



WIM for Mainline E-Screening: Data Collection and Enforcement



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Size & Weight Committee

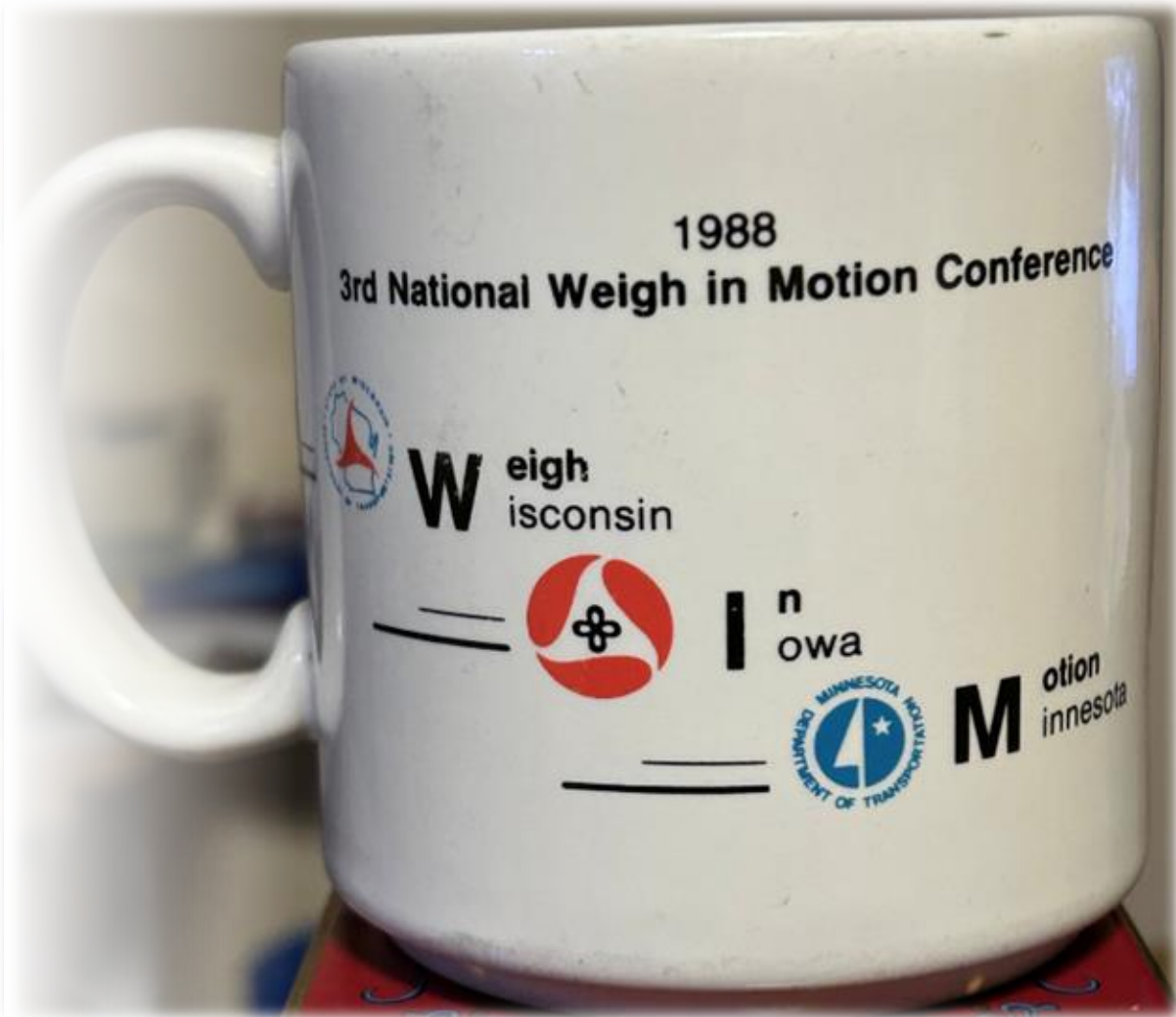
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Commercial Vehicle Operations applies Intelligent Transportation Systems to commercial vehicles, using sensors, communication, and information technologies to improve safety and efficiency.

ITS Initiatives

Commercial
Vehicle
Operations



What is Weigh-in- Motion?

