U.S. Department
of Transportation
National Highway
Traffic Safety
Administration

NHTSA

DOT HS 813 216 December 2021

Special Crash Investigations: Crash Avoidance Technology Investigation; Vehicle: 2018 Honda Accord; Location: Texas; Crash Date: July 2019

DISCLAIMER

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Suggested APA Format Citation:

Dynamic Science, Inc. (2021, December). *Special crash investigations: Crash avoidance technology investigation; Vehicle: 2018 Honda Accord; Location: Texas; Crash date: July 2019* (Report No. DOT HS 813 216). National Highway Traffic Safety Administration.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT HS 813 216		

4. Title and Subtitle	5. Report Date
Special Crash Investigations: Crash Avoidance Technology Investigation; Vehicle: 2018 Honda Accord; Location: Texas; Crash Date: July 2019	December 2021
	6. Performing Organization Code

7. Author	8. Performing Organization Report No.
Dynamic Science, Inc.	DS19027

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Dynamic Science, Inc. 26141 Marguerite Parkway, Suite C Mission Viejo, CA 92692	11. Contract or Grant No. 693JJ918C000012

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
National Highway Traffic Safety Administration 1200 New Jersey Avenue SE Washington, DC 20590	Technical Report September 2021
	14. Sponsoring Agency Code

15. Supplementary Notes

Each crash represents a unique sequence of events, and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicles or their safety systems. This report and associated case data are based on information available to the Special Crash Investigation team on the date this report was published.

16. Abstract

This report documents the investigation of a single-vehicle crash of a 2018 Honda Accord with crash avoidance technology including a road departure mitigation system, lane keeping assist system, and collision mitigating braking system. The crash occurred at night in July 2019 in Texas. Conditions were dark with artificial illumination and clear visibility. The crash site was an interchange/intersection including a north/south roadway and an east/west elevated interstate highway. The unbelted 48-year-old male was driving the Honda south at a high speed when it departed the lane on the left edge, crossed over the northbound lanes, departed the roadway on the left edge, and struck two curbs, an overpass column, and a sign post. Two of the impacts were air bag deployment level events. The driver sustained fatal injuries and was pronounced deceased after being transported to a local hospital.

17. Key Words	18. Distribution Statement
crash avoidance, injury, fatality	This document is available to the public from the DOT, BTS, National Transportation Library, Repository & Open Science Access Portal, rosap.ntl.bts.gov.

19 Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	50	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Table of Contents

Background **1**

Summary **3**
- Crash Site 3
- Pre-Crash 3
- Crash 5
- Post-Crash 6

2018 Honda Accord **7**
- Description 7
- Exterior Damage 7
- Crash Avoidance Technology Discussion 8
  - Lane Keeping Assist System 8
  - Road Departure Mitigation System 9
  - Collision Mitigation Braking System 9
  - Adaptive Cruise Control 9
- Event Data Recorder 10
- NHTSA Recalls and Investigations 10
  - Summary 10
  - Remedy 10
- Manual Restraint Systems 11
- Supplemental Restraints System 11

2018 Honda Accord Occupant **12**
- Driver Demographics 12
- Driver Injuries 12
- Driver Kinematics 13

Crash Diagrams **15**

Appendix A: Event Data Recorder Report for 2018 Honda Accord **A-1**

Special Crash Investigations
Crash Avoidance Technology Investigation
Case Number: DS19027
Vehicle: 2018 Honda Accord
Location: Texas
Crash Date: July 2019

Background

This report documents the investigation of a single-vehicle crash involving a 2018 Honda Accord (Figure 1) equipped with crash avoidance technology including a road departure mitigation system (RDMS), lane keeping assist system (LKAS), and collision mitigating braking system (CMBS). The vehicle departed a roadway and struck several off-road stationary objects, causing the unbelted 48-year-old male driver to sustain fatal injuries. The investigation was intended to determine what role, if any, the RDMS and LKAS played in the crash. The Special Crash Investigations (SCI) group of the National Highway Traffic Safety Administration initiated the investigation in response to a notification from the Fatality Analysis Reporting System (FARS). According to the Honda vehicle owner's manual, the LKAS and RDMS provide steering input to help keep the vehicle in the middle of a detected lane and prevent it from unintentionally crossing over a lane line or departing a roadway. The LKAS provides tactile and visual alerts and the RDMS provides tactile, visual, and audible alterts. SCI assigned the case to Dynamic Science in September 2019, and the field inspections were completed in September 2019. The police report, the driver's autopsy report, and on-scene police photos were obtained in September and October 2019. The Honda's Event Data Recorder (EDR) was supported by the Bosch Crash Data Retrieval system and was imaged during the vehicle inspection. The EDR report included crash avoidance technology data for the vehicle's CMBS, RDMS, LKAS, and adaptive cruise control (ACC). The EDR captured five seconds of pre-crash data and indicated the crash avoidance technology didn't activate during the five seconds prior to the initial impact. This is discussed in greater detail in the Crash Avoidance Technology section of this report.

Figure 1. The 2018 Honda Accord

The crash occurred at night in July 2019 in Texas. Conditions were dark with artificial illumination and clear visibility. Recent rain had left standing water along some curbed edges of the roadway. The crash site was an interchange/intersection of a north/south roadway and an east/west elevated interstate highway. The 48-year-old male was driving the Honda south at a high speed when it departed the lane on the left edge, crossed over the northbound lanes, departed the roadway on the left edge, and struck two curbs (Events 1 and 2), a concrete overpass column (Event 3), and a metal sign post (Event 4). According to the EDR report, Events 2 and 3 were air bag deployment-level events. The driver sustained fatal injuries and was pronounced deceased after being transported by ambulance to a local hospital. The Honda was towed due to disabling damage and placed on a police hold.

Summary

Crash Site

The crash site was in an interchange of a north/south divided roadway and an elevated east/west interstate highway in Texas (Figure 2). The north/south roadway was paved concrete and configured with two lanes for each direction separated by a two-way, left-turn lane. Prior to the interchange, the two-way, left-turn lane ended, and a raised concrete median began that continued in the southbound direction for 146.0 m (479.0 ft) ending at an intersection in the interchange area. The lanes measured 4.4 m (14.4 ft) in width, and the median measured 7.2 m (23.6 ft) at its widest point. The roadway curved left in a radius measuring 120.0 m (393.7 ft) at the north fog line. The lanes were separated by dashed white painted stripes, and the roadway was bordered by solid white painted fog lines. Paved concrete shoulders measuring 3.0 m (9.8 ft) bordered the fog lines. The roadway passed beneath the elevated interstate highway, which was configured with on/off ramps and each corner of the intersection. The intersection was controlled by stop signs. The level roadway and painted lane striping were in good condition. Fog lines were not present on the road edge in all areas of the intersection. No rumble strips were present. The intersection was configured with painted pedestrian crosswalks and raised concrete islands measuring 16 cm (6.3 in) in height.

