



# Automotive Black Box Technology



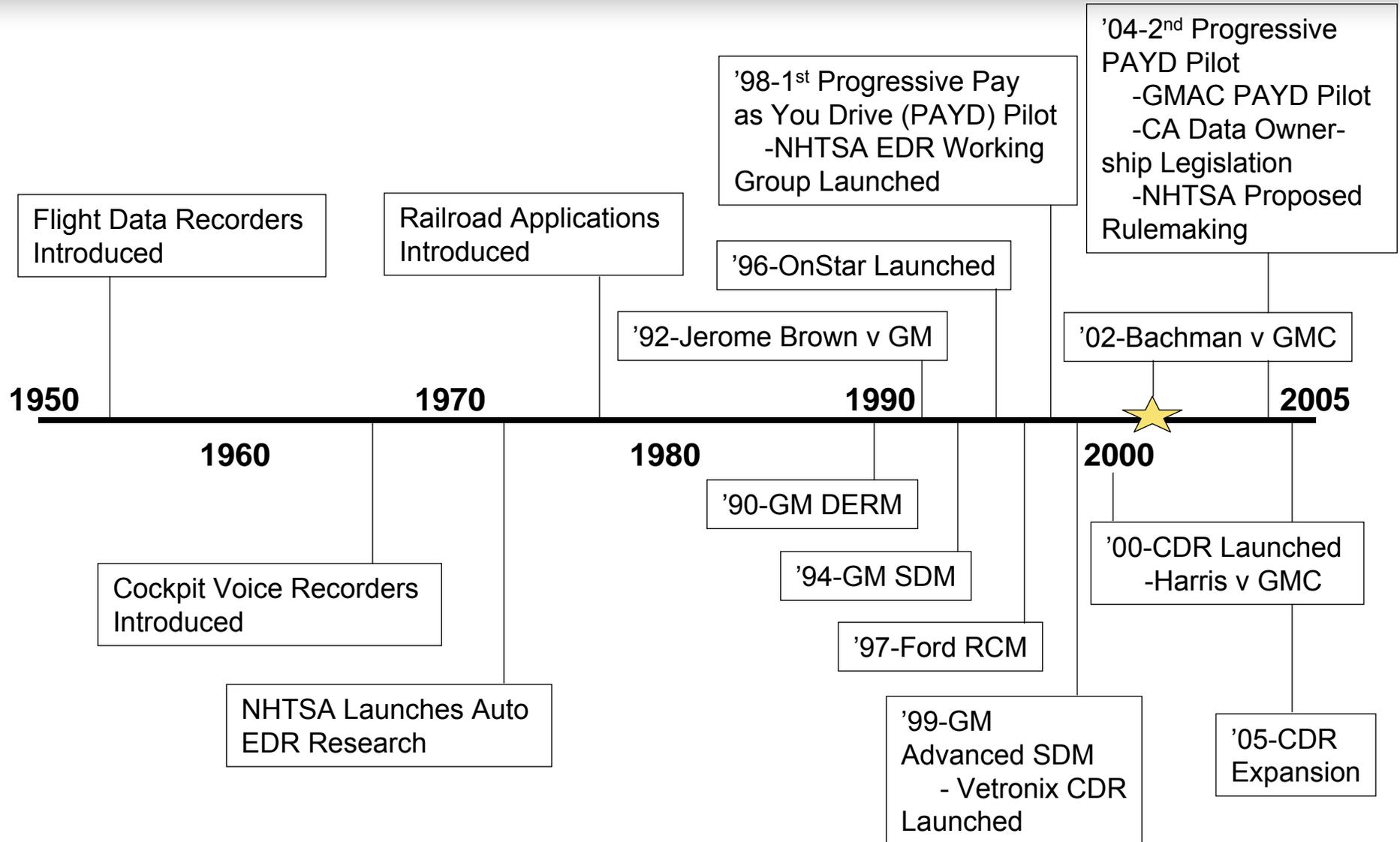
- Only provider of OEM event data recorder or “black box” data harvesting network (in 37 states) and desktop evaluations for claims professionals
- Customers include 16 auto insurers which sell nearly 20% of the auto insurance policies in the U.S.
- Policy: permission is obtained from the owner of the vehicle at the time of the accident before data is extracted