There is nothing new under the sun. –Ecclesiastes 1:9

The more things change, the more they stay the same. –Dave



What is Weigh-in-Motion?

- ▶ Weighs moving vehicles
 - ▶ on roadways
 - ▶ at normal traffic speeds
- ▶ Provides
 - ▶ Vehicle length
 - ▶ Vehicle speed
 - ▶ Axle count
 - ▶ Axle spacing
 - ▶ Axle (or half-axle) weight
 - ▶ Gross weight
 - ▶ Compliance check

WIM Sensors

- ▶ Load cell
- ▶ Bending plate
- ▶ Strip Sensors
- ▶ Piezoelectric strips
- ▶ Bridge



Weigh in Motion Challenges

- ▶ Accuracy
- ▶ Reliability
- ▶ Application
- ▶ Operation and Maintenance
- ▶ Obsolescence
- ▶ Funding
- ▶ Organizational Management

WIM Accuracy & Reliability

Installation

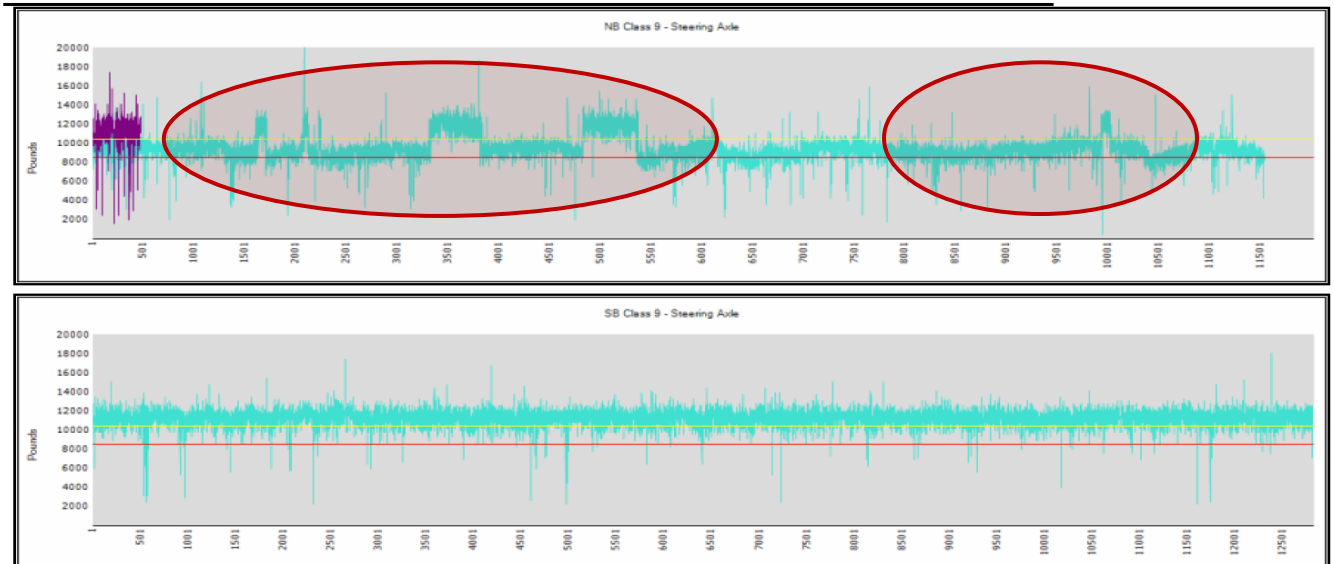
- ▶ Smooth, sound pavement
 - ▶ 300' PCC pavement
 - ▶ Continuous diamond grind
 - ▶ WIM sensors after grinding
- ▶ ASTM E1318-09(2017) validation



