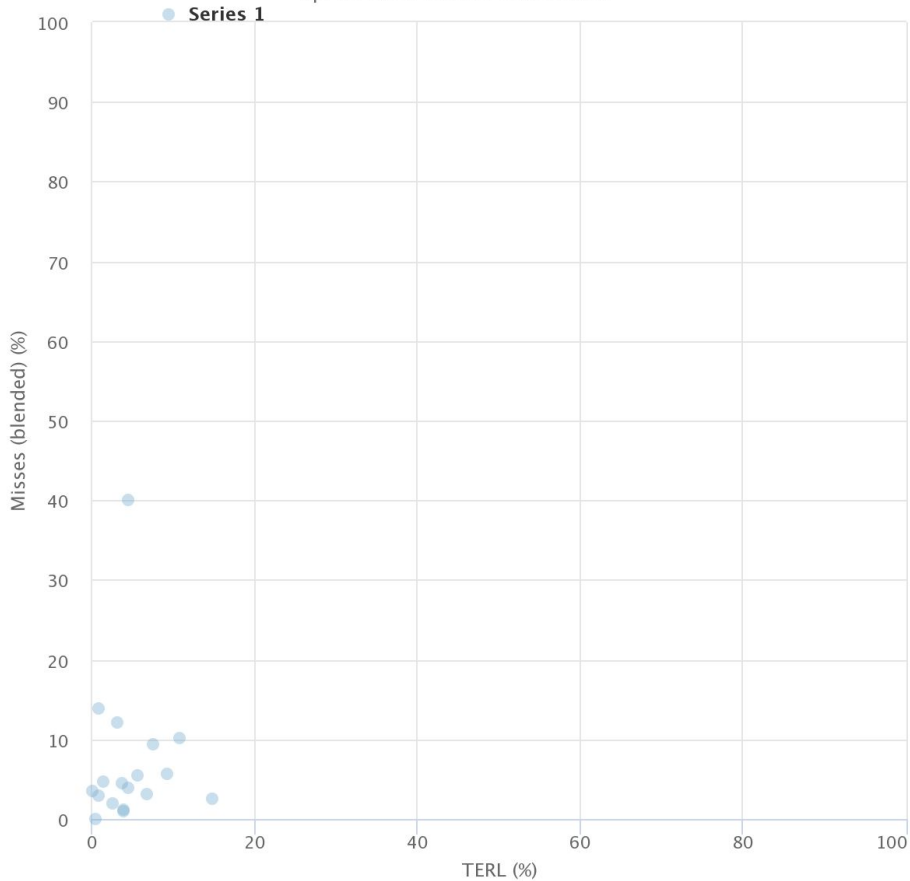
Assessing Detection Accuracy - Example

| Validated 1/9/20 0.8% | | Id: 7a1780f6 Model: [REDACTED] | | Video Retrieval Date: Dec 17, 2019 | | Camera: Miovision SmartView 360 | | | | |
|--|--------------------|---|--|------------------------------------|-------------------------------|---|---------------------------|--|-------------------------------|----------------------------|
| | Result Type | All Periods | Early morning (predawn) [EM] (S) (O) (GD) | Dawn [DA] (S) (O) (S) (O) (GD) | AM Peak [AMP] (S) (O) (GD) | Late AM Off-Peak [LAOP] (S) (O) (GD) | Noon [NO] (S) (O) (GD) | Afternoon Off-Peak [AOP] (S) (O) (GD) | PM Peak [PMP] (S) (O) (GD) | Night [NI] (S) (O) (GD) |
| Interval | | | 1:00 AM - 1:15 AM | 6:30 AM - 7:00 AM | 7:30 AM - 7:45 AM | 8:15 AM - 8:30 AM | 12:00 PM - 12:15 PM | 3:00 PM - 3:15 PM | 5:00 PM - 5:15 PM | 10:30 PM - 10:45 PM |
| Duration | | 2.25 | 0.25 | 0.50 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Video Status | | DONE | DONE | DONE | DONE | DONE | DONE | DONE | DONE | DONE |
|  SBD | TERL Score: | 0.3% (00:51/135:01) | 0.0% (00:00/15:00) | 0.9% (00:15/30:00) | 0.2% (00:02/14:59) | 0.5% (00:04/15:00) | 1.3% (00:11/15:00) | 0.3% (00:02/15:00) | 1.4% (00:12/15:00) | 0.3% (00:02/14:59) |
| | Miss Portion: | 0.1% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.2% | 0.4% | 0.1% |
| | False Hit Portion: | 0.3% | 0.0% | 0.6% | 0.2% | 0.5% | 1.3% | 0.1% | 1.0% | 0.2% |
| | Missed Actuations: | 0.0% (0/336) | 0.0% (0/3) | 0.0% (0/74) | 0.0% (0/44) | 0.0% (0/60) | 0.0% (0/59) | 0.0% (0/36) | 0.0% (0/41) | 0.0% (0/19) |
|  WBD | TERL Score: | 0.5% (00:54/135:01) | 0.1% (00:00/15:00) | 0.9% (00:15/30:00) | 1.1% (00:09/14:59) | 1.5% (00:13/15:00) | 0.1% (00:00/15:00) | 0.3% (00:02/15:00) | 0.8% (00:07/15:00) | 0.4% (00:03/14:59) |
| | Miss Portion: | 0.1% | 0.0% | 0.4% | 0.1% | 0.1% | 0.0% | 0.3% | 0.5% | 0.1% |