Figure 2. Crash site, looking south from the northbound lanes

The overpass measured 5.2 m (16.9 ft) at its lowest point and was supported on each side of the roadway by nine concrete columns measuring 80 cm (31.5 in) in diameter. The posted speed limit was 80 km/h (50 mph). A crash diagram is included at the end of this report.

Pre-Crash

The Honda was being driven southbound by the unbelted 48-year-old male at an EDR-reported vehicle speed of 129.0 km/h (80.2 mph) at T-5 seconds to algorithm enable (AE). According to the EDR report, the vehicle's crash avoidance systems were on including crash avoidance technology data for the CMBS, RDMS, LKAS and ACC. At some point prior to reaching the raised median, the vehicle departed the southbound lanes to the left, entered the northbound lanes, and continued traveling toward the intersection. The EDR captured five seconds of pre-

crash data and indicated the crash avoidance technology didn't activate in the five seconds prior to the initial impact. At T-2.0 seconds, according to EDR data, the steering angle was at 10 degrees to the left at a vehicle speed of 124.0 km/h (77.1 mph) with the brake and stability control "Off." It was not known if the driver was actively steering the vehicle at this time. The EDR-reported steering position over time suggested the vehicle was drifting and not actively being steered. At T-1.0 seconds, the brake was "On," and at approximately T-0.5 seconds the vehicle departed the roadway on the left edge in an area where no fog line or outer lane marker was present. Recent rain had left standing water along the curbed edge of the roadway at the area of departure (Figure 3).

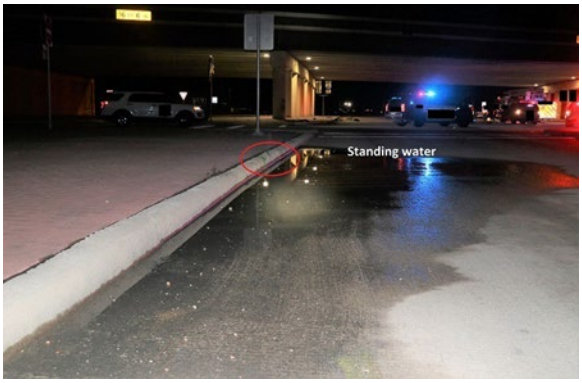


Figure 3. Area of departure (circled), looking south (on-scene police photo)

The EDR-reported pre-crash speed and calculated distances are included in the table below:[1]

Time	Vehicle Speed		Distance Traveled			
			Incremental		Cumulative	
-sec	km/h	mph	m	ft	m	ft
5	129	80	NA	NA	NA	NA
4.5	129	80	17.9	58.7	17.9	58.7
4	127	79	17.8	58.3	35.7	117
3.5	126	78	17.6	57.6	53.2	174.6
3	126	78	17.4	57.2	70.7	231.8
2.5	126	78	17.4	57.2	88.1	289
2	124	77	17.3	56.8	105.4	345.8
1.5	122	76	17.1	56.1	122.5	401.9
1	122	76	17	55.7	139.5	457.6
0.5	122	76	17	55.7	156.5	513.3
0	101	63	15.5	51	172	564.3

[1] One crash event not captured by the EDR occurred prior to T-0.

Crash

The Honda struck the raised curb of a concrete island with its front plane (Event 1) (Figure 4). At that time, the EDR indicated a vehicle speed of 122.0 km/h (75.8 mph) with the service brake, ABS activity, and stability control "On." This was a low-delta-V event not captured by the vehicle's EDR. It continued traveling southbound in a relatively straight path for 23.0 m (75.5 ft) before its front end struck a second raised curb (Event 2) that was captured by the EDR as a deployment-level event causing the driver's frontal and knee air bags to deploy. Continuing in a straight trajectory for approximately 10.0 m (32.8 ft), the vehicle's left plane struck a concrete column supporting the overpass (Event 3) (Figure 5). This event was captured by the EDR as a deployment-level event in which the driver's seat-mounted side impact and inflatable curtain (IC) air bags deployed. At some point during the crash, the driver's seat belt pretensioner actuated with the belt in the stowed position.

Figure 4. Point of curb impact (Event 1) looking south

Figure 5. Point of column impact (Event 3) looking south

Following the column impact, the Honda rotated counterclockwise, and its right plane struck a metal sign pole (Event 4) in a non-deployment event not captured by the EDR. The vehicle then re-entered the northbound lanes, traveling southwest for approximately 42.0 m (137.8 ft), and came to rest in the facing south in the first northbound lane from the right. According to the EDR, at no time prior to or during the crash sequence did any crash avoidance systems engage. The ABS and stability control systems did engage.

For the Honda in Event 2 (front plane to curb), the EDR reported a maximum longitudinal deltaV of -9 km/h (-6 mph) and a maximum lateral delta V of 7 km/h (4 mph).

For the Honda in Event 3 (left plane to column), the barrier algorithm of WinSMASH calculated a total delta V of 19 km/h (12 mph) with a maximum longitudinal delta V of -9 km/h (-6 mph), a maximum lateral delta V of 16 km/h (10 mph), and a barrier equivalent speed (BES) of 19 km/h (12 mph). The results fit the model but appear low when compared to the EDR-reported maximum longitudinal delta V of -33 km/h (-21 mph) and maximum lateral delta V-v of 48 km/h (30 mph).

For the Honda in Event 4, the WinSMASH program calculated a total delta V of 5 km/h (3 mph) with a maximum longitudinal delta V of -2 km/h (-1 mph), a maximum lateral delta V of -4 km/h (-2 mph), and a BES of 5 km/h (3 mph). The results fit the model and appear reasonable.

A crash diagram and detail view are included at the end of this report.

Post-Crash

According to an investigating police officer, the driver was found with his torso, arms, and head lying to the right across the center console and front passenger seat. He sustained critical (AIS 5) injuries and was unresponsive upon arrival of emergency responders. He was transported by ambulance to a local hospital and declared deceased when attempts at resuscitation were unsuccessful. The Honda was towed due to damage and placed on a police hold.

2018 Honda Accord

Description

The 2018 Honda Accord was identified by the Vehicle Identification Number 1HGCV2F91JAxxxxxx. The manufacture date was February 2018. The Honda was a 4-door, 5-passenger, front-wheel-drive sedan with a 4-cylinder, 2.0-liter, gasoline engine and 4-wheel ABS disc brakes. The vehicle manufacturer's recommended tire size was P235/40R19 for the front and rear with a cold pressure of 225 kPa (33 psi). It had Michelin Radial X tires of the recommended size. The vehicle was configured with seating for five in two rows. The front row was a pair of bucket seats with adjustable head restraints. The driver's seat track setting was unknown. The vehicle had several crash avoidance systems discussed in other sections of this report.

Exterior Damage

The Honda sustained minor front plane and undercarriage damage caused by the two curb impacts, major severity damage to the left plane caused by the concrete column impact, and minor severity damage to the right plane damage caused by the pole impact. The front bumper fascia and grille were displaced and missing, the left front wheel was fractured and the tire missing, the left front fender and door panel were missing, and the right side tires were flat and de-beaded.