Ongoing Operation

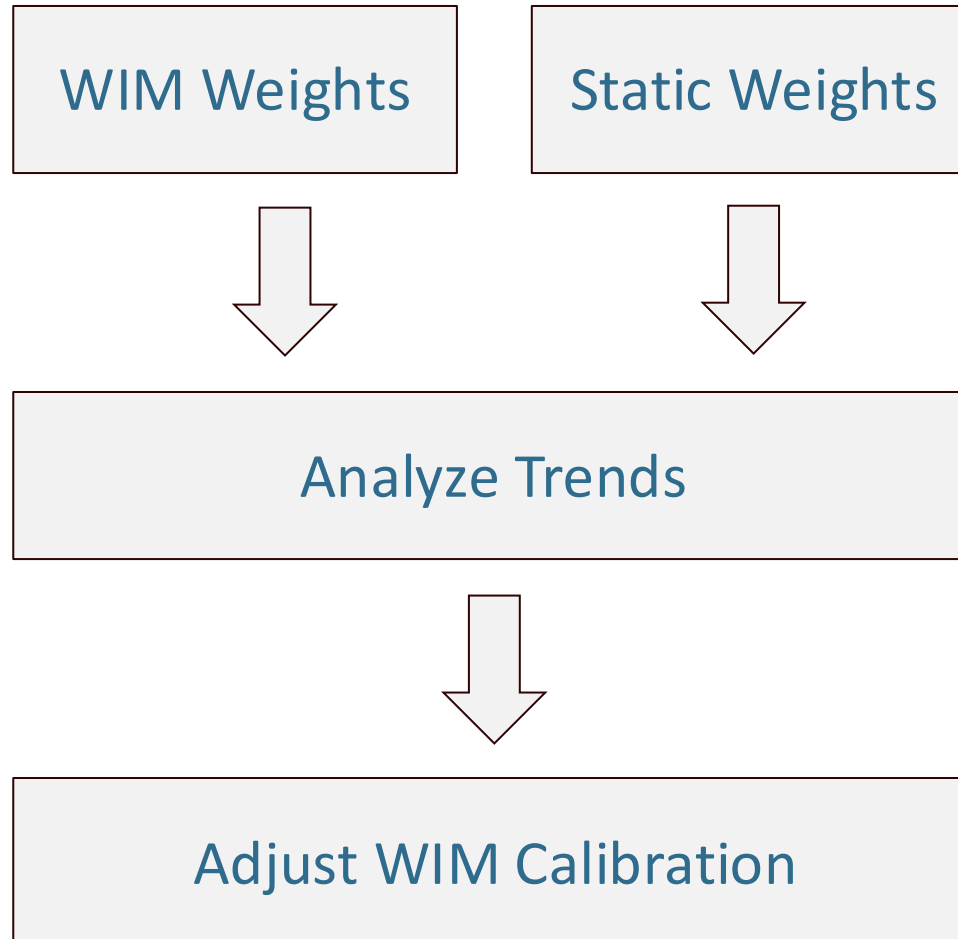
- ▶ Maintenance support contracts
- ▶ Monthly performance reviews
 - ▶ SDDOT ITS, Traffic Monitoring
 - ▶ SDHP POE Managers
 - ▶ E-Screening Vendor
- ▶ Axle weight trend analysis

Station: SISSETON (910) Year: 2025 Month: April



Continuous Calibration

- ▶ Compare WIM weights to static enforcement scale weights
- ▶ Automatically adjust WIM calibration to compensate for difference trends
- ▶ Reduce average error significantly



Electronic Screening

- ▶ Identify & weigh approaching trucks
- ▶ Check safety status, weight, tires, registration and fuel tax
- ▶ Allow “good” trucks to bypass most of the time
- ▶ ~\$6.50 delay cost saved per bypass
- ▶ Ports of Entry
 - ▶ I-29 Jefferson (2003), (renovate 2023)
 - ▶ I-29 Sisseton (2011)
 - ▶ I-90 Tilford (2011), (rebuild POE 2022 - 2023)
 - ▶ SD79 Rapid City (2015)
 - ▶ US14/US83 Blunt (2017), (repair 2023)
 - ▶ I-90 Valley Springs (2019)
 - ▶ I-90 Mitchell (2027)



E-Screening Criteria

- ▶ Valid USDOT
- ▶ Valid IFTA
- ▶ Valid Registration
- ▶ IRP Status check
- ▶ UCR status check
- ▶ PRISM data check
- ▶ Federal OOS check
- ▶ 5% random report
- ▶ Legal Weight
 - ▶ axle
 - ▶ axle combinations (“bridge”)
 - ▶ gross
 - ▶ registered
- ▶ Valid length
- ▶ Valid height
- ▶ OS/OW Permit status
- ▶ Tire anomaly status
- ▶ ISS < 75



Tilford Eastbound POE Mainline E-Screening

Detection

- License Plate Reader
- AVI Transponder Reader
- Loop & Piezo Detectors
- WIM (EB & WB)
- Sideview Camera
- Overheight Detection
- Tire Anomaly Classification