| | False Hit Portion: | 0.4% | 0.1% | 0.5% | 1.0% | 1.4% | 0.1% | 0.3% | 0.3% | 0.4% |
| | Missed Actuations: | 0.0% (0/451) | 0.0% (0/4) | 0.0% (0/84) | 0.0% (0/75) | 0.0% (0/85) | 0.0% (0/56) | 0.0% (0/68) | 0.0% (0/68) | 0.0% (0/11) |
|  NBD | TERL Score: | 0.9% (01:24/135:01) | 0.1% (00:01/15:00) | 1.3% (00:22/30:00) | 0.8% (00:07/14:59) | 1.5% (00:13/15:00) | 0.8% (00:07/15:00) | 0.7% (00:06/15:00) | 1.6% (00:14/15:00) | 1.2% (00:11/14:59) |
| | Miss Portion: | 0.6% | 0.1% | 0.5% | 0.7% | 0.9% | 0.2% | 0.5% | 0.9% | 0.8% |
| | False Hit Portion: | 0.3% | 0.0% | 0.8% | 0.1% | 0.6% | 0.7% | 0.5% | 0.7% | 0.5% |
| | Missed Actuations: | 0.0% (0/363) | 0.0% (0/7) | 0.0% (0/87) | 0.0% (0/33) | 0.0% (0/60) | 0.0% (0/55) | 0.0% (0/49) | 0.0% (0/47) | 0.0% (0/25) |
|  EBD | TERL Score: | 1.2% (02:24/135:01) | 0.7% (00:06/15:00) | 2.1% (00:37/30:00) | 2.2% (00:19/14:59) | 1.7% (00:15/15:00) | 2.1% (00:18/15:00) | 0.4% (00:03/15:00) | 3.4% (00:30/15:00) | 1.3% (00:11/14:59) |
| | Miss Portion: | 1.0% | 0.7% | 1.8% | 0.8% | 0.8% | 1.7% | 0.3% | 3.4% | 1.2% |
| | False Hit Portion: | 0.3% | 0.0% | 0.3% | 1.5% | 0.9% | 0.4% | 0.1% | 0.1% | 0.1% |
| | Missed Actuations: | 1.2% (3/251) | 33.3% (1/3) | 2.2% (1/45) | 0.0% (0/54) | 0.0% (0/35) | 0.0% (0/32) | 0.0% (0/24) | 2.2% (1/45) | 0.0% (0/13) |
| All Zones | | TERL Score: 0.8% (05:35/135:01) | 0.2% (00:07/60:00) | 1.3% (01:31/120:03) | 1.1% (00:39/59:59) | 1.3% (00:47/60:00) | 1.1% (00:38/60:00) | 0.4% (00:16/60:00) | 1.8% (01:04/60:03) | 0.8% (00:28/59:59) |
| | | Miss Portion: 0.4% | 0.2% | 0.8% | 0.4% | 0.5% | 0.5% | 0.3% | 1.3% | 0.5% |
| | | False Hit Portion: 0.3% | 0.0% | 0.5% | 0.7% | 0.9% | 0.6% | 0.1% | 0.5% | 0.3% |
| | | Missed Actuations: 0.2% (3/1401) | 5.9% (1/17) | 0.3% (1/290) | 0.0% (0/206) | 0.0% (0/240) | 0.0% (0/202) | 0.0% (0/177) | 0.5% (1/201) | 0.0% (0/68) |