Direct damage to the left plane began at the left front corner and extended rearward 321 cm (126.4 in), and the induced damage extended 331 cm (130.3) rearward (Figure 6). Vertically, the damage extended from the sill extending upward 125 cm (49.2 in) to the upper left A-pillar. Thirty-five measurements were taken at mid-door level by the Nikon Total Station and the Faro Blitz program computed crush measurement in six increments as follows: C1 = 0 cm, C2 = 7 cm (2.8 in), C3 = 10 cm (3.9 in), C4 = 2 cm (0.8 in), C5= 12 cm (4.7 in), and C6 = 0 cm. The Collision Deformation Classification (CDC) was10LDEW4.

Figure 6. Left plane damage, the 2018 Honda Accord

Direct damage to the right plane began 15 cm (5.9 in) aft of the right rear axle and extended forward 57 cm (22.4 in), and induced damage began 22 cm (8.6 in) aft of the right rear axle and extended forward 64 cm (25.1 in). Six measurements were taken at mid-door level as follows: C1 = 0 cm, C2 = 5 cm (2.0 in), C3 = 7 cm (2.8 in), C4 = 5 cm (2.0 in), C5 = 2 cm (0.4 in), and C6 = 0 cm. The CDC was 02RYEW1.

Crash Avoidance Technology Discussion

According to the vehicle owner's manual, the Honda was equipped with crash avoidance and advanced driver assistance system technologies to improve vehicle safety performance and mitigate potential involvement in crash events. The vehicle's crash avoidance technology included a RDMS, LKAS, CMBS, and ACC. The EDR data indicated the vehicle's crash avoidance systems were on but did not engage during the 5 seconds preceding the crash. The crash avoidance systems employ a radar sensor located at the lower aspect of the front bumper and a front sensor camera mounted to the interior windshield and located behind the rear-view mirror. Operational switches used by the driver to activate the crash avoidance systems are located on the left instrument panel as well as the left and right aspects of the steering wheel. The crash avoidance systems for this vehicle are as follows.

Lane Keeping Assist System

This system provides steering input to help keep the vehicle in the middle of a detected lane and provides tactile and visual alerts if the vehicle is detected drifting out of its lane. The front sensor camera monitors lane lines and provides tactile and visual alerts when the vehicle is drifting out of a detected lane. If a lane departure occurs without a turn signal applied, the alerts activate and torque is applied to the steering. The system does not work if hands are off the steering wheel or the driver does not actively steer. According to the EDR report, this system was on prior to impact but did not activate during the five seconds prior to the initial impact.

Figure 7. Front sensor camera mounted to top center windshield, the 2018 Honda Accord

Figure 8. Front sensor camera mounted to top center windshield, the 2018 Honda Accord

Road Departure Mitigation System

The technology alerts and helps to assist the driver when the system determines a possibility of the vehicle unintentionally crossing over detected lane markings and/or leaving the roadway altogether. The front camera behind the rearview mirror (Figures 7 and 8) monitors left and right lane markings (in white or yellow). The system will apply visual, tactile, and audible alerts in addition to applying torque to the steering to assist the driver in keeping the vehicle in the lane. Additionally, the system may apply braking but only when the lane markings are solid continuous lines. The accuracy of this system is affected by vehicle speed and lane line condition. The system does not activate during periods of braking, acceleration, or active steering to left or right. According to the EDR report, this system was on prior to impact but did not activate during the five seconds prior to the initial impact. It was unknown if driver steering input overrode this system. At the area of departure, conditions were dark with illumination with standing water at the curb and no fog line present. Environmental conditions, including darkness, sudden changes between dark and light, low contrast between objects and background, strong light reflected onto the roadway, and driving in shadows, may limit the system's functionality.

Collision Mitigation Braking System

According to the owner's manual, the system is designed to alert the driver when a potential collision is determined, as well as to reduce vehicle speed to help minimize collision severity when a collision is deemed unavoidable. The system is designed primarily to detect pedestrians and other vehicles in the path of this vehicle. When the system activates, it may automatically apply the brake, but it does not automatically stop the vehicle. The system has limitations, including environmental conditions such as darkness, sudden changes between dark and light, low contrast between objects and background, strong light reflected onto roadway, and driving in shadows. The system also had detection limitations at times such as approaching a vehicle or pedestrian ahead at high speed, or when the speed difference between this vehicle and a vehicle or pedestrian in front is significantly large. The system uses three alert stages as follows:

- risk detected: audible and visual alerts.
- increased risk detected: audible and visual alerts plus light braking.
- unavoidable collision: audible and visual alerts plus forcefully applied braking.

According to the EDR report, this system was on at the time of the crash but did not engage within the five seconds prior to impact. The vehicle was traveling at a speed of (123 km/h [76 mph]), and the driver braked for approximately 1.5 seconds prior to the first deployment level event. The speed difference between vehicle and object contacted was likely beyond the system limitations, and the driver was already manually applying the brakes to the moment of impact.

Adaptive Cruise Control

This system helps maintain a constant vehicle speed at a set following interval behind a vehicle detected ahead and, if the detected vehicle comes to a stop, can decelerate and stop this vehicle, without the driver having to keep a foot on the brake or the accelerator. According to the EDR report, this system was on at the time of the crash but did not engage. Since the crash involved impacts with stationary objects and not moving vehicles, the technology was not applicable to the circumstances of the crash.

Event Data Recorder

The Honda was equipped with an air bag control module (ACM) that had EDR capability. The EDR was imaged during the SCI vehicle inspection using Bosch CDR software version 19.0 via the direct-to-module method. The report is included in this technical report using version 21.2.1. According to the data limitations, the EDR typically records only one event. Two events can be recorded if the T0 (time zero) values for each event occur within five seconds of each other, and such was the case in this crash with the two deployment level events. Both captured events included five seconds of pre-crash data in 0.5 second intervals and 250 milliseconds of post-crash data. The EDR report indicated that the driver was unbelted. The report included air bag deployment events and times as well as pre-crash data for driver actions, including accelerator pedal position, service brake, and steering input. The report also included crash avoidance technology data for the CMBS, RDMS, lane keeping assist system, and ACC. The data indicated that the vehicle's crash avoidance systems were on but did not activate during the five seconds prior to the crash. The ABS and stability control systems did activate near the end of the pre-crash sequence, after the driver braked at approximately T-1.5 seconds to AE. The complete EDR report is included at the end of this report as Appendix A.

NHTSA Recalls and Investigations

A search of recalls last queried in September 2021 using the vehicle's VIN revealed one unrepaired recall as described below. The search revealed no investigations.

Description	**Rearview Image Display Failure/FMVSS 111**
Manufacturer Recall Number	V2F
NHTSA Recall No.	18V-629
NHTSA Campaign No.	18V629000
Release Date	09/13/2018
Status	Incomplete

Summary

American Honda Motor Co. recalled certain 2018 Honda Accord and 2019 Honda Insight vehicles. In certain scenarios, the back-up camera center display may not function properly.

Remedy

Honda will notify owners, and dealers will reprogram the display audio unit software, free of charge. The recall began on October 30, 2018.