# Vehicle Data Recorder Applications



- **Aftermarket**
  - Trip Logging Devices
  - Passive GPS Tracking Devices
  - Non-OEM Crash Data Recording Devices
  - Telematics
- **OEM**
  - Telematics with real-time GPS Tracking (OnStar, ATX)
    - Communications
    - Vehicle maintenance and diagnostics
    - Travel services
    - Safety services
    - Accident and highway safety analysis
  - Airbag Control Modules (SDMs, RCMs)

# Timeline of Historical EDR Events



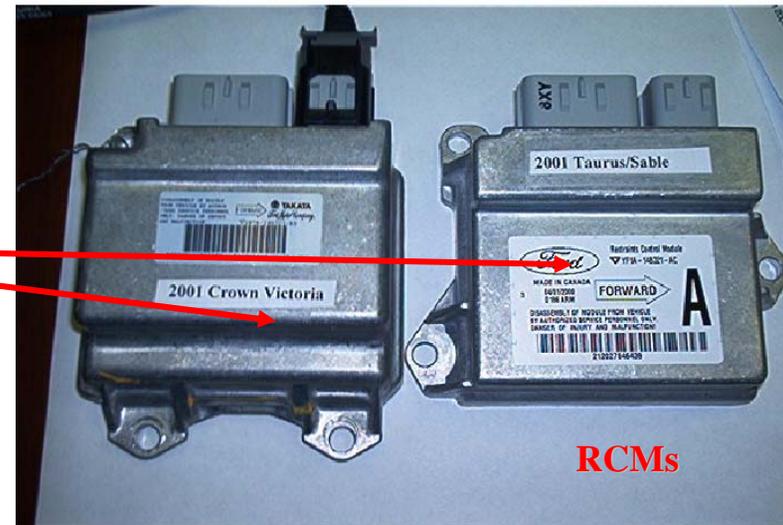
★ EDR Available to Auto Insurance Industry for Claim Investigations

# What are OEM EDRs?



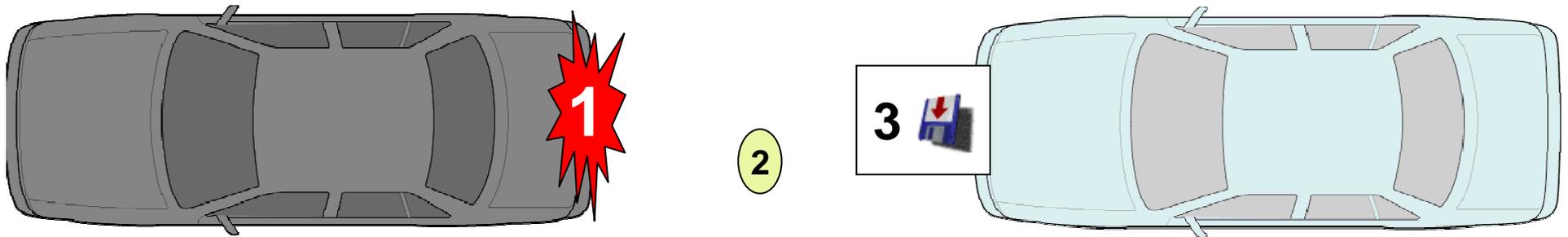
**OEM Event Data Recorder (EDR) devices control deployment of occupant protection systems**

- SDM (Sensing and Diagnostic Module - GM and Isuzu)
- RCM (Restraint Control Module - Ford)



**RCMs**

**The Event Data Recorder has 3 purposes:**



1. Measure collision severity
2. Make decisions about airbag deployment
3. Record the event data for future reference

# Data Harvesting – How....



CDR Peripheral

## Points of Connection:

- OBDII Port (DLC)
- Direct to EDR
  - In vehicle
  - Out of vehicle



# Harvestable Black Box Data GM, Saturn and Isuzu



[Deployment Data Summary]

File Edit View Run Window Help Special

0G4K00000X0000000 System Status At Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	ON
Ignition Cycles At Deployment	187
Ignition Cycles At Investigation	213
Time From Algorithm Enable to Deployment Command Criteria Met (msec)	18.75
Time From Algorithm Enable to Pretensioner Deployment Command Criteria Met (msec)	18.75
Time From Near Deployment To Deployment (msec)	N/A

Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Recorded Velocity Change (MPH)	-1.54	-3.07	-3.51	-5.27	-7.68	-10.09	-12.29	-16.24	-21.50	-27.86	-32.69	-39.93	-42.78	-43.44	-44.32
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Recorded Velocity Change (MPH)	-44.98	-45.42	-46.07	-46.95	-47.17	-47.17	-47.17	-47.17	-47.17	-47.17	-47.17	-47.17	-47.17	-47.17	-47.17

PRE-CRASH DATA			Electronic Data Validity Check Status = VALID	
Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	57	4032	100	OFF
-4	65	4160	70	OFF
-3	62	2304	2	ON
-2	55	1088	2	ON
-1	47	896	2	ON

File loaded

Events: DEPLOYMENT NEAR-DEPLOYMENT NO Interface

- **When data is available**
  - Airbag deployment – permanently written into EDR Memory
  - Non-deployment – temporarily written into EDR Memory
  - Non-deployment – represents the most severe event if multiple events
  - One to three collision events may be stored, depending on module
- **When no data is available**
  - Vehicle was not operational
  - There was no impact resulting in frontal decelerations
  - Impact was too minor to wake up sensors
  - Non-deployment – temporary storage period has been exceeded
- **No date and time stamp available**

# Harvestable Black Box Data

## Ford



- Longitudinal (generally) change in velocity for approximately 80 milliseconds
- Driver and passenger airbag deployment
- Driver and passenger (front seat) seat belt status (buckled vs. unbuckled)
- Driver and passenger pretensioner performance
- Driver seat track position

# Overview of Data Rules - Ford



- Crash data is only available
- Airbag deployment – data permanently stored
- Non-deployment events – data temporarily stored
- Lateral impact information available for Sable and Taurus models