Misses (blended) (%) vs. TERL

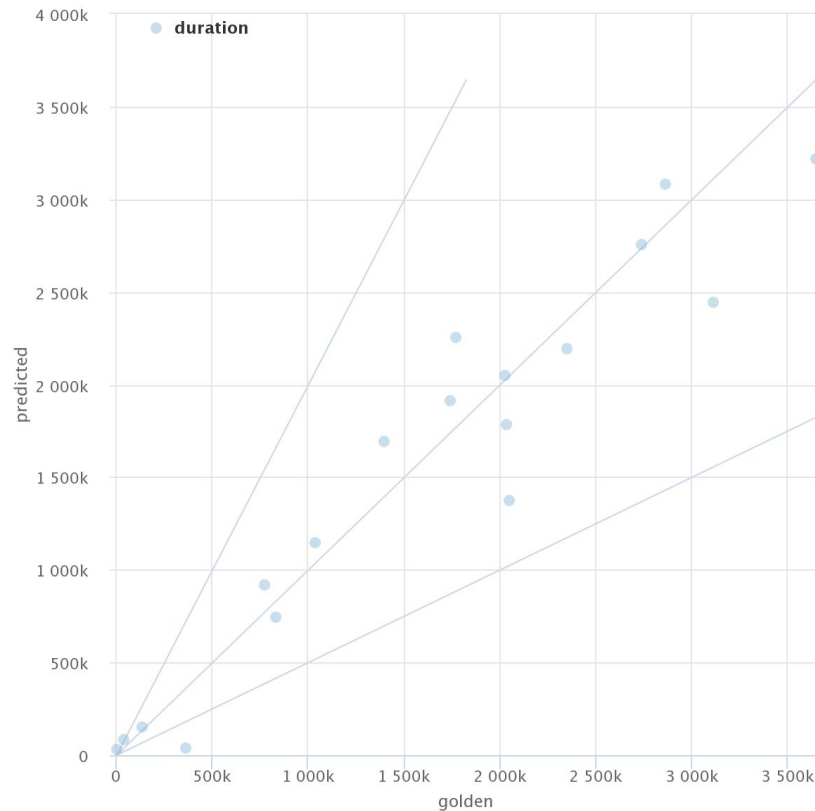
Count as miss if 25% or 5000ms of actuation is missed

Apr 14 2022 : RIDOT TERL results



Golden vs. Predicted (duration)

