# SAE TOPTEC Government\Research

## Event data Recorders – User Perspectives on Parameters & Data Accessibility

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National Center for Statistics & Analysis

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# Discussion Topics Government/Research

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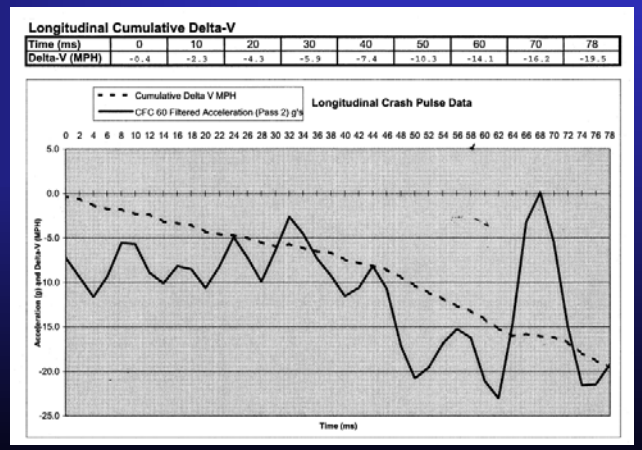
- EDR Field Data Collection Program at NHTSA
  - Collection Rates & Missing Data Issues
- EDR Data Needed for Crash Discrimination
- What We Have Learned
- The Bottom Line



# EDR Field Data Collection Program at NHTSA

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- To date NHTSA has over 1,100 EDR data files in the Electronic Data Collection System(EDCS)
- Approximately 20 files were documented via the SCI program pre-EDCS.
  - First case in 1991

SPECIAL CRASH INVESTIGATIONS
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# EDR Field Data Collection Program at NHTSA

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- CY2002 first data collection year that EDR data has coded variables in NCSA EDS.
- CY2002 *All* NASS/SCI/CIREN team members were equipped with Vetronix CDR units.
- 2002 NASS CDS EDR Data Collection Effort
  - 2002 NASS data file as of 12/1/2002
    - 684 cases with EDR Equipped Vehicles

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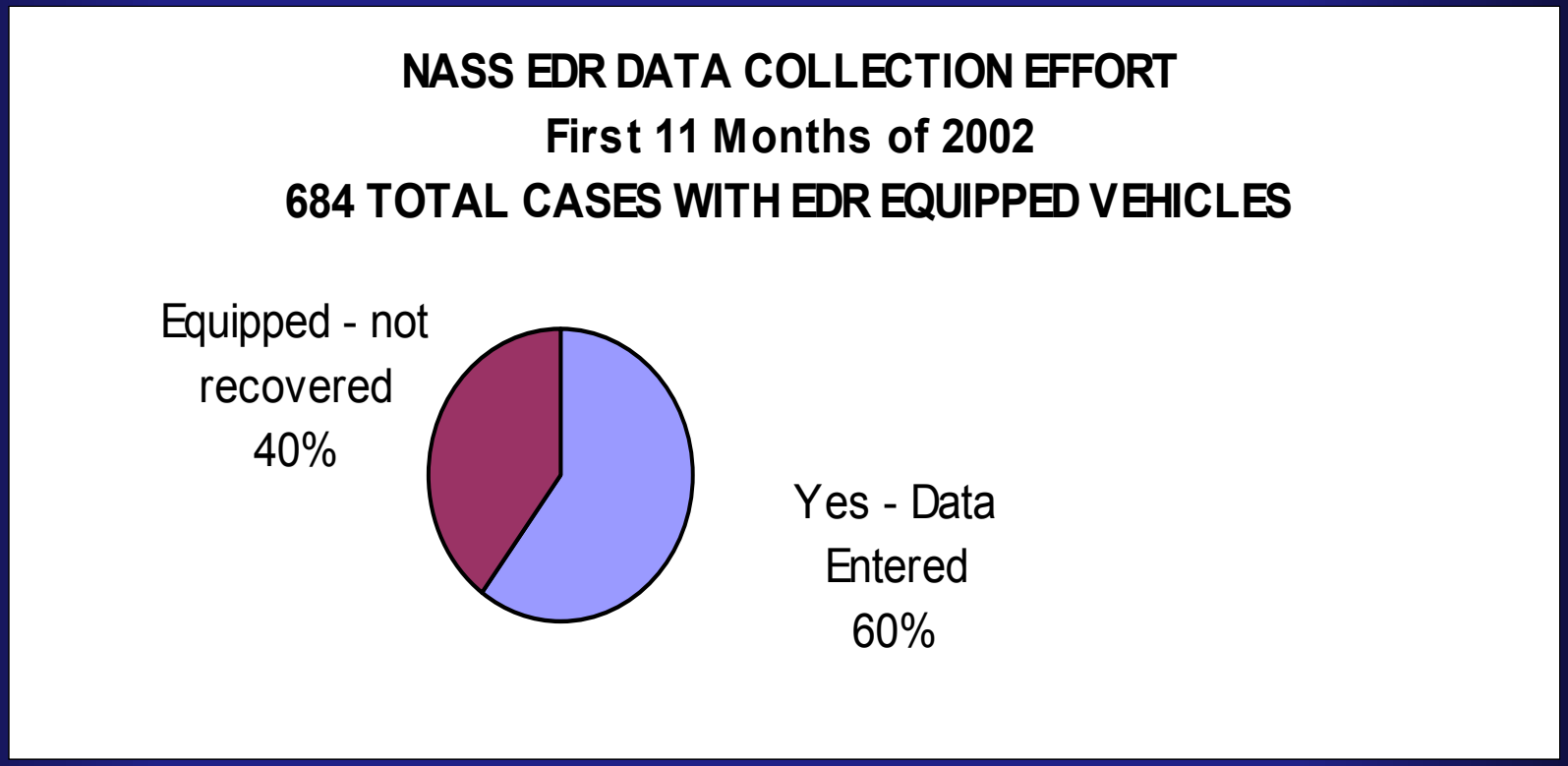


