

Rollover and Certified Advanced 208-Compliant Air Bag Investigation
Dynamic Science, Inc./Case Number: DS06001
2005 Chevrolet Trailblazer
California
August 2005

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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16. Abstract This on-site investigation focused on the rollover event and performance of the Certified Advanced 208-Compliant air bag system in a 2005 Chevrolet Trailblazer. This single vehicle crash occurred in August 2005 at 0018 hours in an urban area of California. The crash occurred in the eastbound lanes of a divided state freeway. The case vehicle was a 2005 Chevrolet Trailblazer being driven by a restrained 20-year-old male. There were no other passengers on-board. There are no traffic controls in this area, but at the time of the crash, there were orange traffic cones present and the two left eastbound lanes were closed. The driver of the Trailblazer was traveling east in lane three of six. He reported to police that he changed lanes to the left and continued traveling east in lane four. The driver reported that he began to change lanes to his left again, but then realized that lanes five and six were blocked by the traffic cones. The driver steered back to his right and began to lose control of the vehicle. He tried to regain control by steering left but overcorrected and the Chevrolet Trailblazer began to rotate counterclockwise. The case vehicle traveled across lanes five and six, and the front end impacted the jersey barrier dividing the east and westbound lanes, resulting in the deployment of the driver's front air bag. The Trailblazer continued rotating counterclockwise and the back right impacted the concrete barrier. The vehicle continued traveling east as it rotated and began to rollover to the left. The case vehicle completed two quarter turns and came to final rest on its top, facing southeast. The driver was not injured in the crash, although an ambulance was dispatched to the scene. The case vehicle was towed due to damage and was later declared a total loss.		13. Type of report and period Covered	
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BACKGROUND

Description

This on-site investigation focused on the rollover event and the Certified Advanced 208-Compliant air bag system in a 2005 Chevrolet Trailblazer. This single vehicle crash occurred in August 2005 at 0018 hours in an urban area of California. The crash occurred in the eastbound lanes of a divided state freeway.

The case vehicle was a 2005 Chevrolet Trailblazer being driven by a restrained 20-year-old male. There were no other passengers on-board. There were no traffic controls in this area, but at the time of the crash there were orange traffic cones present and the two left eastbound lanes were closed. The driver of the Trailblazer was traveling east in lane three of six. He reported to police that he changed lanes to the left and continued traveling east in lane four. The driver reported that he began to change lanes to his left again, but then realized that lanes five and six were blocked by the traffic cones. The driver steered back to his right and began to lose control. He tried steering left but overcorrected and the Chevrolet Trailblazer began to rotate counterclockwise. The case vehicle traveled across lanes five and six, and the front end impacted the jersey barrier dividing the east and westbound lanes. At impact, the driver's front air bag deployed. The Trailblazer continued rotating counterclockwise and the back right impacted the concrete barrier. The vehicle continued traveling east as it rotated and began to roll over (to the left). The case vehicle completed two quarter turns and came to final rest on its top, facing an unknown direction. The police report did not indicate if the driver was injured in the crash, but did mention that an ambulance had been dispatched to the scene. The case vehicle had to be towed and was later declared a total loss.

This crash was identified within a group of potential cases DSI personnel provided to NHTSA. The original focus of this on-site investigation was to be on the case vehicle's Electronic Stability Control (ESC) system. It was subsequently determined that this particular model year is not equipped with ESC. DSI located and obtained permission to inspect the case vehicle on January 5, 2006. The vehicle inspection was completed on January 12, 2006. Data from the electronic data recorder was downloaded using the Vetronix tool and is included as Attachment 2 to this report.



Figure 1. Front, 2005 Chevrolet Trailblazer



Figure 2. Front damage - 2005 Chevrolet Trailblazer

There were difficulties determining the correct crash location because the driver was not injured and claimed responsibility for the collision and the driver's insurance company did not request a copy of the police report from the investigating jurisdiction. The insurance company had very little information concerning the crash details. The police agency with jurisdiction initially reported that they had no record of this crash. Tow company personnel were contacted via phone and in person in order to gather additional crash information. Tow yard personnel were able to provide a general crash location, but could not provide specific or detailed information, including what object(s) the vehicle struck and what lane the driver had been traveling in precrash. Some of the information the tow yard personnel provided, such as whether or not the case vehicle departed the roadway to the right or left, was later determined to be incorrect. The scene inspection was completed on January 12, 2006 based on the information that was known at the time. After multiple attempts to locate an official record of this crash, a police report was finally obtained on March 16, 2006.

SUMMARY

Crash Site

This one vehicle crash occurred in August 2005 at 0018 hours in an urban area of California. The crash occurred in the eastbound lanes of a divided state freeway. There are six eastbound lanes that are separated from the westbound lanes by a concrete jersey barrier. There are asphalt shoulders on both sides of the eastbound lanes and a concrete jersey barrier adjacent to the north shoulder. There are no traffic controls in this area, but at the time of the crash there were orange traffic cones on the freeway, blocking off a section of the two left eastbound lanes. The lanes were composed of asphalt, were level and dry at the time of the crash. The police report stated that it was cloudy at the time and the roadway was dark with no street lights. The posted speed limit is 105 km/h (65 mph).

Pre-Crash

The case vehicle was a 2005 Chevrolet Trailblazer being driven by a restrained 20-year-old male.

There were no other occupants in the vehicle. The driver was traveling east in lane three of six, and for unknown reasons, began changing lanes to his left.

