Event Data **R**ecorders

Downloading
Crash data

Event Data Recorders (EDR)

What gets recorded?

- Different make and model vehicles record different amounts of data and a different number of “events” or what might be called “recordings”
- An “event” is a condition where the crash module has recognized some type of sudden change in the vehicle’s direction
  - “Events” can be significant impacts or as little as hard braking
  - Some events can be the result of sudden body roll

Deployment & Non-Deployment Events

Non-Deployment (ND)

Acceleration observed along one of the car's axis ***sufficient*** to cause the module's crash sensing algorithm to "enable" or "wake up" but which does not warrant a commanded deployment

Deployment (D)

Acceleration observed along one of the car's axis ***sufficient*** to cause the module's crash sensing algorithm to "enable" or "wake up" and which is ***sufficient*** to warrant a commanded deployment

Example GM Deployment Event Data

- SDMs may store *up to* two events
- ***One*** deployment may be recorded alone **or** in combinations of a deployment ***PLUS*** a…
- …non-deployment ***or*** a…
- …second deployment event
- Cannot be erased or overwritten

Example GM Non-Deployment Event Data

- SDMs record and store one “ND” event
- Cleared after ~250 ignition cycles
  - unless it is associated or *“locked”* with a deployment event
- May be overwritten by another non-deploy

Can data be accidentally altered?

- Downloading data alone does not alter stored crash data
  - Think of it as taking a picture, an image, of the data rather than removing it from the module or moving it from the module to your computer
  - Each download simply images what is stored, leaving it there so the next person can gather the same crash information

Can data be accidentally overwritten?

- Rough handling of a module, while it's powered up outside of a vehicle, may cause the module to overwrite a previously stored non-deployment or create a deployment event.

Evaluating events

- Stored Crash data should be evaluated with, and in the context of, a crash analysis (reconstruction)
  - Normally, crash data is a supplement to a reconstruction or a part of research data
- The complexity of the reconstruction is variable, conditional, and subject to the events under study


Is the data
"always"
right?

Vehicle speed example

- Data collected by the Ontario Provincial Police (OPP) during training activities
- Data shared with the permission of the OPP

"Speed = zero" for about 2 sec…?

System Status At Non-Deployment	
SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	BUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	Air Bag Not Suppressed
Ignition Cycles At Non-Deployment	6549
Maximum SDM Algorithm Forward Velocity Change (MPH)	0.00

PRE-CRASH DATA				
Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	24	3392	18	OFF
-4	24	3264	24	OFF
-3	21	2304	0	ON
-2	0	832	0	ON
-1	0	768	0	ON

Was speed zero for about 2 sec?

System Status At Non-Deployment				
PRE-CRASH DATA				
Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	24	3392	18	OFF
-4	24	3264	24	OFF
-3	21	2304	0	ON
-2	0	832	0	ON
-1	0	768	0	ON