Notification

- Loop Detectors
- AVI Transponder Antenna
- Changeable Message Signs
- Open/Closed Sign

Compliance

- Mainline Loop & Piezo Detectors
- Ramp Loop & Piezo Detectors

Weigh Station

- Loop & Piezo Detectors
- Thermal Brake Imaging
- Computer
- Operator Console
- Multiplatform Enforcement Scale
- Variable Message Sign at Scale
- Inspection Bay



Detection



Opposing Direction Traffic Monitoring



Notification

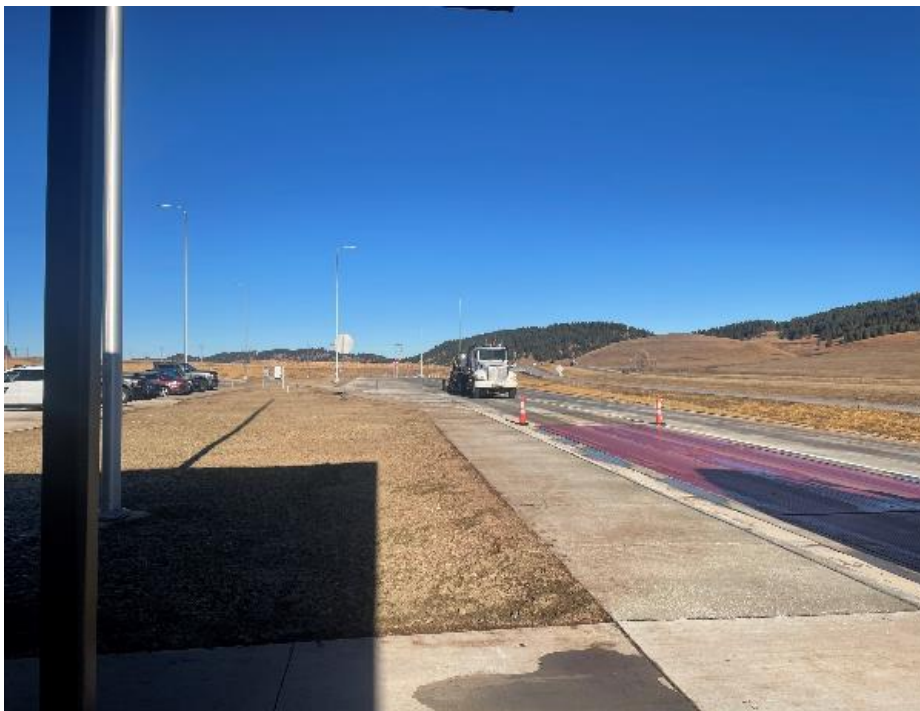


Compliance



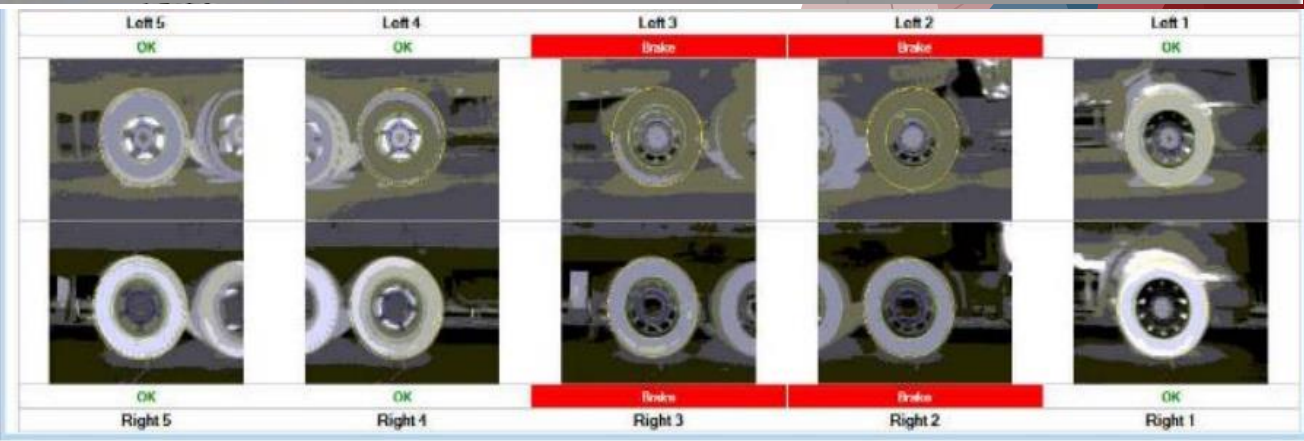