Apr 14 2022 : RIDOT TERL results



Highcharts.com

Real-world
accuracy

Model 5: 97.3%

← Zone Detection Report for Larrabee Road and Riverside Street

Validated 12/11/18

2.7%

Id: db1fb121

Model: general-model-5

StreamAgent: 1.5.102

Validated 12/17/18

2.3%

Id: 48287ffa

Model: general-model-6

StreamAgent: 1.5.102

Validated 1/31/19

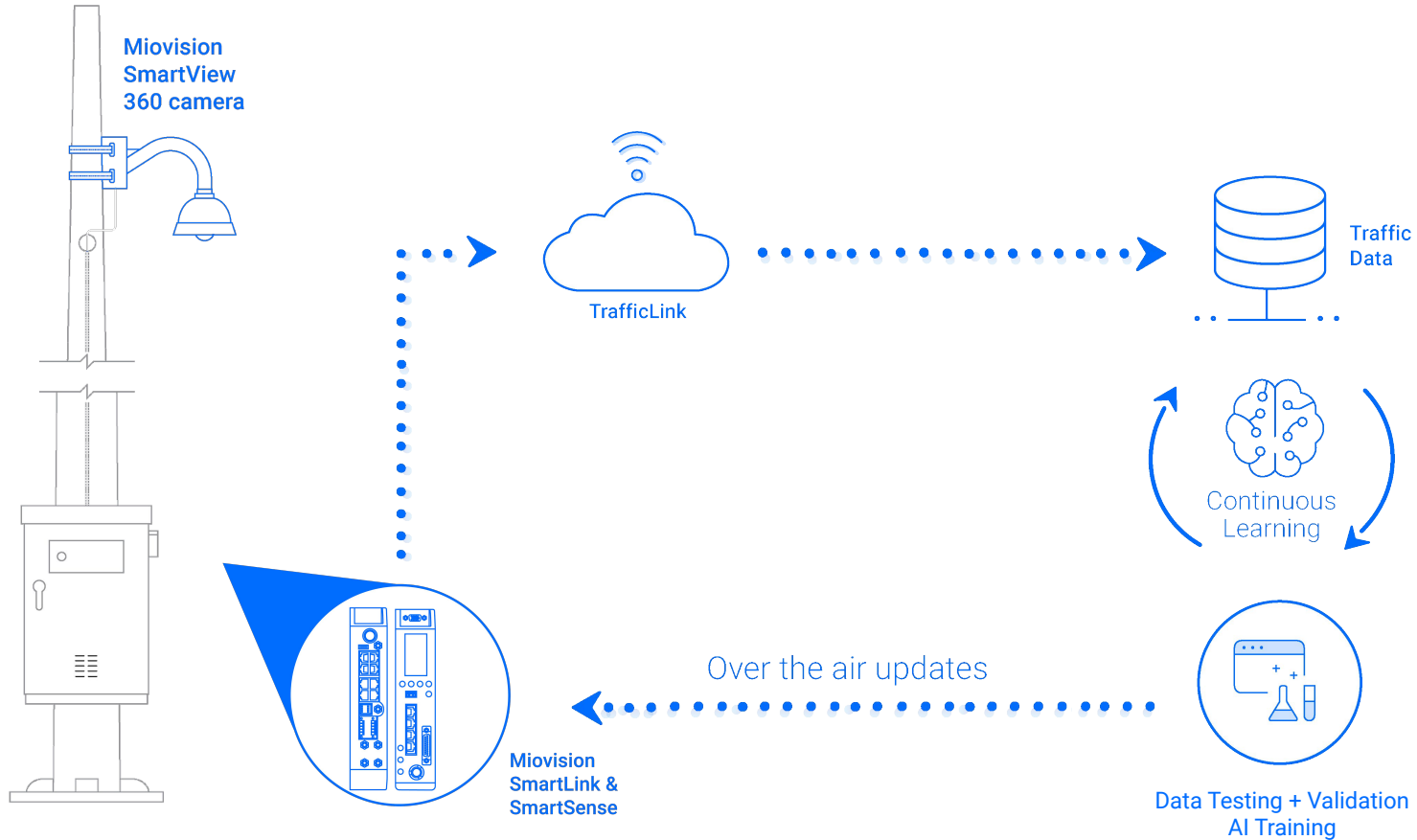