Crash

The driver of the case vehicle reported to police that he had been traveling in lane three but changed lanes to the left and continued east in lane four. The driver reported that he began to change lanes to his left again, but then realized that lanes five and six were blocked by the traffic cones. The driver steered back to his right and began to lose control of the vehicle. He attempted to regain control by steering left but



Figure 3. Approach of case vehicle - east

overcorrected and the Chevrolet Trailblazer began to rotate counterclockwise. The case vehicle traveled across lanes five and six and the front end impacted the jersey barrier (01FDEW2) dividing the east and westbound lanes. The impact severity was moderate and resulted in the deployment of the driver's front air bag and actuation of his seat belt pretensioner. The Trailblazer continued rotating counterclockwise and the back right impacted the concrete barrier (05BREW1). The vehicle continued traveling east as it rotated and began to rollover to the left (00TDDO3). The case vehicle completed two quarter turns and came to final rest on its top, facing southeast.

Post-Crash

The driver was not injured in the crash, although an ambulance was dispatched to the scene. The driver's insurance company verified that the driver reported no injuries as a result of the collision. The 2005 Chevrolet Trailblazer was towed from the crash scene and was later declared a total loss.

Vehicle Data - 2005 Chevrolet Trailblazer

The 2005 Chevrolet Trailblazer was identified by the Vehicle Identification Number (VIN): 1GNET16S256xxxxxx. The vehicle's digital odometer could not be read because there was no power to the instrument panel. The case vehicle is a four-door hatchback, four wheel drive sport utility vehicle with seating for seven. It was equipped with a 4.2 liter 6-cylinder engine, 4 speed automatic transmission, front and rear disc anti-lock brakes, and a tilt steering wheel.

The Trailblazer was equipped with advanced occupant protection systems including dual stage Certified Advanced 208-Compliant driver and front right passenger air bags. The multi-stage air bags were certified by the manufacturer to meet the advanced air bag requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The case vehicle is also equipped with a front right Passenger Sensing System that consists of sensors that are part of the right front passenger seat, safety belt, and dual front seat belt pretensioners.

The 2005 Chevrolet Trailblazer was equipped with Continental Contitrac TR P245/65R17 tires. The recommended cold tire pressure was 207 kPa (30 psi) for the front and 241 kPa (35 psi) for the rear. The specific tire information is as follows:

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	172 kPa (25 psi)	6 mm (8/32 in)	Yes	None
LR	165 kPa (24 psi)	6 mm (7/32 in)	No	None
RR	172 kPa (25 psi)	6 mm (7/32 in)	No	None
RF	Flat	6 mm (8/32 in)	No	Tire bead unseated; Rim scrapes

The front row seating in the 2005 Chevrolet Trailblazer was configured with dual cloth covered bucket seats. The seats were equipped with adjustable head restraints that were not damaged. The second row was configured as a cloth covered 60/40 split bench seat with folding backs. The two outboard second row seating positions were equipped with adjustable head restraints that were not damaged. The second row center seat did not come equipped with a head restraint. The second row outboard seating positions were equipped with the lower anchor points that are part of this vehicle's Lower Anchors and Tethers for Children (LATCH) system. All three second row seating positions were equipped with child safety seat top tether anchor points, located at the bottom rear of the seat cushions. The third row was configured as a cloth covered 50/50 split bench with folding backs. Both seats were equipped with adjustable head restraints that were not damaged.

Vehicle Damage

Exterior Damage - 2005 Chevrolet Trailblazer

The 2005 Chevrolet Trailblazer sustained moderate front end damage as a result of the impact with the concrete traffic barrier. The Trailblazer sustained direct damage that was distributed across the front end from bumper corner to bumper corner. The location of maximum crush was at the right front bumper corner and measured 29.0 cm (11.4 in). The Collision Deformation Classification (CDC) for this impact was 01FDEW2.

The case vehicle also sustained moderate back right damage as a result of the secondary impact with the same concrete traffic barrier. The Trailblazer sustained 44.0 cm (17.3 in) of direct damage beginning 42.0 cm (16.5 in) right of the precrash center point, extending along the back bumper to the right. The location of maximum crush was the right rear bumper corner and measured 11.0 cm (4.3 in). The CDC for this impact was 05BREW1.

The Trailblazer sustained moderate damage as a result of the rollover event. The maximum vertical crush to the passenger compartment was 22.0 cm (8.7 in) and was located 224.0 cm (88.2 in) forward of the right rear axle, in the area of the right windshield header. The CDC for this impact was 00TDDO4.

CDC (Impact 1):	01FDEW2
(Impact 2):	05BREW1
(Impact 3):	00TDDO4

Barrier Equivalent Speed (Impact 1):	30.5 km/h (18.9 mph)
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Figure 4. Back right damage - 2005 Chevrolet Trailblazer



Figure 5. Maximum lateral rollover crush



Figure 6. Rollover damage - 2005 Chevrolet Trailblazer

Interior Damage - 2005 Chevrolet Trailblazer

The 2005 Chevrolet Trailblazer sustained moderate interior damage due to occupant contact, intrusion and normal air bag deployment related damage.

The driver's retractor pretensioner actuated during the crash and was locked in place post-impact. There was blood found on the back of the driver air bag in the 6 o'clock location, on the glove compartment door and on the front right seat cushion. All three blood transfers likely occurred post-crash, while the driver was moving around inside of the passenger compartment.