•Gabler, H.C., T. Roston "Estimating Crash Severity: Can Event Data Recorders Replace Crash Reconstruction", Paper No. 02-490, Proceedings of the 18th International Technical Conference on the Enhanced Safety of Vehicles, Nagoya, Japan (May 2003)

# EDR Field Data Collection Program at NHTSA

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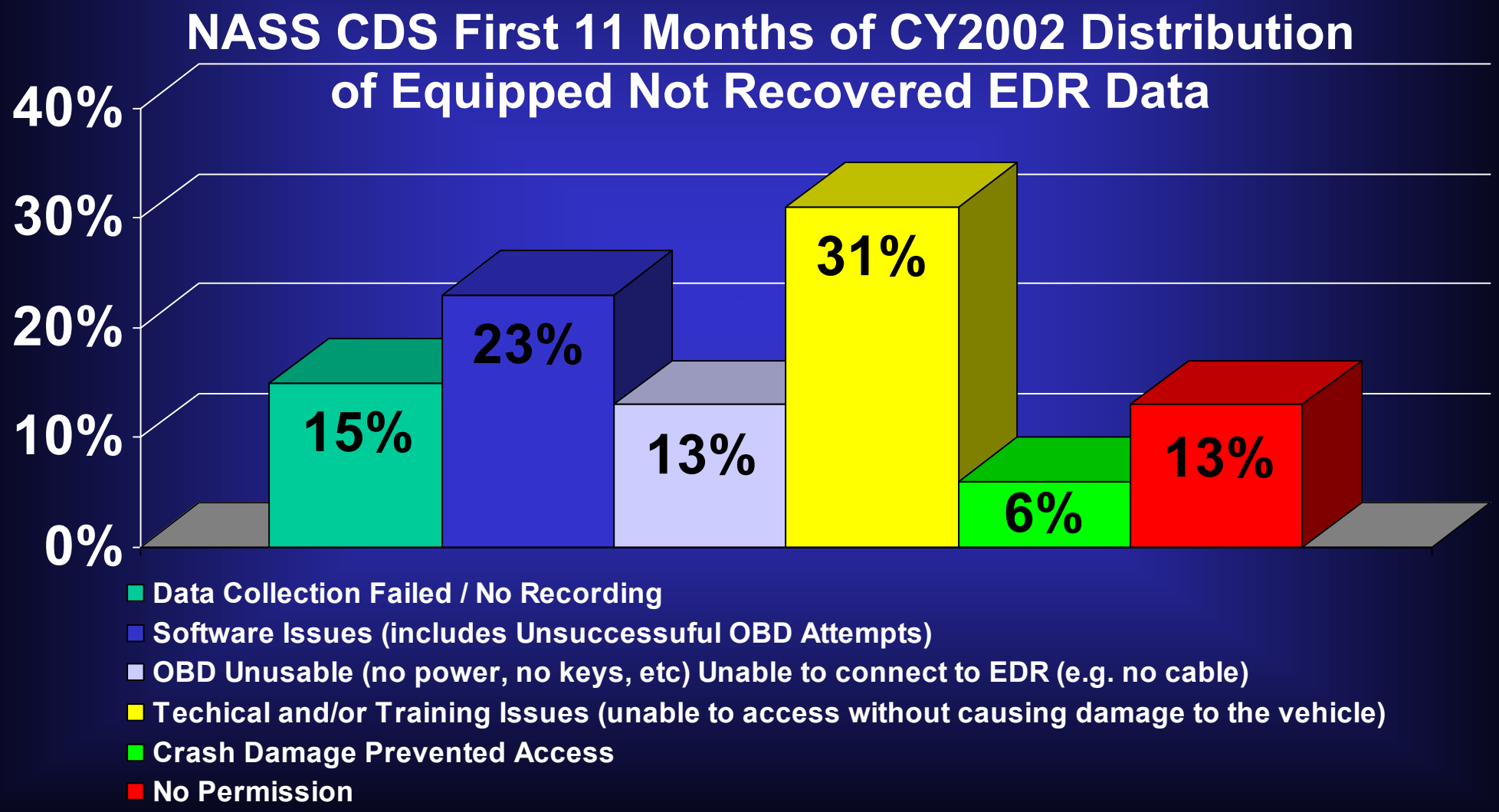