2.3%

Id: 31e28782

Model: general-model-6

StreamAgent: 1.5.102

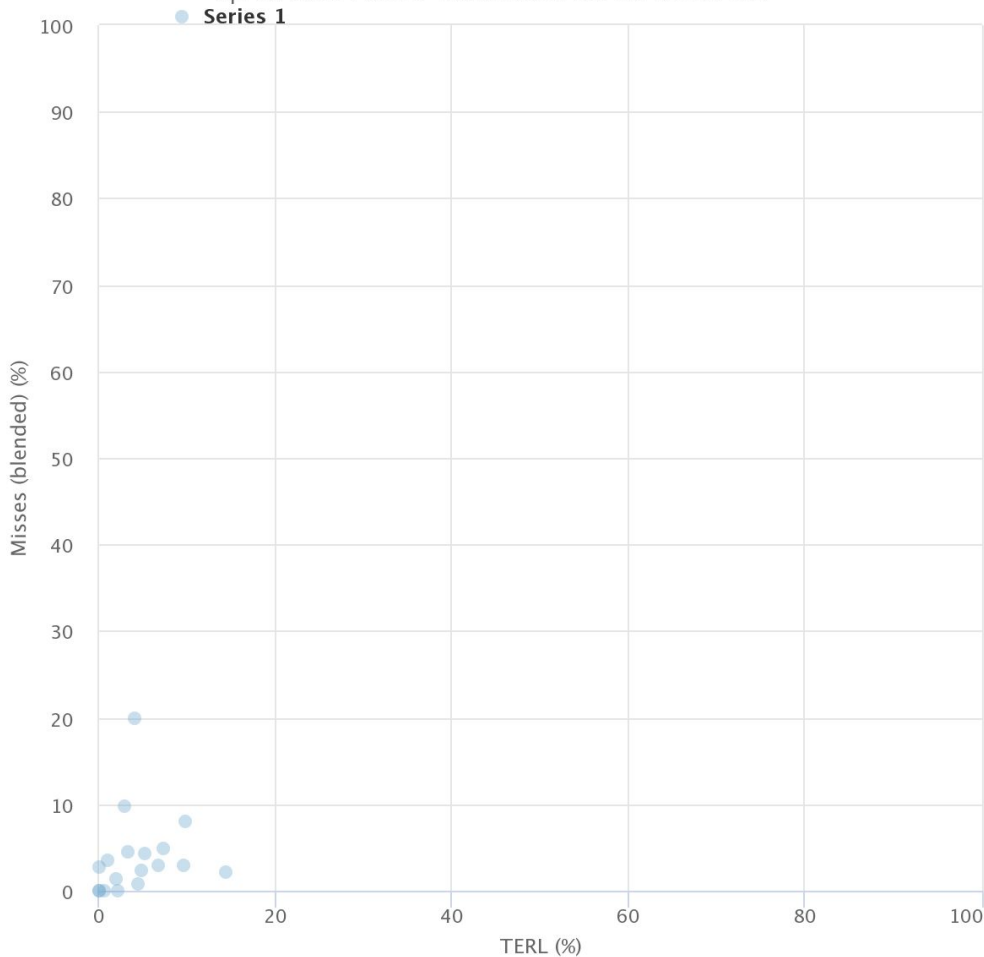
Turning Video into Data



Misses (blended) (%) vs. TERL

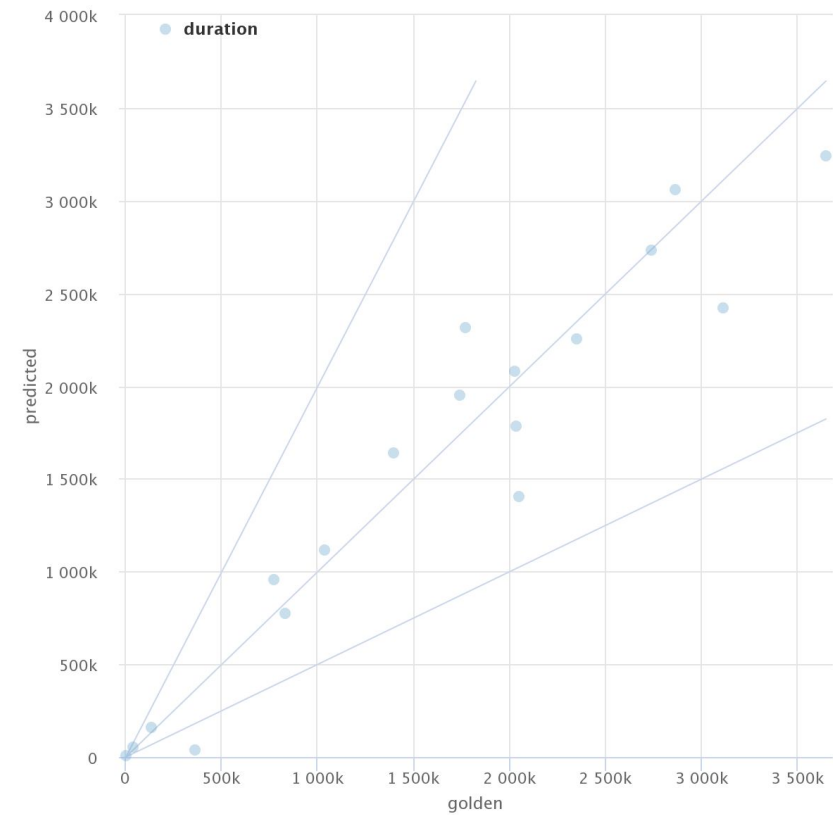
Count as miss if 25% or 5000ms of actuation is missed

Apr 20 2022 : RIDOT TERL Zoomed Out GM 9.0 SA 1.33



Golden vs. Predicted (duration)