# Potential Telematic Data Elements



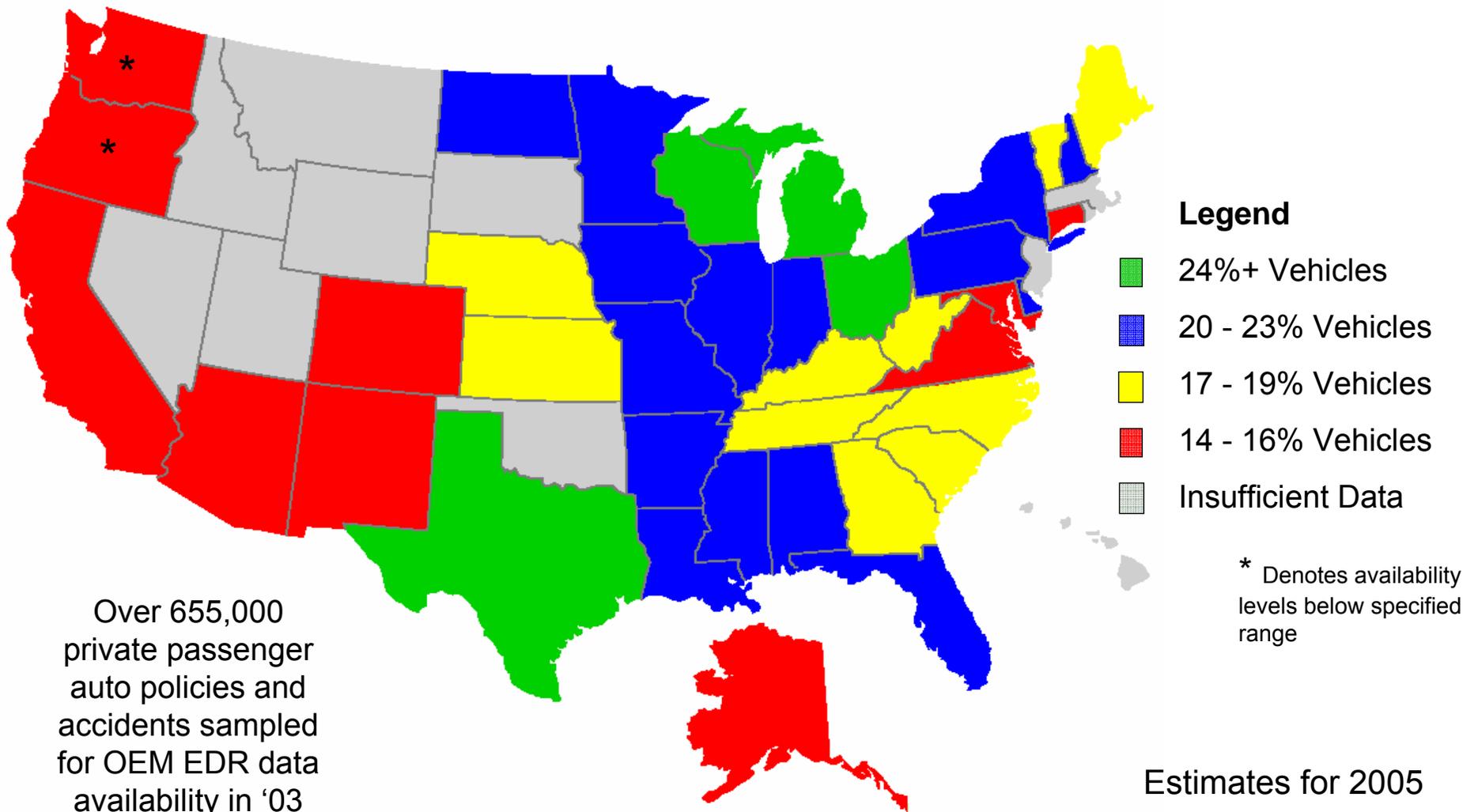
- Airbag deployment
- Crash pulse ( $\Delta V$ )
- Pre-impact braking
- Pre-impact speed
- Pre-impact engine RPM
- Pre-impact throttle position
- Gear selection
- Seat belt usage
- Seat tensioning restraint activation
- Occupant weight sensor data
- Head rest position
- Airbag disabler (on/off)
- VIN
- Date and approximate time of collision
- Mileage
- Vehicle location
- Pre-impact travel direction
- Headlights (on/off)
- Headlight dim and high beam switches (on/off)
- Turn signal status (on/off)
- Tire pressure sensor data
- Traction control sensor data
- Vehicle stability sensor data
- Other?

# How Often is OEM Data Available?



- **Nearly 25% of all private passenger vehicles have harvestable “black box” data**
  - GMs dating to '94,
  - Saturns dating to '95 and
  - Isuzus dating to 2001
  - Fords dating to 2001
- ***NY Times* reports more manufacturers to participate – Chrysler and Toyota**
- **Without new manufactures reported by *NY Times*, percentage will expand approximately 4% per year**
- **NHTSA’s proposed rulemaking, effective Oct., 2008 will further expand coverage**
- ***Availability varies by region***

# Regional EDR Data Availability



# Insurance Applications & Benefit



## Type of Claim

## Required EDR Functionality

<b>Low/minimal impact claims, frontal impact by insured</b>	<b>All Types</b>
<b>Intersection accidents</b>	<b>Pre-Crash Data</b>
<b>Claims involving the potential issue of speeding</b>	<b>Pre-Crash Data</b>
<b>Accidents involving 3 or more vehicles where the claimant is the middle vehicle</b>	<b>Pre-Crash Data</b>
<b>Hit and run (phantom vehicle) claims</b>	<b>Will Vary</b>
<b>Claims involving allegation of mechanical failure (brakes, cruise control, etc)</b>	<b>Pre-Crash Data</b>
<b>Airbag system replacement</b>	<b>All Types</b>
<b>Date of coverage vs accident questions</b>	<b>Will Vary</b>
<b>Serious injury cases – seat belt defense</b>	<b>Will Vary</b>

- **Who owns the data?**
  - Vehicle owner at the time of the accident (*prevalent practice*)
  - Ownership transferred to subsequent owner (salvage of entire vehicle or replaced components)
  - Driver of the vehicle at the time of the accident (significant implications to commercial applications)
  - Vehicle rentals or leases
- **Should permission be obtained from the data owner before the extraction of data?**
  - Authorization form for 1<sup>st</sup> and 3<sup>rd</sup> party (*prevalent practice*)
  - Policy language
  - Exceptions when fraud suspected
- **Is an insurer potentially liable if it does not obtain the data as it defends its insured?**