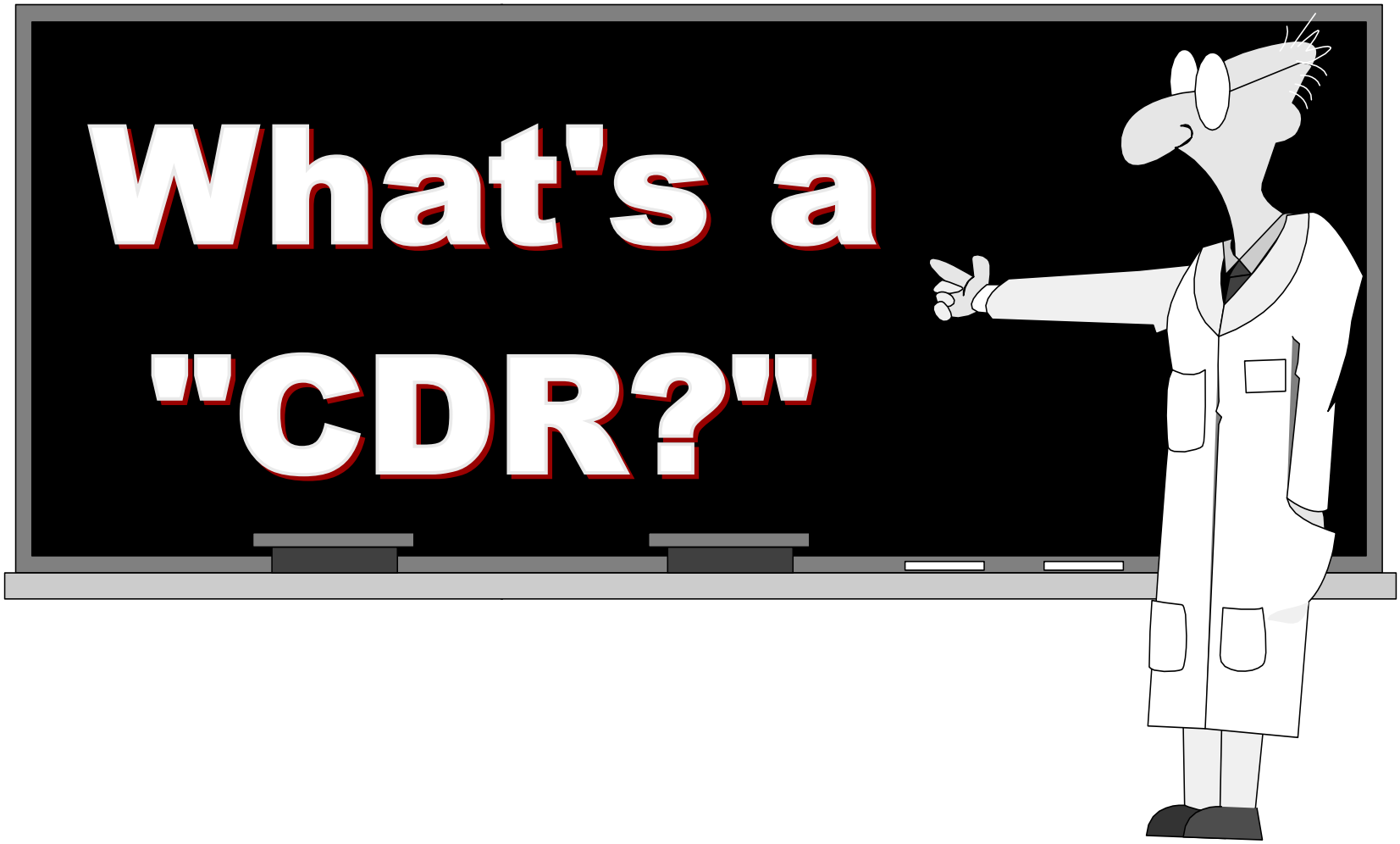
Was speed zero at impact?

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circ
-5	24	3392	18	OFF
-4	24	3264	24	OFF
-3	21	2304	0	ON
-2	0	832	0	ON
-1	0	768	0	ON

Analysis is more complicated

- Analysis takes into account all the *available* information
  - To include the humans, the vehicles and the environment
- Analysis may require mechanical inspections and will normally require an analysis of the vehicle dynamics and physical evidence

Crash Data Retrieval Tool


What's a
"CDR?"