Interior Damage

The inspection of the interior revealed damage from impact forces, deployed air bags and post-crash activities. The windshield was fractured and holed; the left side glass for the front and second rows was disintegrated; the front left door was jammed shut (later sprung by responders), with the interior trim panel missing; the left and right second row doors were jammed shut; the

driver's frontal, knee, seat-mounted side impact, and IC air bags deployed; and the driver's seat belt pretensioner actuated. A possible occupant contact was present on the right aspect of the driver's deployed knee air bag. The front row was reduced by the following intrusions: left sill = 9 cm (3.5 in) lateral; left B-pillar = 8 cm (3.1 in) lateral; and left roof side rail = 3 cm (1.2 in) lateral. The second row was reduced by the left roof side rail = 5 cm (2.0 in) lateral.

Manual Restraint Systems

The front row was equipped with driver and front right passenger lap and shoulder seat belts. The driver's belt was equipped with continuous loop belt webbing, a sliding latch plate, an emergency locking retractor, and an adjustable shoulder anchor. The front seat positions were equipped with dual pretensioners. The driver was unbelted at the time of the crash, and his seat belt pretensioners actuated during the crash while in the stowed position. The EDR report stated that the seat belt was unbuckled, but it did not indicate the event or time of pretensioner actuation.

Supplemental Restraints System

The Honda had seven air bags for supplemental restraint, including driver's and passenger's frontal and seat-mounted side impact air bags, driver's knee air bag, and left and right IC air bags. The driver's frontal and knee air bags deployed at impact with the curb in Event 2. His seat-mounted side impact and IC air bags deployed at impact with the concrete column in Event 3. The driver's knee air bag exibited a possible occupant contact on the right aspect of the front panel.

2018 Honda Accord Occupant

Driver Demographics

Age/sex:	48 years/male
Height:	183 cm (72 in)
Weight:	70 kg (154 lb)
Eyewear:	Unknown
Seat type:	Bucket with adjustable head restraint
Seat track position:	Unknown
Manual restraint usage:	Lap and shoulder seat belt not used
Usage source:	Vehicle inspection
Air bags:	Frontal, knee, seat-mounted side impact and IC air bags deployed
Alcohol/drug data:	BAC .158 g/dL
Egress from vehicle:	Removed by emergency responders through left front door while unresponsive
Transport from scene:	Ambulance to a hospital
Type of medical treatment:	Declared deceased prior to admission

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Transection, lacerations, aorta	420210.5	Left door panel unknown/multiple quadrants	Probable
2	Laceration, intraventricular septum	441300.5	Left door panel unknown/multiple quadrants	Probable
3	Lacerations, with pulpification, liver	541826.4	Left door panel unknown/multiple quadrants	Probable
4	Lacerations NFS, heart (1-8 cm)	441008.3	Left door panel unknown/multiple quadrants	Probable
5	Laceration NFS, right lung	441414.3	Left door panel unknown/multiple quadrants	Probable

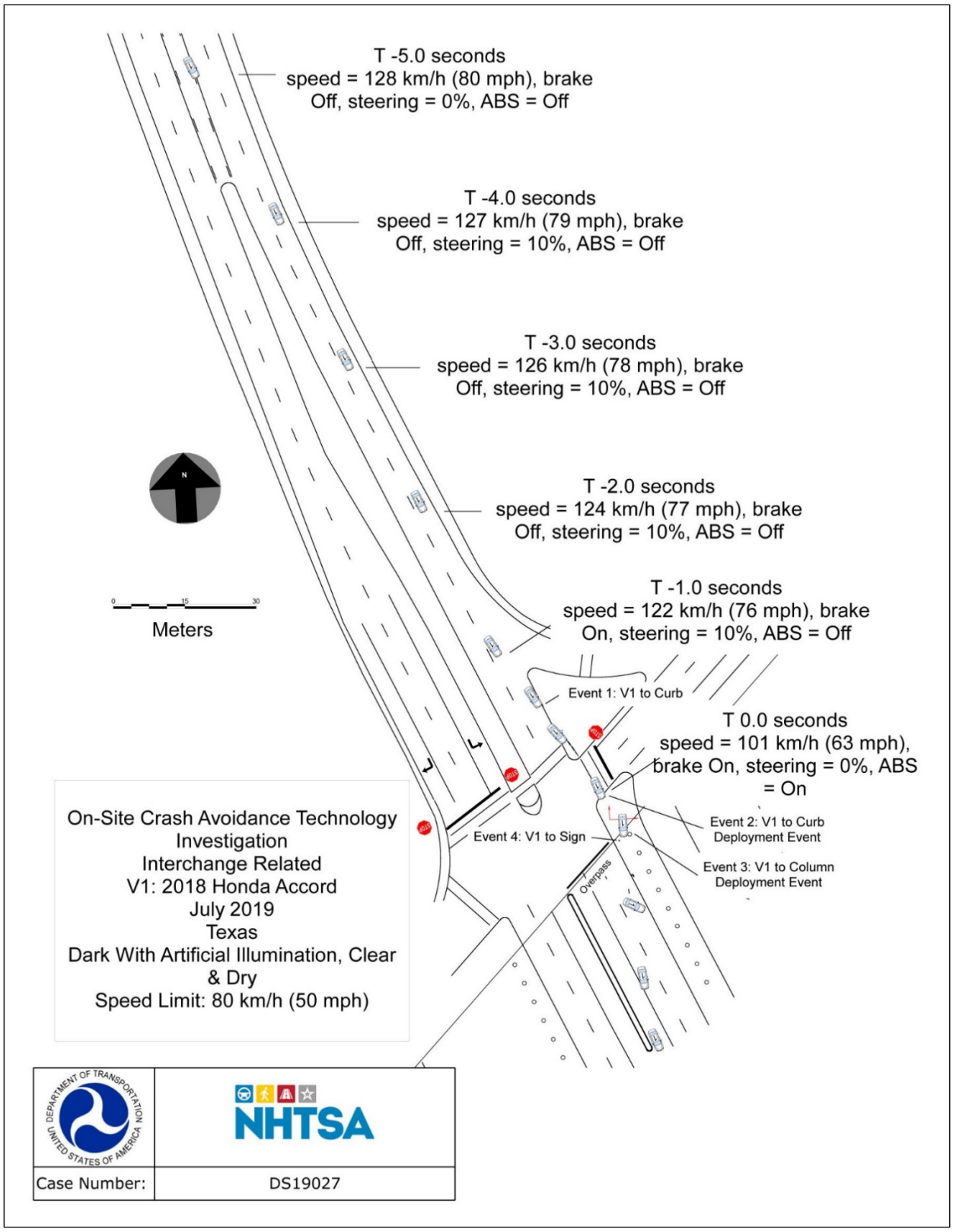
Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
6	Contusions, bilateral lungs	441411.3	Left door panel unknown/multiple quadrants	Probable
7 8	Hemothoraces, bilateral (500 mL each)	442200.3 442200.3	Left door panel unknown/multiple quadrants	Probable
9	Laceration, pericardium	441602.2	Left door panel unknown/multiple quadrants	Probable
10	Hemopericardium (300 mL), pericardium	441603.3	Left door panel unknown/multiple quadrants	Probable
11	Fractures NFS, multiple left ribs with flail	450211.3	Left door panel unknown/multiple quadrants	Probable
12	Fracture NFS, left femur	853000.3	Lower left IP	Probable
13	Lacerations, spleen (1-3 cm)	544222.2	Left door panel unknown/multiple quadrants	Probable
14	Laceration, minor, scalp	110602.1	Left A-pillar	Probable
15	Laceration, minor, upper lip	210602.1	Left A-pillar	Probable
16 17	Abrasions, chest and abdomen	410202.1 510202.1	Left door panel unknown/multiple quadrants	Probable
18	Abrasion, left back	410202.1	Seat back	Probable
19	Abrasions, bilateral hands	710202.1	Left IP	Probable