There was integrity loss to the side glazing and windshield. The right front, left front, and rearmost left side glazing disintegrated most likely during the rollover. There was a laceration beginning at the center of the base of the windshield running diagonally upward towards the upper left corner. The opening measured 70.0 cm (27.6 in) in length and was 18.0 cm (7.1 in) wide at its widest point. It is likely that this damage also occurred during the rollover event.

The side doors and hatch all remained closed and operational.

There was lateral intrusion of the A pillar into the driver's area. In the front row seating areas, there was vertical intrusion of the windshield, windshield header, left A and B pillars, right A pillar, and roof. In the second row seating area there was vertical intrusion of the roof.



Figure 7. Windshield damage



Figure 8. Driver's seating area

The specific passenger compartment intrusions were documented as follows:

Row/Position	Intruded Component	Magnitude of Intrusion	Direction
1L	A pillar	26.0 cm(10.2 in)	Lateral
1L	Windshield header	20.0 cm (7.9 in)	Vertical
1L	Windshield	19.0 cm (7.5 in)	Vertical
1L	Roof	13.0 cm (5.1 in)	Vertical
1L	A pillar	11.0 cm (4.3 in)	Vertical
1L	B pillar	6.0 cm (2.4 in)	Vertical
1C	Windshield header	18.0 cm (7.1 in)	Vertical
1C	Windshield	16.0 cm (6.3 in)	Vertical
1C	Roof	9.0 cm (3.5 in)	Vertical
1R	Windshield header	19.0 cm (7.5 in)	Vertical
1R	Windshield	16.0 cm (6.3 in)	Vertical
1R	Roof	9.0 cm (3.5 in)	Vertical
1R	A pillar	8.0 cm (3.1 in)	Vertical
2L	Roof	9.0 cm (3.5 in)	Vertical
2M	Roof	7.0 cm (2.8 in)	Vertical
2R	Roof	7.0 cm (2.8 in)	Vertical

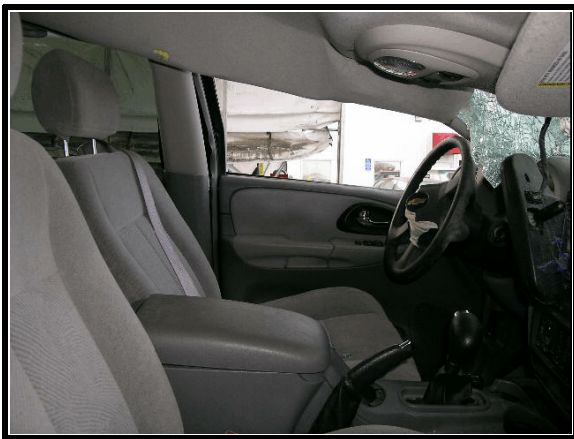


Figure 9. Intrusion in driver area and possible occupant injury point to the roof

Manual Restraints - 2005 Chevrolet Trailblazer

The 2005 Chevrolet Trailblazer was configured with manual 3-point lap and shoulder belts for each of the seven seating positions. Both front seat belts were integrated and equipped with retractor pretensioners. The driver's retractor pretensioner actuated during the crash. The passenger side pretensioner also actuated, but there was no occupant in this seating position. The driver's safety belt was configured with a sliding latch plate and an emergency locking retractor (ELR). The right front seat belt had a sliding latch plate and a switchable ELR/Automatic Locking Retractor (ALR).

All three second row safety belts had sliding latch plates and switchable retractors. The second row center seat belt was integrated into the seat back.

At the inspection, the third row seat backs were found folded forward in the stowed position with crash debris laying across the area. Both seat belts had sliding latch plates and switchable retractors.

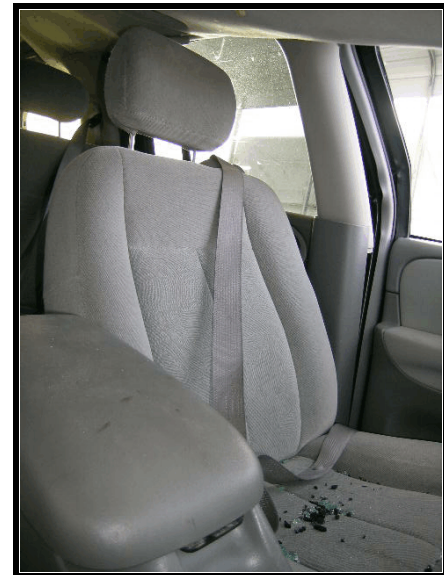


Figure 10. Driver's integrated seat belt

Supplemental Restraint Systems - 2005 Chevrolet Trailblazer

The 2005 Chevrolet Trailblazer was equipped with an advanced occupant protection system. The system consists of the Sensing and Diagnostic Module (SDM), dual stage Certified Advanced 208-Compliant driver and front right passenger air bags, and a front right Passenger Sensing System which works with sensors that are part of the right front passenger's seat and safety belt. The sensors are designed to detect the presence of a properly seated occupant and determine if the passenger's frontal air bag should be deployed or not. In certain conditions the passenger sensing system will turn off the right front air bag. There is a passenger air bag status indicator located in the rearview mirror which displays "ON" or "OFF" when the vehicle is running. The air bag system will monitor the severity of a collision and will inflate the air bags based on whether or not the seat belts are in use. The system is controlled by the SDM. The primary function of the SDM is to control the deployment of the occupant protection systems. The system records the vehicle's forward velocity change. For Deployment Events



Figure 11. Driver front air bag - arrows point to top of bag

and Deployment Level Events, the SDM will record 230 milliseconds of data after the deployment criteria is met and up to 70 milliseconds of data before the deployment criteria is met. For Non-Deployment events, the SDM will record the first 300 milliseconds of data after algorithm enable. The minimum SDM Recorded Vehicle Forward Velocity change that is needed to record a Non-Deployment event is 8 km/h (5 mph). The SDM data was downloaded using the Vetronix Crash Data Retrieval System.