The Crash Data Retrieval System

CDR CRASH DATA RETRIEVAL SYSTEM

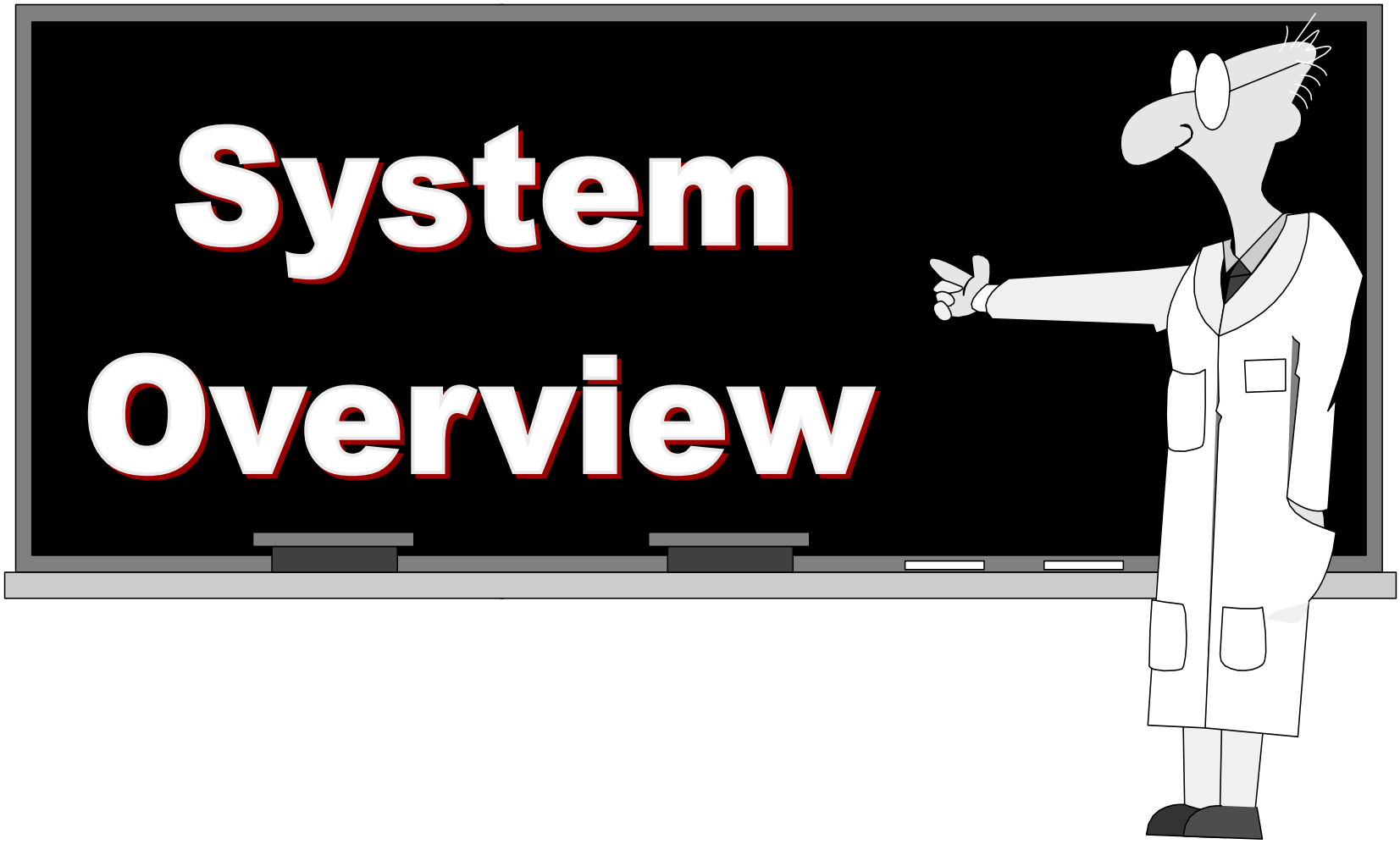
"CDR"

- Crash Data Retrieval (CDR) system
  - *Not* a "crash data recorder"

- *Not* something installed *in* a vehicle

- Provides access to crash data that is stored in late model vehicles

System Overview



Select retrieval method

- Two “normal” methods of retrieval:
  - Through the Data Link Connector
  - Direct to the module
    - “In vehicle,” module remains bolted into the vehicle
    - “Desktop,” module removed from vehicle