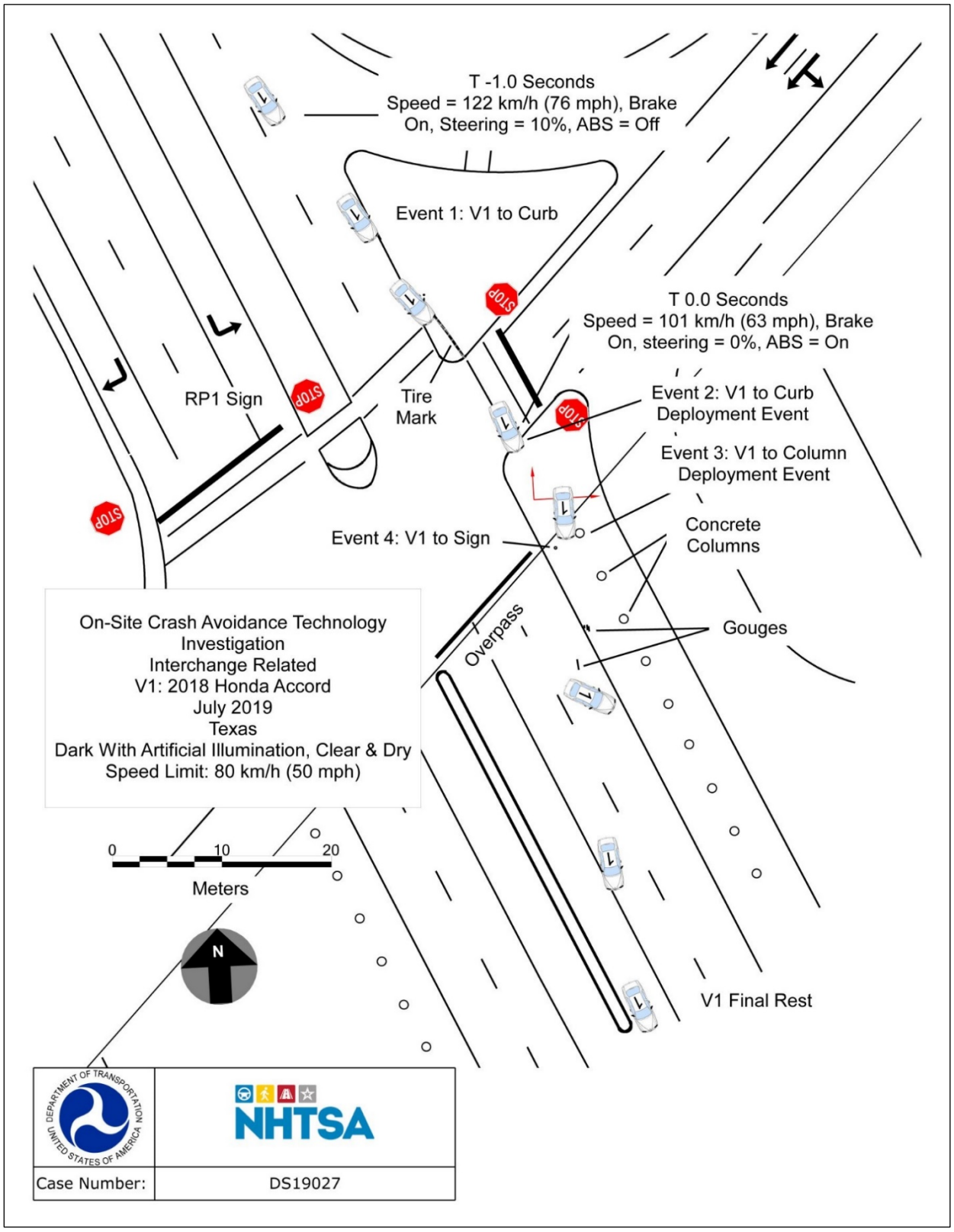
Driver Kinematics

The unbelted 48-year-old male driver was seated in an unknown posture. It was unknown whether he was actively steering the vehicle or allowing it to drift left into the lane for opposing traffic. A toxicology report identified the presence of alcohol, and the police report stated a blood alcohol concentration of .158 g/dL, almost twice the legal per se limit. At impact with the first curb, he was displaced forward and left while probably remaining in his seat. At or soon after the

curb impact, the driver braked. At impact with the second curb, his frontal and knee air bags deployed, and he was likely displaced forward and perhaps upward as the vehicle traversed the raised median. At impact with the column, the driver was displaced forward and left, with his head and face likely impacting the left A-pillar, which caused lacerations. His chest and abdomen likely loaded the left door panel in multiple quadrants, which caused lacerations to the aorta, intraventricular septum, liver, heart, right lung, pericardium, and spleen, and contusions to the lungs, as well as fractures with flail to the left ribs. The driver's left leg contacted the left IP, which caused a fracture to the left femur. Following the crash, the driver was unresponsive. He was found by responders to be lying across the front row with his head on the front row right passenger seat and his torso on the center console. He was removed through the front left door by emergency responders and transported by ambulance to a local hospital, where he was declared deceased in the ER after efforts at resuscitation were unsuccessful. His unbelted status and high delta V were considered to be contributing factors to his injury severity.

Crash Diagrams




T -1.0 Seconds
Speed = 122 km/h (76 mph), Brake On, Steering = 10%, ABS = Off
Event 1: V1 to Curb
T 0.0 Seconds
Speed = 101 km/h (63 mph), Brake On, steering = 0%, ABS = On
RP1 Sign
Tire Mark
Event 2: V1 to Curb Deployment Event
Event 3: V1 to Column Deployment Event
Event 4: V1 to Sign
Concrete Columns
Gouges
Overpass
V1 Final Rest
STOP
On-Site Crash Avoidance Technology Investigation
Interchange Related
V1: 2018 Honda Accord
July 2019
Texas
Dark With Artificial Illumination, Clear & Dry
Speed Limit: 80 km/h (50 mph)
0
10
20
Meters
N
DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA
NHTSA
Case Number:
DS19027

Appendix A: Event Data Recorder Report for 2018 Honda Accord[2]

[2] The EDR report contained in this technical report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the associated Crash View application may differ relative to this report.