Two events were recorded by the SDM, a Deployment Event and a Non-Deployment Event. The Deployment Event occurred as a result of the first impact with the concrete barrier. The data in the Non-Deployment Event appears to mirror the Deployment Event data to some extent. The cause of this has not been determined.

The Vetronix system status at deployment report indicates that:

SIR warning lamp status was OFF.

The driver's belt switch status was BUCKLED.

Ignition cycles at deployment = 2764.

Ignition cycles at investigation = 2768.

Number of ignition cycles SIR Warning Lamp was ON/OFF continuously = 2763.

Maximum SDM recorded velocity change -36.72 km/h (-22.82 mph).

Driver first stage time algorithm enabled (AE) to deployment command criteria met was 10 milliseconds.

Driver second stage time algorithm enabled to deployment command criteria met was 23.75 milliseconds.

Passenger first stage time algorithm enabled to deployment command criteria met was not applicable. Suppressed.

Passenger second stage time algorithm enabled to deployment command criteria met not applicable. Suppressed.

Time between non-deployment and deployment events = N/A.

Estimated Principal Direction of Force (PDOF) degrees is 30.

Event recording complete = YES.

The vehicle speed was 121 km/h (75 mph) five seconds before AE and decelerated to 40 km/h (25 mph) at 1 second before AE.

The brake switch status was OFF from 5 through 1 seconds before AE.

The driver and front right passenger positions were also equipped with seat belt retractor pretensioners. During the initial impact with the concrete barrier, both front seat belt pretensioners actuated, and the driver's front air bag deployed.

The driver's front air bag was mounted in the center of the steering wheel hub. The air bag module had a symmetrical I configuration. The left and right flaps measured 7.0 cm (4.3 in) wide at the top edge, 6.0 cm (2.4 in) wide at the bottom edge and were 12 cm (4.7 in) high. There was a semi-circular cut-out in the center of the left flap measuring 6.5 cm (2.6 in) in height. The air bag was circular in shape and measured 55.0 cm (21.7 in) high/wide in its deflated state. The maximum excursion measured 19.0 cm (7.5 in) from the module face. The

distance between the module face and the front left seat back was 75.0 cm (29.5 in). The air bag had two internal tethers. There were two circular vent ports on the back of the bag at the 11 and 1 o'clock positions. There was no damage to the air bag or air bag module cover flaps.

The front right passenger air bag was a mid instrument mount. This vehicle is equipped with a Passenger Sensing System. Because there was no occupant seated in this position, the air bag was suppressed and did not deploy.

Occupant Demographics - 2005 Chevrolet Trailblazer

	Driver
Age/Sex:	20/Male
Seated Position:	Front left
Seat Type:	Fabric covered bucket seat
Height:	183 cm (72 in)
Weight:	77 kg (170 lbs)
Occupation:	Unknown
Pre-existing Medical Condition:	None noted
Alcohol/Drug Involvement:	None
Driving Experience:	Unknown
Body Posture:	Presumed to be upright, facing forward
Hand Position:	Presumed to be on the wheel, actively steering
Foot Position:	Presumed to be on the foot controls and/or floorboards
Restraint Usage:	Integrated manual lap and shoulder belt available - used
Air bag:	Front air bag available - deployed

Occupant Injuries - 2005 Chevrolet Trailblazer

Driver: Not injured per the police report. An insurance company representative confirmed that the driver reported no injuries as a result of the crash.

Occupant Kinematics - 2005 Chevrolet Trailblazer

Driver Kinematics

The 20-year-old male driver of the case vehicle was seated in an upright posture in the cloth covered bucket seat and was restrained by the integrated 3-point manual lap and shoulder belt. His seat was adjusted to the fully rearward track position. The seat back was reclined at a 66 degree angle and the seat bottom had a 9 degree angle. During the first impact, the driver's safety belt pretensioner actuated and the front air bag deployed. The male driver initiated forward and slightly lateral trajectory towards the 1 o'clock direction of force. He loaded the safety belt and likely engaged the deployed front air bag with his face. There were no direct indications of contact to the air bag, but a small bloodstain was found on the back of the air bag, at the 6 o'clock location. This blood transfer likely occurred post-crash. After the front end impact, the vehicle continued rotating counterclockwise, causing this occupant to pitch to his right slightly. It is likely that the deployed seat belt pretensioner held this occupant within his general seating area. As the back right bumper corner impacted the concrete barrier, the driver initiated a slightly rearward and lateral trajectory towards the impact, but remained

contained within his seating position, held in place due to the actuated seat belt pretensioner. As the vehicle began to rollover to the left, the driver pitched back to his left and may have contacted the left front door panel, but no visible contact evidence was found. The Trailblazer completed two quarter turns and came to rest on its top.

Per the investigating officer, this driver was not injured. The driver's insurance company confirmed that this driver reported no injuries as a result of the crash.