- **Requires disclosure of EDR existence in owner's manual**
- **Defines vehicle owner as a person:**
  - Possessing legal title, and
  - Entitled to possession of the vehicle as a purchase under a security agreement, or
  - Entitled to possession of the vehicle as a lessee provided lease is over 3 months
- **Defines an EDR (includes recording steering performance and ACN)**
- **Defines conditions in which EDR data can be downloaded**
  - Owner
  - Owner or owner's agent or legal representative consents
  - Court order
  - For purposes of improving safety provided identity of the owner and driver not disclosed and last 4 digits of VIN deleted
  - Retrieved by a dealer or an auto technician to service or repair the motor vehicle
  - ACN
- **If applicable, disclosure in subscription services agreement**

# Proposed Rulemaking by NHTSA



- **For light vehicles equipped with EDRs (estimated to be in 65-90% of 2004 model years)**
  - Require the EDRs to record a minimum set of specified elements
    - Vehicle speed (-8 to 0 seconds)
    - Engine RPM (-8 to 0 seconds)
    - Engine throttle % (-8 to 0 seconds)
    - Braking (-8 to 0 seconds)
    - Driver belt usage (-1 second)
    - Longitudinal acceleration ( $\Delta V$ ) – Crash Data
  - Standardize the data format
  - Require that the EDRs function during and after front, side and rear vehicle crashes
  - Require vehicle manufacturers to:
    - Make publicly available information that would enable crash investigators to retrieve data from the EDR
    - Include a brief standardized statement in the owner's manual indicating that the vehicle is equipped with an EDR
- **Proposed effective date of September 01, 2008**

**Authoritative white paper – “Legal Issues Surrounding the Implementation and Use of Event Data Recorders” by Michael Edmund O’Neill – Assoc. Professor, George Mason University School of Law**

- Fifth Amendment does not necessarily apply
- Fourth Amendment only applies relative to owners expectations to privacy
  - Fourth Amendment rights not as strong in a mobile vehicle
  - Fourth Amendment exceptions remain applicable
- Federal rules of discovery, evidence spoliation and admissibility apply

- ***Harris v. GMC* (2000)** - found that EDR data should be evaluated under the *Daubert* criteria that governs the qualification and admission of scientific testimony
- ***Bachman v. GM* (2002)** – After extensive review of evidence found data scientifically reliable. Suggested expert testimony may not be necessary.
- ***State New York v. Christmann* (Jan. 2004)** – Citing *Bachman*, found general acceptance in the scientific community. No need for expert witness.
- ***State New York v. Hopkins* (Aug. 2004)** – Found scientifically reliable based upon case review and supporting documentation. Frye hearing not necessary.
- ***Matos v. State Florida* (March 2005)** – citing *Bachman*, held EDR scientifically reliable and not “new or novel” science.

- **Data available today from EDRs is evidence - not an invasion of privacy**
  - Forensic analysis can recreate similar information, but with less precision
  - Forensic analysis has been traditionally used, and consistently admitted into evidence, to address the previously-noted claim questions
  - EDR data increases precision and reduces cost
  - Eye witness accounts are not consistently reliable substitutes
- **Obtaining permission to extract the data neutralizes invasion of privacy arguments**
- **Data is objective and therefore favors no particular party**
  - Data tampering to introduce bias is not practically achievable using reasonable safeguards
  - Newton's laws give insight to vehicles without available EDR information
- **While not perfect, the AAM model is practical and works**
  - Vehicle owner as owner of data is consistent with other protocols
  - Model could benefit from definition of the timing of collision relative to data ownership
  - Permission from vehicle owner or court order to obtain data is reasonably balanced in the context of insurance "duties" (1<sup>st</sup> and 3<sup>rd</sup> party)

# Thank You



**W. Scott Palmer**  
**President & CEO**  
**Injury Sciences LLC**  
**877-979-7378**  
**scott.palmer@injsci.com**