CDR connection overview

Source of 12v

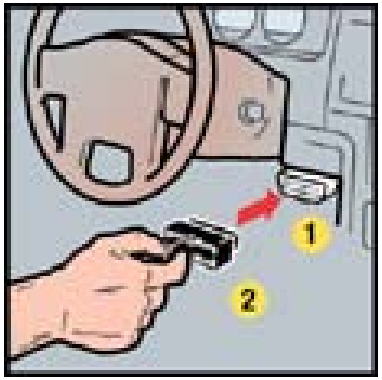
Direct connect to SDM in/out of vehicle

DLC connect in vehicle

CDR system interface module

Mechanics of a download

CDR in-car DLC download



Typical DLC location

Typical DLC location

Typical DLC connection

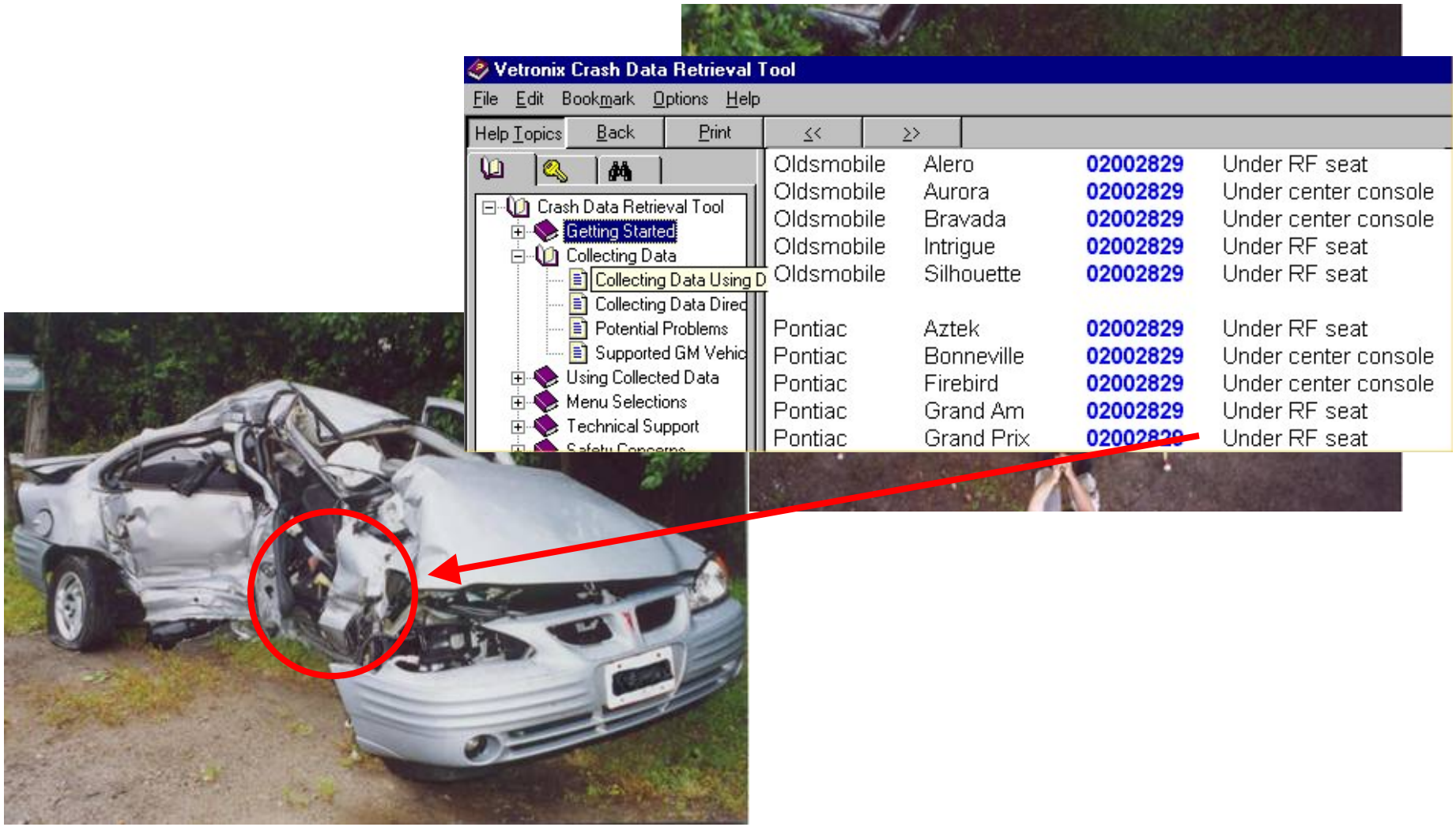
The location of the SDM varies