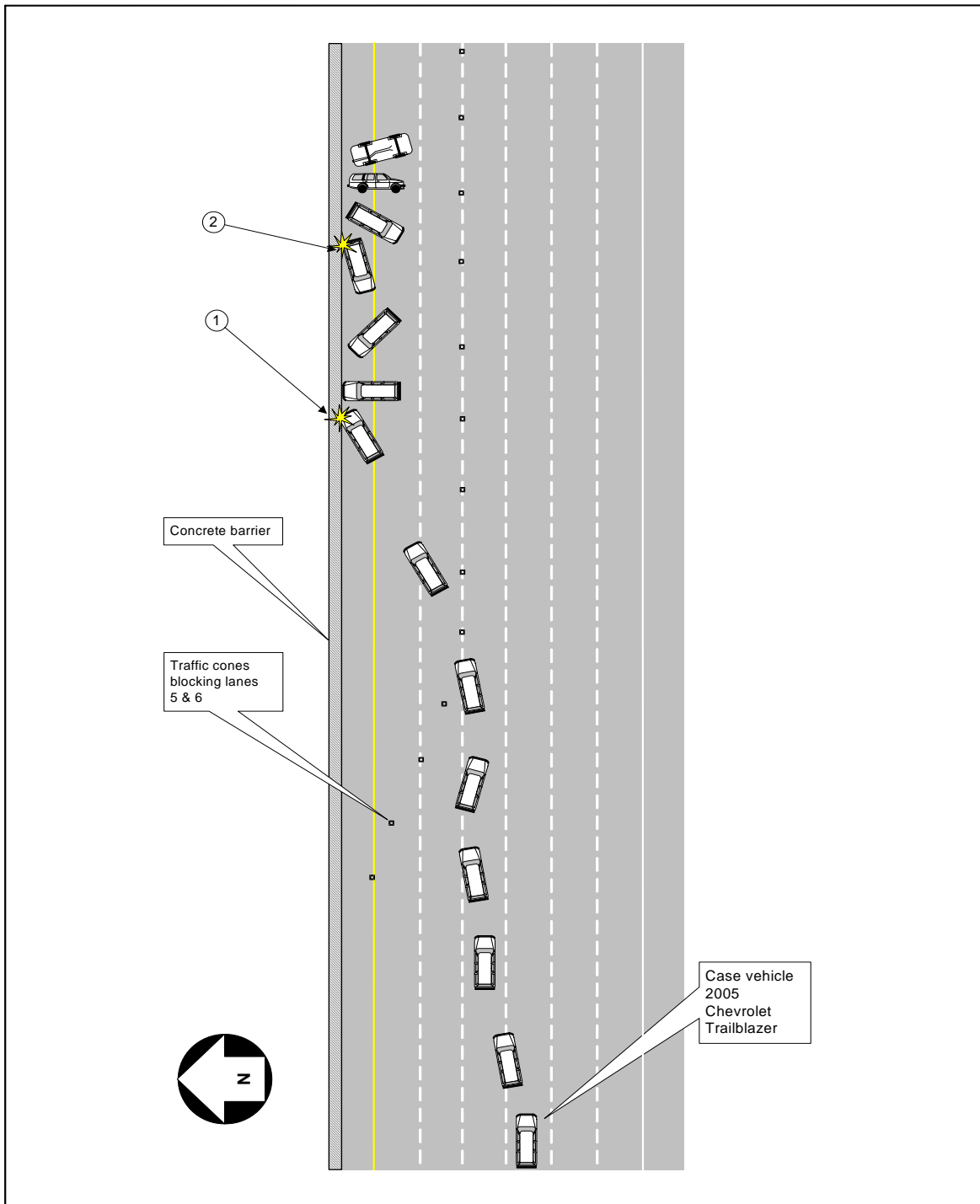


Figure 12. Possible driver contact point



Figure 13. Blood found on back of driver air bag

Attachment 1. Scene Diagram



Attachment 2. Vetronix Report



CDR File Information

Vehicle Identification Number	1GNET16S256*****
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	06001 WITHOUT VIN.CDR
Saved on	Friday, February 3 2006 at 11:58:39 AM
Collected with CDR version	Crash Data Retrieval Tool 2.800
Collecting program verification number	9238B95E
Reported with CDR version	Crash Data Retrieval Tool 2.800
Reporting program verification number	9238B95E
Interface used to collected data	Block number: 00 Interface version: 4A Date: 11-08-05 Checksum: 7500
Event(s) recovered	Deployment Non-Deployment

SDM Data Limitations

SDM Recorded Crash Events:

There are two types of SDM recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event is an event severe enough to "wake up" the sensing algorithm but not severe enough to deploy the air bag(s). It contains Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle forward velocity change. This event will be cleared by the SDM after the ignition has been cycled 250 times.

The second type of SDM recorded crash event is the Deployment Event. It also contains Pre-Crash and Crash data. The SDM can store up to two different Deployment Events, if they occur within five seconds of one another. Deployment Events cannot be overwritten or cleared from the SDM. Once the SDM has deployed the air bag, the SDM must be replaced.

The data in the Non-Deployment Event file will be locked after a Deployment Event, if the Non-Deployment Event occurred within 5 seconds before the Deployment Event unless a Deployment Level Event occurs within 5 seconds after the Deployment Event, then the Deployment Level Event will overwrite the Non-Deployment Event file.