# EDR Data Needed for Crash Discrimination

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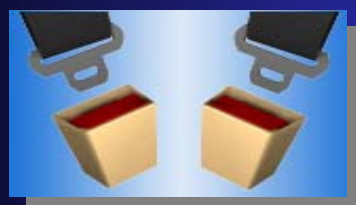

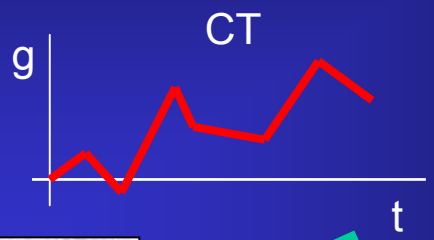


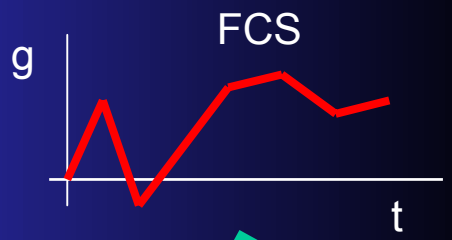


Data Recorder

Occupant Status

Severity Assessment

Deployment Control

Driver

Passenger

Pret

Stg 1

Stg 2

Pret

Stg 1

Stg 2

# What We Have Learned: EDR Data Collection

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- The most effective method to observe and/or measure and confirm the performance of Advanced 208 Compliant Occupant Protection System Features is through the EDR data

- Crash pulse, time to deployment, restraint usage, etc
- Deployment timing of the dual-stage air bag system

# Sample of EDR Data Collected in a Multi-Stage Air Bag System

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| 1GCEC19TX3Zxxxxxx System Status At Deployment | |
|---|---|
| SIR Warning Lamp Status | OFF |
| Driver's Belt Switch Circuit Status | BUCKLED |
| Ignition Cycles At Deployment | 666 |
| Ignition Cycles At Investigation | 675 |
| Maximum SDM Recorded Velocity Change (MPH) | -6.93 |
| Algorithm Enable to Maximum SDM Recorded Velocity Change (msec) | 117.5 |
| Driver First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec) | 35 |
| Driver Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec) | N/A |
| Passenger First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec) | 0 |
| Passenger Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec) | N/A |
| Time Between Near Deployment And Deployment Events (sec) | N/A |
| Frontal Deployment Level Event Counter | 1 |
| Event Recording Complete | Yes |
| Multiple Events Associated With This Record | No |
| One Or More Associated Events Not Recorded | No |

# Sample of EDR Data Collected in a Multi-Stage Air Bag System

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## EDR Control Module Data

| | | | |
|---|---|---|---|
| Data Validity Check: | Valid | EDR Model Version: | 141 |
| | | | |
| Time From Side Safing Decision to Left (Driver) Side Bag Deployment: | | | 21 |
| Time From Side Safing Decision to Right (Passenger) Side Bag Deployment: | | | Not Deployed |
| Passenger Airbag Switch Position During Event: | | | N/A |
| Diagnostic Codes Active When Event Occurred: | | | 0 |