Under the driver or front passenger seats...

SDM location
- “center tunnel”

SDM location
- center tunnel

Find the Grand Prix SDM



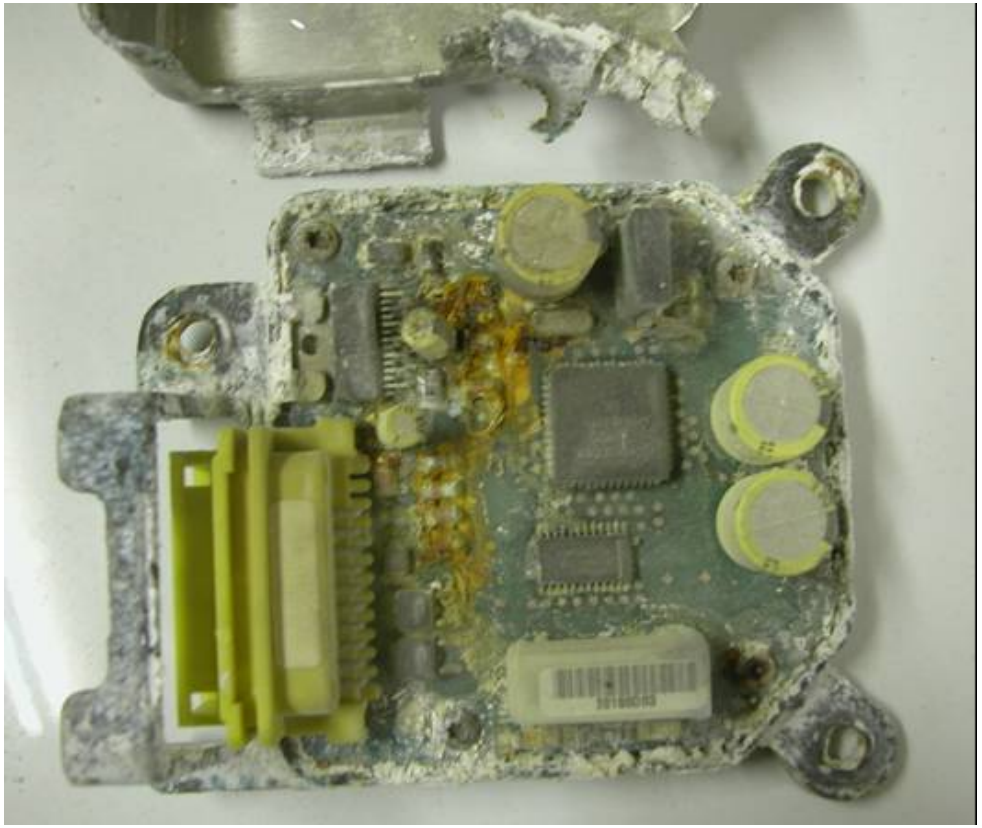
Accessing the SDM can be difficult at times

What about vehicle condition?

What about module condition?

What about module condition?

- Flooded, shorted, unusable



End