SDM Data Limitations:

- SDM Recorded Vehicle Forward Velocity Change reflects the change in forward velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Forward Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. This data should be examined in conjunction with other available physical evidence from the vehicle and scene when assessing occupant or vehicle forward velocity change. For Deployment Events and Deployment Level Events, the SDM will record 230 milliseconds of data after deployment criteria is met and up to 70 milliseconds before deployment criteria is met. For Non-Deployment Events, the SDM will record up to the first 300 milliseconds of data after algorithm enable. The minimum SDM Recorded Vehicle Forward Velocity Change, that is needed to record a Non-Deployment Event, is 5 MPH.
- Maximum Recorded Vehicle Velocity Change is the maximum recorded velocity change in the vehicle's combine "X" and "Y" axis.
- Calculated Principal Direction of Force (PDOF) is the arctangent of the maximum observer lateral velocity change divided by the maximum observed longitudinal velocity change. PDOF is displayed where zero degrees is located at the front of the vehicle, with 90 degrees is displayed to the right side of the vehicle and so on, clockwise around the vehicle.
- Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
- SDM Recorded Vehicle Speed accuracy can be affected if the vehicle has had the tire size or the final drive axle ratio changed from the factory build specifications.
- Brake Switch Circuit Status indicates the status of the brake switch circuit.
- Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if the SDM receive an invalid message from the module sending the pre-crash data.
- Driver's and Passenger's Belt Switch Circuit Status indicates the status of the seat belt switch circuit.
- The Time Between Non-Deployment and Deployment Events is displayed in seconds. If the time between the two events is greater than 5 seconds, "N/A" is displayed in place of the time. If the value is negative, then the Deployment Event occurred first. If the value is positive, then the Non-Deployment Event occurred first.
- If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded. -Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by various vehicle control modules, via the vehicle's communication network.
- The SDM may obtain Belt Switch Circuit Status data a number of different ways, depending on the vehicle architecture. Some switches are wired directly to the SDM, while others may obtain the data from various vehicle control modules, via the vehicle's communication network.

SDM Data Source:

1GNET16S256*****



All SDM recorded data is measured, calculated, and stored internally, except for the following:

- Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by various vehicle control modules, via the vehicle's communication network.
- The Belt Switch Circuit is wired directly to the SDM.



Multiple Event Data

An Event(s) Preceded the Recorded Event(s)	No
An Event(s) was in Between the Recorded Event(s)	No
An Event(s) Followed the Recorded Event(s)	No
The Event(s) Not Recorded was a Deployment Event(s)	No
The Event(s) Not Recorded was a Non-Deployment Event(s)	No
Associated Events Not Recorded	0

System Status At 1 second

Left Front Door Ajar	No
Right Front Door Ajar	No
Left Rear Door Ajar	No
Right Rear Door Ajar	No

Pre-crash data

Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Vehicle Speed (MPH)	78	65	63	48	25
Engine Speed (RPM)	2112	1728	1472	1408	1024
Percent Throttle	0	0	0	0	0
Brake Switch Circuit Status	applied	applied	applied	not applied	applied