Apr 20 2022 : RIDOT TERL Zoomed Out GM 9.0 SA 1.33



Highcharts.com

Model 6: 98.3%

Validated 2/8/19

1.7%

Id: bdea9999

Model: general-model-6

StreamAgent: 1.6.0

Validated 2/8/19

1.7%

Id: 2c75af16

Model: general-model-6

StreamAgent: 1.6.0

Model 7: 98.4%

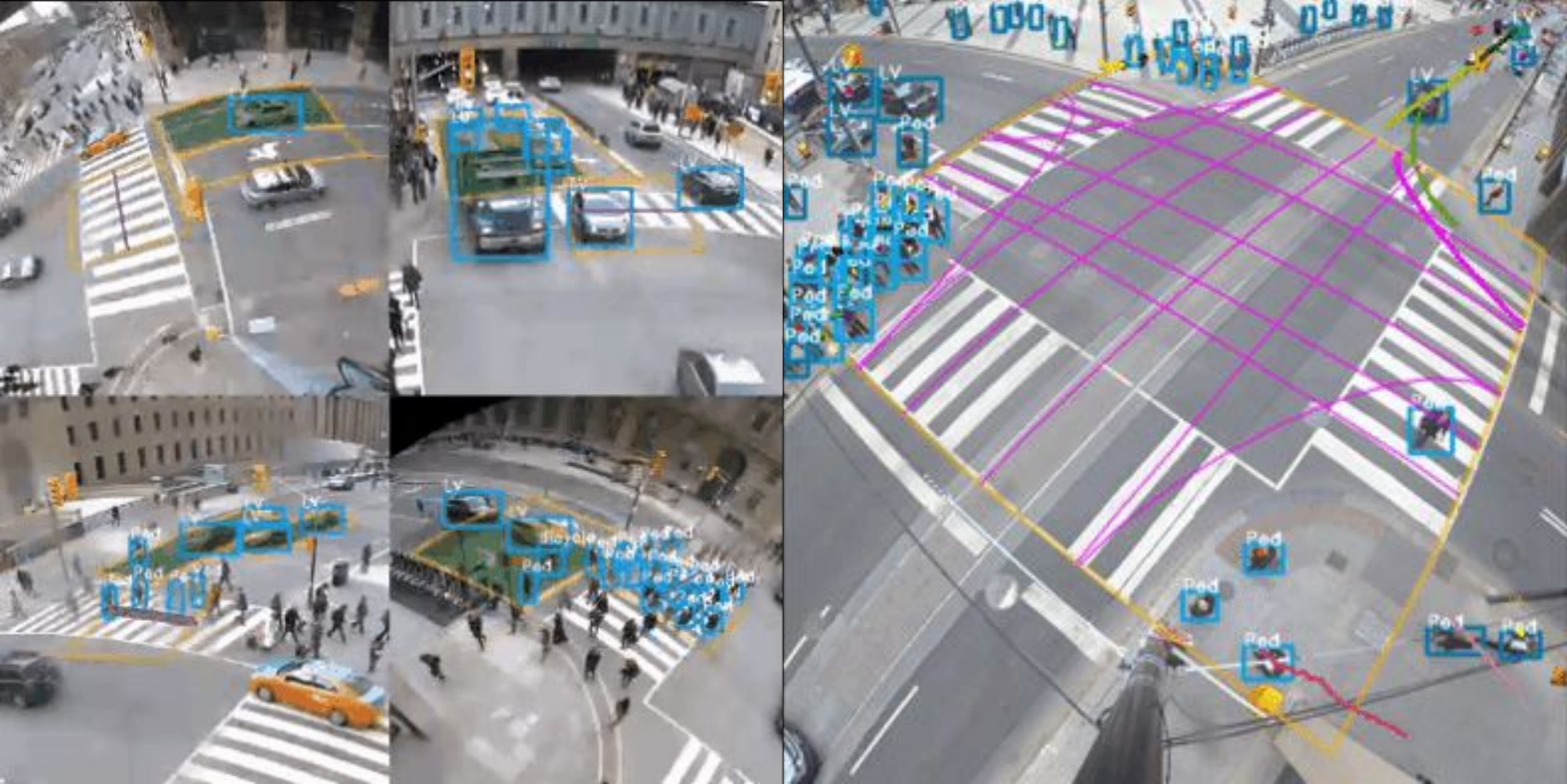
Validated 2/20/19

1.6%

Id: e59befad

Model: general-model-7

StreamAgent: 1.6.0



Thank you for your time!

Joel Quigley

jquigley@miovision.com

1-226-581-3914

Miovision Technologies, Inc.

137 Glasgow St. Suite 110

Kitchener, ON

N2G 4X8

www.miovision.com