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	1HGCV2F91JA******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	DS19027_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 19.0
Imaged with Software Licensed to (Company Name)	NHTSA
Reported with CDR version	Crash Data Retrieval Tool 21.2.1
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	2

Comments

No comments entered.

Data Limitations

General Information:

These limitations are intended to assist you in reading the event data that has been imaged from the vehicle's SRS control unit. They contain general information and are not specific to this particular event. Event data should be considered in conjunction with other available physical evidence from the vehicle and scene.

Honda and Acura passenger vehicles designated as 2013 or later model year production are designed to be compatible with the Bosch CDR tool. Only some 2012 model year vehicles are compatible with the Bosch CDR tool.

Recorded Crash Events:

Data for front, side, rear and rollover events can be recorded as either non-deployment or deployment events. Both types of events can contain pre-crash and crash data.

- A non-deployment event is recorded if the change in longitudinal or lateral velocity equals or exceeds 8km/h over a 150ms timeframe or another type of non-reversible deployable restraint device other than a front, side, or side curtain airbag (e.g. seatbelt pretensioner) is commanded to deploy. Except as indicated below, non-deployment events are not locked into memory and can be over-written by subsequent non-deployment or deployment events.
- A deployment event is recorded if front airbag(s), side airbag(s), or side curtain airbag(s) are commanded to deploy. Deployment events are locked into memory and cannot be over-written.

The SRS control unit typically records only one event. Two events can be recorded if the T0 (time zero) values for each event occur within 5 seconds of each other. Therefore, a non-deployment event can be recorded and locked if it occurs within 5 seconds of a deployment event.

T0 is established by whichever of the following occurs first: (1) the change in longitudinal velocity at the SRS control unit equals or exceeds 0.8km/h over a 20ms timeframe; or (2) the change in lateral velocity at the SRS control unit equals or exceeds 0.8km/h over a 5ms timeframe; or (3) the occupant restraint control algorithm is activated; or (4) a commanded deployment of any type of non-reversible deployable restraint device (e.g. airbag or seatbelt pretensioner). If the time to deploy equals 0, then the command to deploy occurred at T0 or the device was not commanded to deploy during the event.

TEnd (end of event) is established by whichever of the following occurs first: (1) the change in longitudinal and lateral Delta V equals or falls below 0.8km/h over a 20ms timeframe; or (2) the occupant restraint control algorithm resets; or (3) time from T0 exceeds 300ms.

Data:

- Data recorded by the SRS control unit and imaged by the CDR tool is displayed relative to T0, not the time at which the vehicle made contact with another vehicle or object.
- Pre-crash data is recorded at 2 samples per second within the 5 seconds before T0. The sampling point at 0.0 is taken at T0 and is asynchronous with the other sample points. The time between -0.5 and 0.0 is not recorded and is between 1 and 500ms.
- Delta V data is recorded at 100 samples per second from T0 to 250ms or T0 to TEnd plus 30ms.
- Acceleration data is recorded at 100 samples per second from T0 to 250ms.
- Delta V, longitudinal reflects the change in velocity that the SRS control unit experienced in the longitudinal direction during the recorded portion of the event and is not the speed the vehicle was traveling before the event.
- Depending on the severity of the event and the accelerometer characteristics, saturation of the SRS control unit longitudinal or lateral accelerometers may occur, decreasing the recorded Delta V value.

- Time, accelerometer range exceeded is recorded if saturation of the SRS control unit longitudinal, lateral and/or normal (vertical) accelerometer occurs. The recorded data is the time at which the sensor range is first exceeded.
- The maximum recording capability of Deployment Command Data is 254ms or 255ms depending on vehicle model. A recorded value of 254ms or 255ms may indicate that the recording maximum was exceeded. In this case, the deployment command may have occurred between the recorded time and TEnd.
- Speed, vehicle indicated data is the speed indicated to the driver by the speedometer, not actual vehicle ground speed. Data accuracy can be affected by various factors, including but not limited to the following:
    - Significant changes in tire size from the factory setting
    - Wheel lockup or spin
    - Data latency or filtering and hysteresis within the speedometer module
- Accelerator pedal position, percent full is the ratio of accelerator pedal position compared to the fully depressed position.
- PCM (Powertrain Control Module) derived accelerator pedal position, percent full may differ from the accelerator pedal position, percent full under circumstances such as brake override activation or cruise control system engagement. These circumstances are based on vehicle equipment application and vary by model.
- Steering input angle is recorded in 5 degree increments.
- Side air bag suppression system status, right front passenger is recorded when the vehicle is equipped with the Occupant Position Detection System (OPDS).
- Occupant size classification, right front passenger airbag suppressed data is recorded as yes (suppressed) if the front passenger seat weight sensor system determined the passenger seat was empty or occupied by a child-size occupant.
- EV mode data records the vehicle powertrain status, not a driver selected operation mode. EV mode is recorded as On when the vehicle is moving and the internal combustion engine is not operating. EV mode may be recorded as On or Off when the vehicle is stopped.
- Ignition switch status represents the status of the ignition switch when the T-1 sample is taken prior to the event.
- Time, ignition switch off prior to event is recorded in 1 second increments. This value represents the number of full seconds that have elapsed between the time the ignition switch was turned off and T0, with a maximum of 255 seconds.
- If power to the SRS control unit is lost during an event, all or part of the data may not be recorded.

Roll Rate Data:
- Vehicle roll rate data is recorded separately from the non-deployment and deployment events as described above. Therefore, the T0 for the roll rate data may differ from the T0 for the other data in this report.
- Roll rate recording trigger (T0) is established by whichever of the following occurs first: (1) a rollover algorithm ON judgment (SRS control unit decision to command deployment); or (2) a change in relative roll angle at the SRS control unit equal to or exceeding 30 degrees (roll angle is not measured, but is calculated from the roll rate data); or (3) the rollover algorithm is activated.
- Once a recording trigger has been met, roll rate data is recorded for one rollover event at 10 samples per second from 1 second before to 2 seconds after T0. If a roll angle trigger is satisfied without a rollover algorithm ON judgment, the recorded roll rate data is unlocked and can be over-written by a subsequent rollover event. Roll rate data triggered by or recorded during a rollover algorithm ON judgment is locked into memory and cannot be over-written.
- If roll rate is detected at the SRS control unit during a non-deployment or deployment event but the recording trigger has not been satisfied, no roll rate data will be recorded. A graph of roll rate data will only be present in this report if roll rate data is recorded.

Data Element Sign Convention:
Except as noted below, all data is displayed in SAE J211 sign convention. The following table provides an explanation of the sign notation for data elements that may be included in this CDR report. All directional references to sign notation are from the perspective of the driver when seated in the vehicle facing the direction of forward vehicle travel.