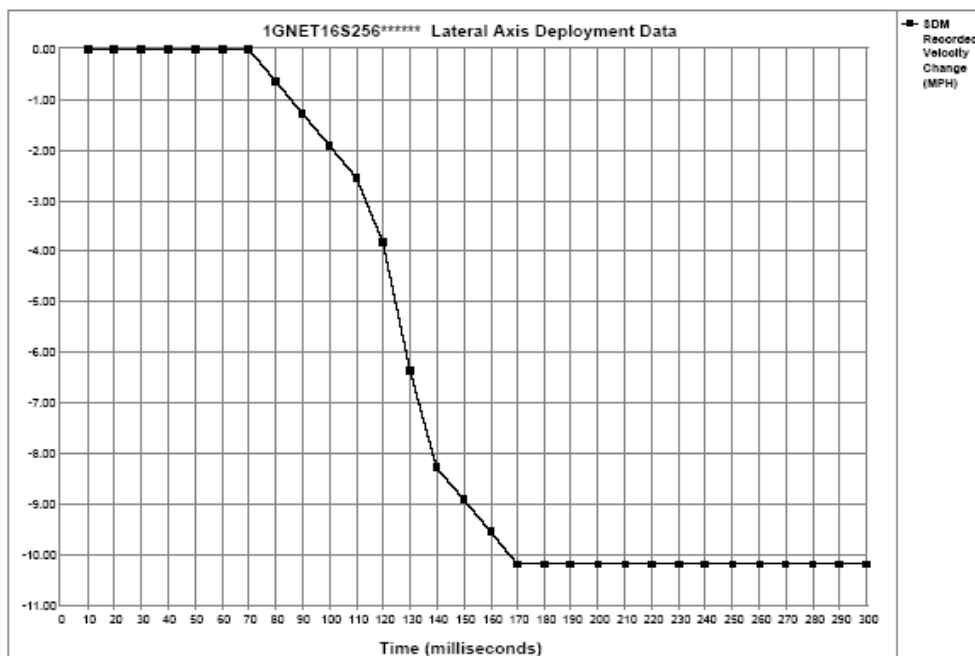


System Status At Deployment

SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time (seconds)	655350
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	2763
Ignition Cycles At Investigation	2768
Ignition Cycles At Event	2764
Ignition Cycles Since DTCs Were Last Cleared	255
Driver's Belt Switch Circuit Status	BUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Driver Seat Position Switch Circuit Status	Rearward
Passenger Seat Position Switch Circuit Status	Rearward
Automatic Passenger SIR Suppression System Status at AE	Air Bag Suppressed
Driver First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	10
Driver Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	23.75
Passenger First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	Suppressed
Passenger Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	Suppressed
Driver Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	0
Passenger Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	0
Driver 1st Stage Deployment Loop Commanded	Yes
Driver 2nd Stage Deployment Loop Commanded	Yes
Driver Side Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop Commanded	Yes
Driver Roof Rail/Head Curtain Loop Commanded	No
Supplemental Deployment Loop #1 Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	Yes
Passenger Roof Rail/Head Curtain Loop Commanded	No
Supplemental Deployment Loop #2 Commanded	No
Second Row Left Side Deployment Loop Commanded	No
Second Row Left Pretensioner Deployment Loop Commanded	No
Supplemental Deployment Loop #3 Commanded	No
Second Row Right Side Deployment Loop Commanded	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Supplemental Deployment Loop #4 Commanded	No
Second Row Center Pretensioner Deployment Loop Commanded	No
Diagnostic Trouble Codes at Event, fault number: 1	N/A
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Diagnostic Trouble Codes at Event, fault number: 7	N/A
Diagnostic Trouble Codes at Event, fault number: 8	N/A
Diagnostic Trouble Codes at Event, fault number: 9	N/A
Crash Record Locked	Yes
Vehicle Event Data (Pre-Crash) Associated With This Event	Yes
Event Recording Complete	Yes
Estimated Principal Direction of Force (PDOF) degrees	30



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Longitudinal Axis Recorded Velocity	0.00	0.00	0.00	0.00	0.00	0.00	-1.27	-2.55	-4.46	-5.09	-7.00	-10.19	-12.73	-14.64	-15.92
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Longitudinal Axis Recorded Velocity	-16.55	-16.55	-17.19	-17.19	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55

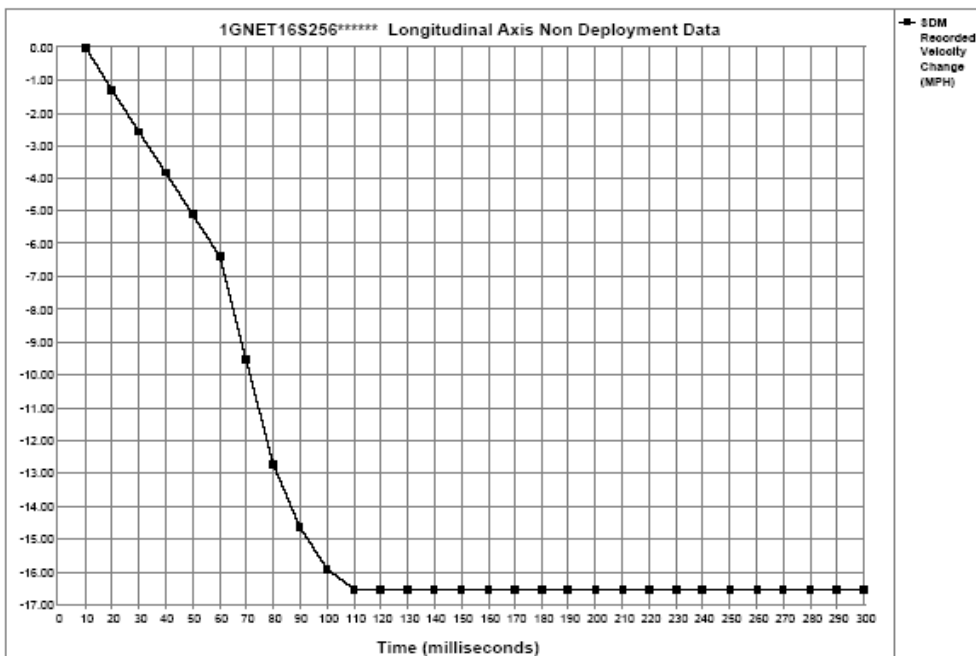


Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.64	-1.27	-1.91	-2.55	-3.82	-6.37	-8.28	-8.91
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Lateral Axis Recorded Velocity Change (MPH)	-9.55	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19