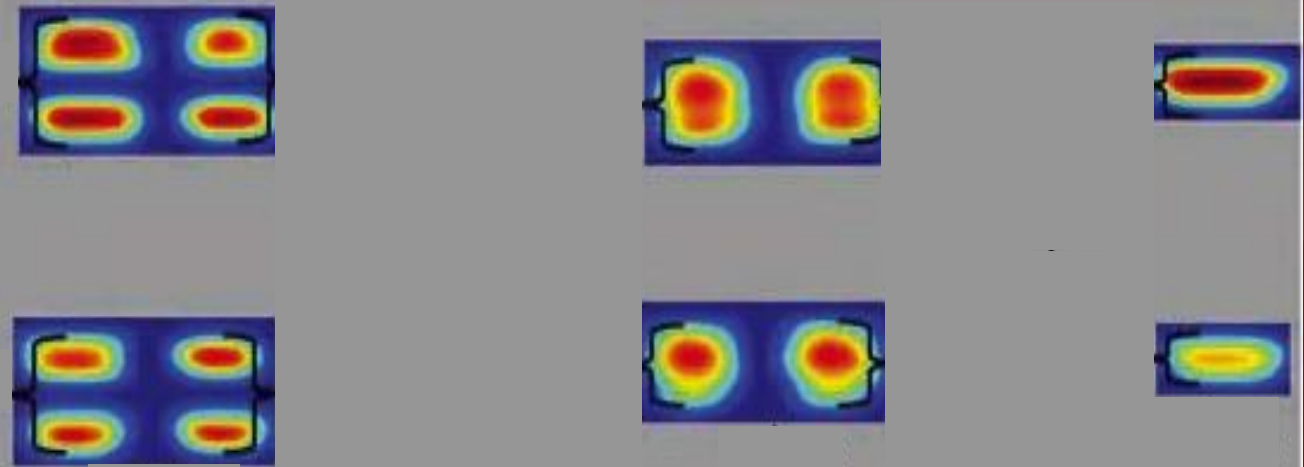
Tilford POE Weigh Station

- ▶ E-screening system funded by 2021 FMCSA Innovative Technology Deployment grant
- ▶ Port of Entry reconstruction funded by federal & state highway funding



Tire Anomaly & Thermal Brake Checking

- ▶ I-90 Valley Springs
- ▶ I-29 Jefferson
- ▶ I-29 Sisseton
- ▶ SD79 Rapid City (TAC only)
- ▶ I-90 Tilford
- ▶ I-90 Mitchell (2027 TAC only)



Inspections Prompted by Electronic Screening

- ▶ Tires
- ▶ Brakes
- ▶ Exhaust
- ▶ Lighting
- ▶ Wheels
- ▶ Frames
- ▶ Drivers
- ▶ More