Data element name	Positive sign indicates
Longitudinal Acceleration	Forward direction acceleration
Delta-V, Longitudinal	Forward direction acceleration
Lateral Acceleration	Left to right direction acceleration
Delta-V, Lateral	Left to right direction acceleration
Normal (Vertical) Acceleration	Downward direction acceleration
Vehicle Roll Rate*	Left to right (clockwise) rotation
Steering Input Angle*	Left Turn

*Not SAE J211 sign convention

Data Source:
All recorded data is measured and calculated within the SRS control unit except for the following parameters (if applicable) which are transmitted via the vehicle's communication network to the SRS control unit:
- Speed, vehicle indicated
- Accelerator pedal position, percent full
- Service brake
- ABS activity
- Stability control
- Steering input angle
- Engine RPM
- PCM derived accelerator pedal position, percent full
- EV mode
- Forward Collision Warning
- Collision Mitigation Braking System information
- Lane Keeping Assist System information
- Lane Departure Warning
- Road Departure Mitigation information
- Cruise Control status
- Adaptive Cruise Control status

Depending on vehicle feature content, capability, or conditions described above, the following items may not be recorded. If these items are not recorded, they will not be present in this document.
- EV mode
- Forward Collision Warning
- Collision Mitigation Braking System information
- Lane Keeping Assist System information
- Lane Departure Warning
- Road Departure Mitigation information
- Cruise Control status
- Adaptive Cruise Control status
- Ignition switch status
- Time, ignition switch off prior to event

Hexadecimal Data:
All data that has been specified for imaging is shown in the hexadecimal data section of this report. However, not all of this data is translated by the CDR tool. The SRS control unit may contain additional data that is not retrievable by the CDR tool.

Data Imaging:
If the SRS control unit is imaged outside of the vehicle, ensure that it is not moved, tilted or turned while connected to the CDR tool. Also, after imaging is complete, wait 3 minutes after removing the CDR tool before moving the SRS control unit. Not following this guideline could cause current non-deployment event data to be overwritten and a new event to be recorded. Current fault status could also be altered if the SRS control unit is imaged outside of the vehicle.

04003_HondaSRS_GEN3_r002

System Status at Retrieval

EDR Version	1.5.4.0

System Status at Event (Event Record 1)

Multi-Event, Number of Events (1, 2)	1
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	1952
Maximum Delta-V, Longitudinal (MPH [km/h])	-6 [-9]
Time, Maximum Delta-V, Longitudinal (msec)	55.0
Maximum Delta-V, Lateral (MPH [km/h])	4 [7]
Time, Maximum Delta-V, Lateral (msec)	292.5
Time, Maximum Delta-V, Resultant (msec)	292.5
Time, Accelerometer Range Exceeded, Longitudinal (msec)	0
Time, Accelerometer Range Exceeded, Lateral (msec)	0
Time, Accelerometer Range Exceeded, Normal (msec)	16.0

Deployment Command Data (Event Record 1)

Pretensioner Deployment, Time to Fire, Driver (msec)	0
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Lap Pretensioner Deployment, Time to Fire, Driver (msec)	0
Lap Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to Deploy First Stage, Driver (msec)	20
Frontal Air Bag Deployment, Time to Deploy First Stage, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (msec)	0
Knee Air Bag Deployment, Time to Deploy, Driver (msec)	20
Knee Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	0
Safety Belt Adaptive Load Limiter, Time to Initiation, Right Front Passenger (msec)	0
Side Air Bag Deployment, Time to Deploy, Driver (msec)	0
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	0
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Driver Side (msec)	0
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Right Side (msec)	0
Frontal Air Bag Deployment, 2nd Stage Disposal, Right Front Passenger (Yes/No)	No

Pre-Crash Data -1 sec (Event Record 1)

Safety Belt Status, Driver	Off
Safety Belt Status, Right Front Passenger	Off
Seat Track Position Switch, Foremost, Status, Driver	No
Occupant Size Classification, Right Front Passenger Airbag Suppressed (Yes/No)	Yes
Ignition Switch Status (On, Off)	Off
Frontal Air Bag Warning Lamp (On, Off)	Off
Ignition Cycle, Crash	1951
Time, Ignition switch off prior to Event (sec)	0

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 1 of 3

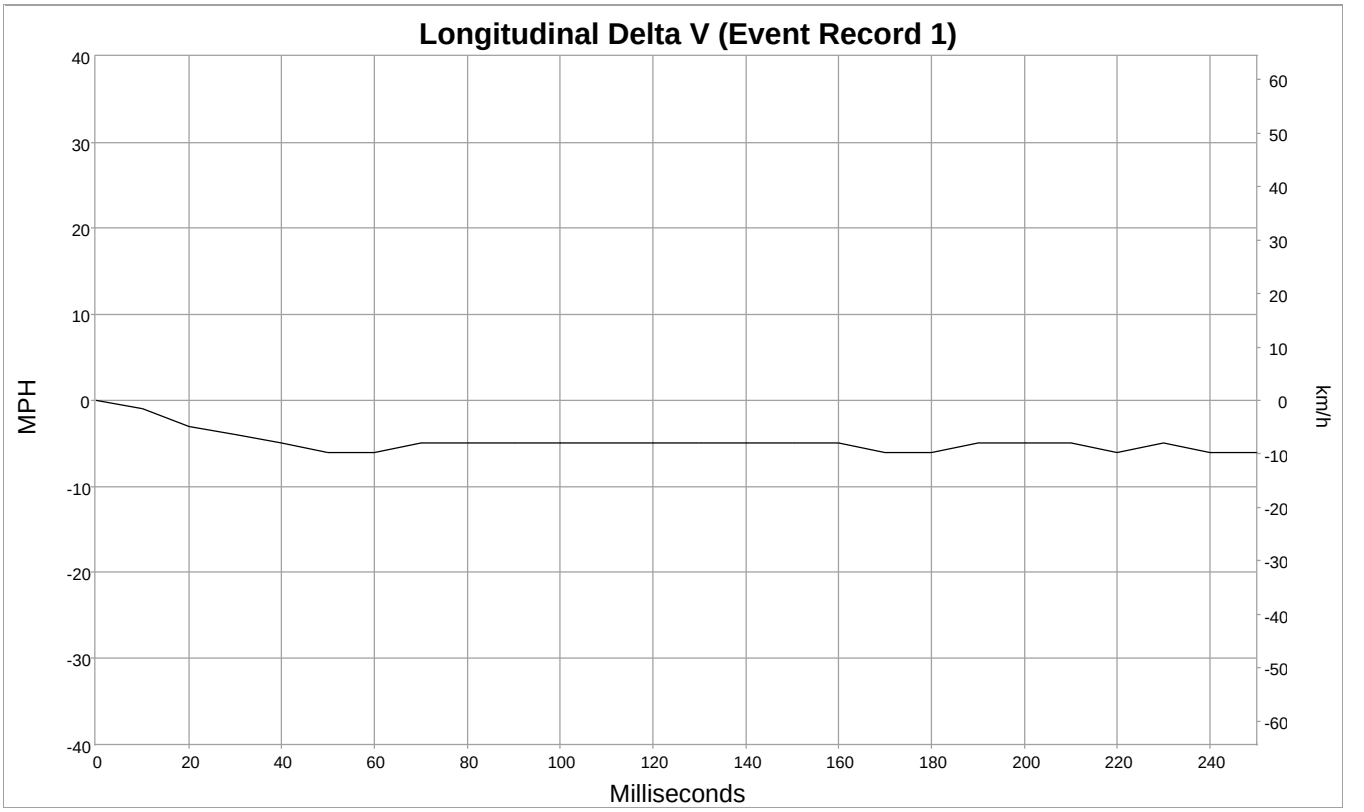
Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	ABS Activity (On, Off)	Stability Control (On, Off, Engaged)	Steering Input (deg)	Engine RPM
-5.0	80 [128]	7	Off	Off	On Non-Engaged	0	1,900
-4.5	80 [128]	7	Off	Off	On Non-Engaged	5	1,900
-4.0	79 [127]	7	Off	Off	On Non-Engaged	10	1,900
-3.5	78 [126]	7	Off	Off	On Non-Engaged	10	1,900
-3.0	78 [126]	7	Off	Off	On Non-Engaged	10	1,800
-2.5	78 [125]	0	Off	Off	On Non-Engaged	10	1,800
-2.0	77 [124]	0	Off	Off	On Non-Engaged	10	1,800
-1.5	76 [123]	0	On	Off	On Non-Engaged	10	1,800
-1.0	76 [122]	0	On	Off	On Non-Engaged	10	1,800
-0.5	76 [122]	0	On	On	On Engaged	0	1,600
0.0	63 [101]	0	On	On	On Engaged	0	1,500