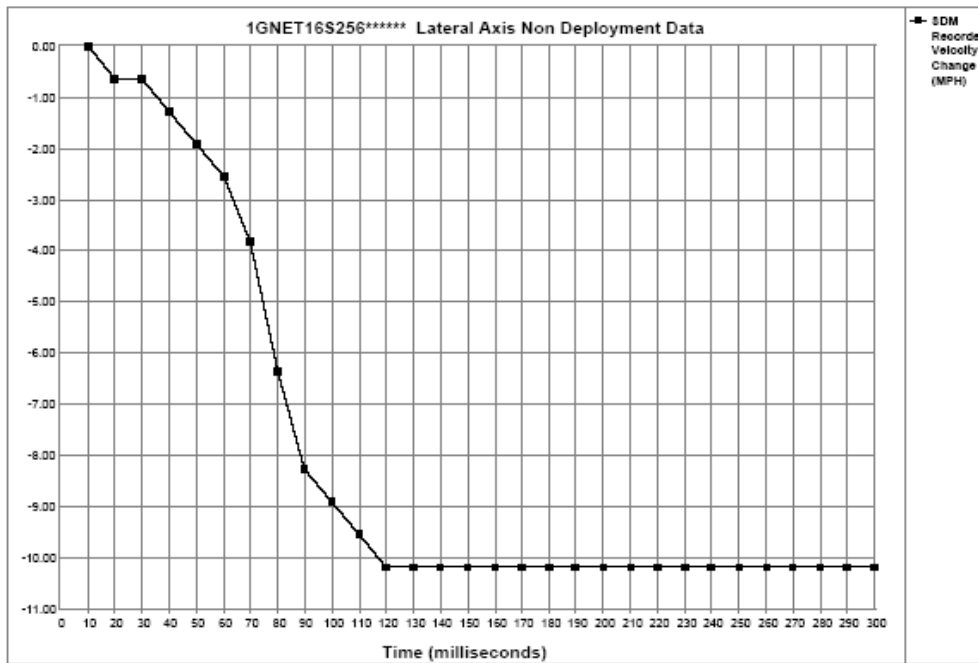


System Status At Non-Deployment

SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time (seconds)	655350
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	2763
Ignition Cycles At Investigation	2768
Ignition Cycles At Event	2764
Ignition Cycles Since DTCs Were Last Cleared	255
Driver's Belt Switch Circuit Status	BUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Driver Seat Position Switch Circuit Status	Rearward
Passenger Seat Position Switch Circuit Status	Rearward
Automatic Passenger SIR Suppression System Status at AE	Air Bag Suppressed
Time Between Events (sec)	N/A
Driver 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Driver Side Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop Commanded	No
Driver Roof Rail/Head Curtain Loop Commanded	No
Supplemental Deployment Loop #1 Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	No
Passenger Roof Rail/Head Curtain Loop Commanded	No
Supplemental Deployment Loop #2 Commanded	No
Second Row Left Side Deployment Loop Commanded	No
Second Row Left Pretensioner Deployment Loop Commanded	No
Supplemental Deployment Loop #3 Commanded	No
Second Row Right Side Deployment Loop Commanded	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Supplemental Deployment Loop #4 Commanded	No
Second Row Center Pretensioner Deployment Loop Commanded	No
Diagnostic Trouble Codes at Event, fault number: 1	N/A
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Diagnostic Trouble Codes at Event, fault number: 7	N/A
Diagnostic Trouble Codes at Event, fault number: 8	N/A
Diagnostic Trouble Codes at Event, fault number: 9	N/A
Maximum SDM Recorded Velocity Change (MPH)	22.82
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	1880
Crash Record Locked	Yes
Deployment Event Recorded in the Non-Deployment Record	No
Vehicle Event Data (Pre-Crash) Associated With This Event	No
Event Recording Complete	Yes
Estimated Principal Direction of Force (PDOF) degrees	30



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Longitudinal Axis Recorded Velocity	0.00	-1.27	-2.55	-3.82	-5.09	-6.37	-7.64	-8.92	-10.19	-11.46	-12.73	-14.00	-15.27	-16.55	-16.55
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Longitudinal Axis Recorded Velocity	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55	-16.55



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Lateral Axis Recorded Velocity Change (MPH)	0.00	-0.64	-0.64	-1.27	-1.91	-2.55	-3.82	-6.37	-8.28	-8.91	-9.55	-10.19	-10.19	-10.19	-10.19
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Lateral Axis Recorded Velocity Change (MPH)	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19	-10.19



Hexadecimal Data

This page displays all the data retrieved from the air bag module.
It contains data that is not converted by this program.

```

$01 B2 3C 00 E6 64 69
$02 00 00 00 00 F8 FF
$03 FF FF FF FF 00 00
$04 00 F8 00 00 00 00
$05 3F 00 00 06 C0 E2
$06 3F 00 00 06 C0 E2
$07 00 00 C0 00 22 00
$08 00 08 08 50 50 00
$09 04 64 04 64 7F 00
$0A 00 00 00 00 00 00
$0B 00 FE 00 00 FE 00
$12 FF 7F 00 84 40 00
$17 07 07 07 07 00 00
$18 07 07 00 00 00 00
$19 00 00 00 00 00 00
$1A 00 00 00 00 00 00
$1B 00 00 00 00 00 00
$1C 01 01 00 01 00 01
$1D 2B 00 00 00 00 88
$1E 00 00 00 00 00 00
$1F 9D 9C 0D 0D FC F0
$20 20 AB 03 00 00 00
$21 00 00 FF 00 00 FF
$22 C0 00 00 00 00 00
$23 80 01 B3 00 04 00
$24 FF FF 0A D0 00 00
$25 82 C0 00 00 00 00
$26 00 00 00 00 00 00
$27 B8 01 01 01 01 01
$29 10 16 17 1B 21 00
$2A 14 27 33 34 3F 00
$2B 00 00 00 00 00 80
$2C 01 01 00 01 00 40
$2F 00 00 00 00 00 80
$30 00 00 00 00 00 80
$36 00 00 00 00 00 00
$37 80 A5 00 00 00 00
$38 00 00 00 00 00 00
$39 00 FF FF 0A CB 00
$3A FF 0A CC 00 00 00
$3B FF FF FF FF FF FF
$3C FF FF FF FF FF FF
$3D FF FF FF FF FF FF
$3E 00 02 04 06 08 0A
$3F 0F 14 17 19 1A 1A
$40 1A 1A 1A 1A 1A 1A
$41 1A 1A 1A 1A 1A 1A
$42 1A 1A 1A 1A 1A 1A
$43 00 FF FF FE FD FC
$44 FA F6 F3 F2 F1 F0
$45 F0 F0 F0 F0 F0 F0
$46 F0 F0 F0 F0 F0 F0
$47 F0 F0 F0 F0 F0 F0
$48 BC 05 05 00 00 00
$49 D0 00 00 50 00 00
$4A 00 80 00 00 40 00
$4B 00 00 00 00 00 00
$4C 00 00 00 00 00 00
$4D 00 C0 00 00 00 00
$4E 00 00 00 00 00 00
$4F 00 00 00 00 00 00
$50 80 A5 00 00 00 00

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1GNET16S256*****

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