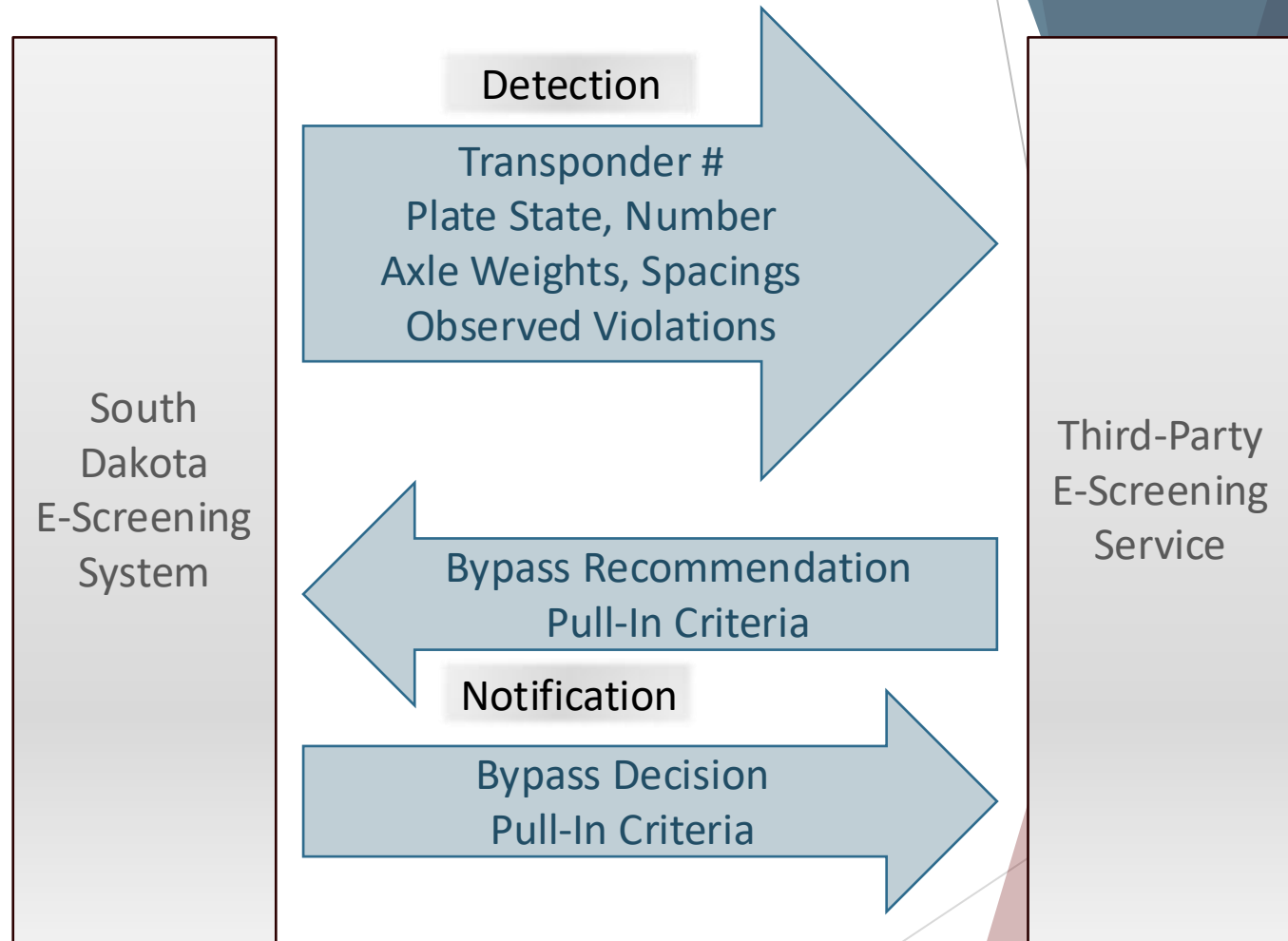
Automated Permitting System

- ▶ Issue commercial vehicle permits online or by staff
- ▶ Automatic oversize/overweight routing
 - ▶ Bridge load and clearance
 - ▶ Other fixed objects
- ▶ Temporary restrictions from SD511
 - ▶ Closures
 - ▶ Construction
 - ▶ Load limits
 - ▶ Incidents
- ▶ Accept credit card, escrow payment
- ▶ Feed to E-Screening systems



Third-Party Permitting Services

- ▶ Uses AVI transponder or driver's cell phone or ELD
- ▶ Privately operated and financed
- ▶ Synced to Detection and Notification phases
- ▶ Application Programming Interface (API)
- ▶ State E-screening criteria



Planning, Programming, & Financing

Funding Source	Life Cycle Stage			
	Initial Construction	Operation and Maintenance	Renovation	Emergency Repair
State Highway Funds	E-Screen + Facility		E-Screen + Facility	E-Screen + Facility
Federal Highway Formula Funds	E-Screen + Facility		E-Screen + Facility	
Innovative Technology Deployment	E-Screen		E-Screen	
Motor Carrier Safety Assistance Program		E-Screen		E-Screen

- ▶ Plan for long-term operation and renovation
- ▶ Maintain a state of good repair
- ▶ Build into your Statewide Transportation Improvement Program (STIP)



The Point of It All

- ▶ Safety
- ▶ Target enforcement
- ▶ Protect roads & bridges
- ▶ Reduce delay
- ▶ Staff efficiency & effectiveness
- ▶ Reliable travel for all road users



**BETTER LIVES
THROUGH BETTER
TRANSPORTATION**

Q&A

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Thank You!!