## Algorithm Times

Actual initiation depends on restraint system status (below).

| | ms |
|---|---|
| Time From Algorithm Wakeup to Pretensioner: | 14 |
| Time From Algorithm Wakeup to First Stage - Unbelted: | 17 |
| Time From Algorithm Wakeup to First Stage - Belted: | 21 |
| Time From Algorithm Wakeup to Second Stage: | 0 |

## Restraint System Status

| | |
|---|---|
| Driver Seat Belt Buckle: | Engaged |
| Passenger Seat Belt Buckle: | Not Engaged |
| Driver Seat Track In Forward Position: | No |
| Passenger Seat Weight Switch Position: | N/A |

## Deployment Initiation Attempt Times

| | Driver | Passenger |
|---|---|---|
| Time From Algorithm Wakeup to Pretensioner Deployment Attempt: | 14 | Unbelted |
| Time From Algorithm Wakeup to First Stage Deployment Attempt: | 21 | 21 |
| Time From Algorithm Wakeup to Second Stage Deployment Attempt: | Disposal | Disposal |

# What We Have Learned: EDR Data Collection

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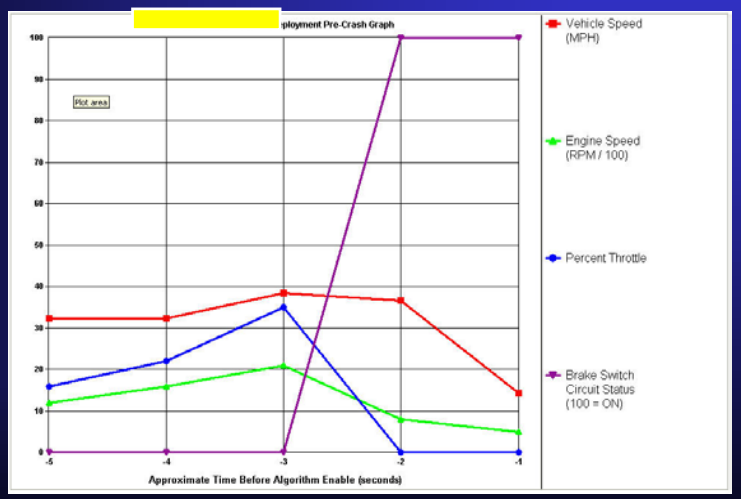
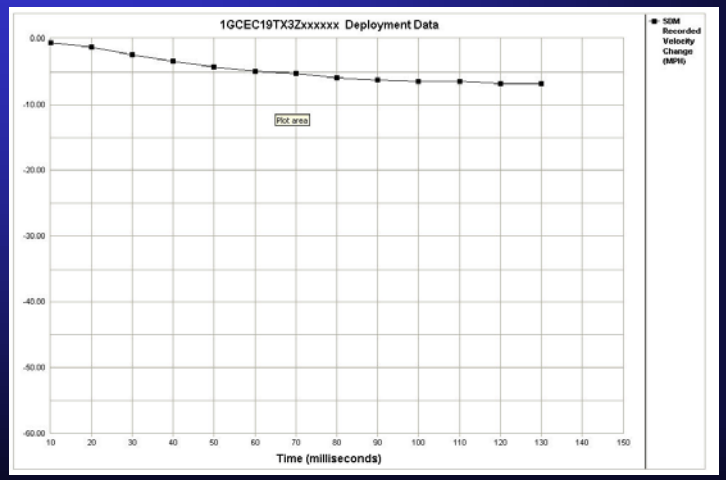
- **We can only read a limited number of vehicles**
  - **Vetronix CDR tool**
  - **Version 2.0 of Vetronix Software**
    - Most General Motors 1994 and newer
    - Some Ford and Mercury 2001 and newer
    - Isuzu Hombre 2000 - 2002 and Ascender 2003



# The Bottom Line

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- We <u>need</u> the EDR data!
- Investigators <u>cannot</u> determine:
  - System performance
    - When the air bag(s) deployed
    - Which stage the air bag(s) deployed
    - Timing issues (pretensioners, 2nd stage deployments, disposals)

# Questions?