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 2 of 3

Time Stamp (sec)	PCM Derived Accelerator Pedal Position, % full	Forward Collision Warning (Not Warning/ Warning)	Collision Mitigation Braking System (Not Engaged/ Engaged)	Collision Mitigation Braking System, Forward Collision Warning (On/Off)	Lane Departure Warning (Not Warning/ Warning)	Road Departure Mitigation (Not Engaged/ Engaged)	Road Departure Mitigation, Lane Departure Warning (On/Off)
-5.0	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-4.5	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-4.0	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-3.5	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-3.0	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-2.5	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-2.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-1.5	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-1.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-0.5	0	Not warning	Not engaged	On	Not warning	Not engaged	On
0.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On

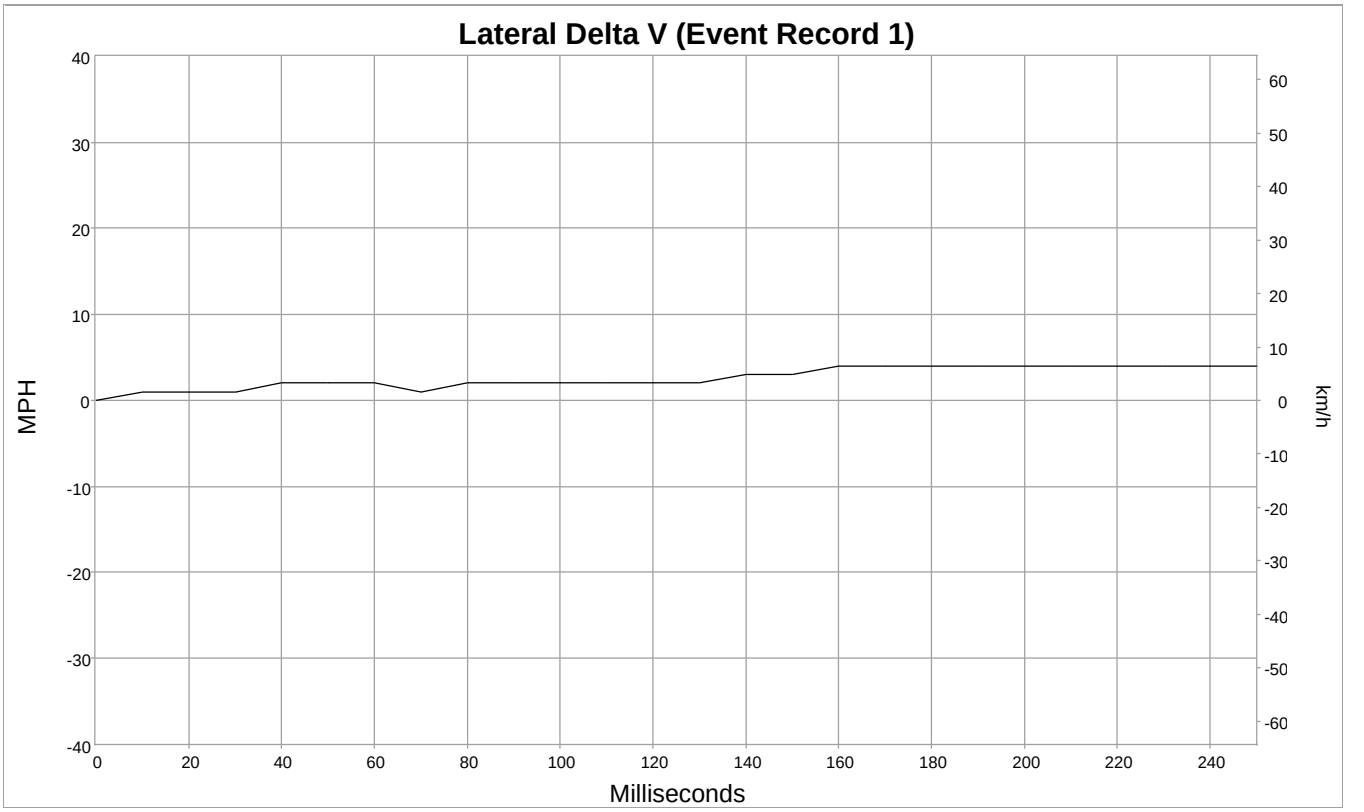
Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 3 of 3

Time Stamp (sec)	Adaptive Cruise Control (Not Engaged/ Engaged)	Adaptive Cruise Control (On/Off)	Lane Keeping Assist (Not Engaged/ Engaged)	Lane Keeping Assist (On/Off)	Cruise Control (Not Engaged/ Engaged)	Cruise Control (On/Off)
-5.0	Not engaged	On	Not engaged	On	Not Engaged	On
-4.5	Not engaged	On	Not engaged	On	Not Engaged	On
-4.0	Not engaged	On	Not engaged	On	Not Engaged	On
-3.5	Not engaged	On	Not engaged	On	Not Engaged	On
-3.0	Not engaged	On	Not engaged	On	Not Engaged	On
-2.5	Not engaged	On	Not engaged	On	Not Engaged	On
-2.0	Not engaged	On	Not engaged	On	Not Engaged	On
-1.5	Not engaged	On	Not engaged	On	Not Engaged	On
-1.0	Not engaged	On	Not engaged	On	Not Engaged	On
-0.5	Not engaged	On	Not engaged	On	Not Engaged	On
0.0	Not engaged	On	Not engaged	On	Not Engaged	On



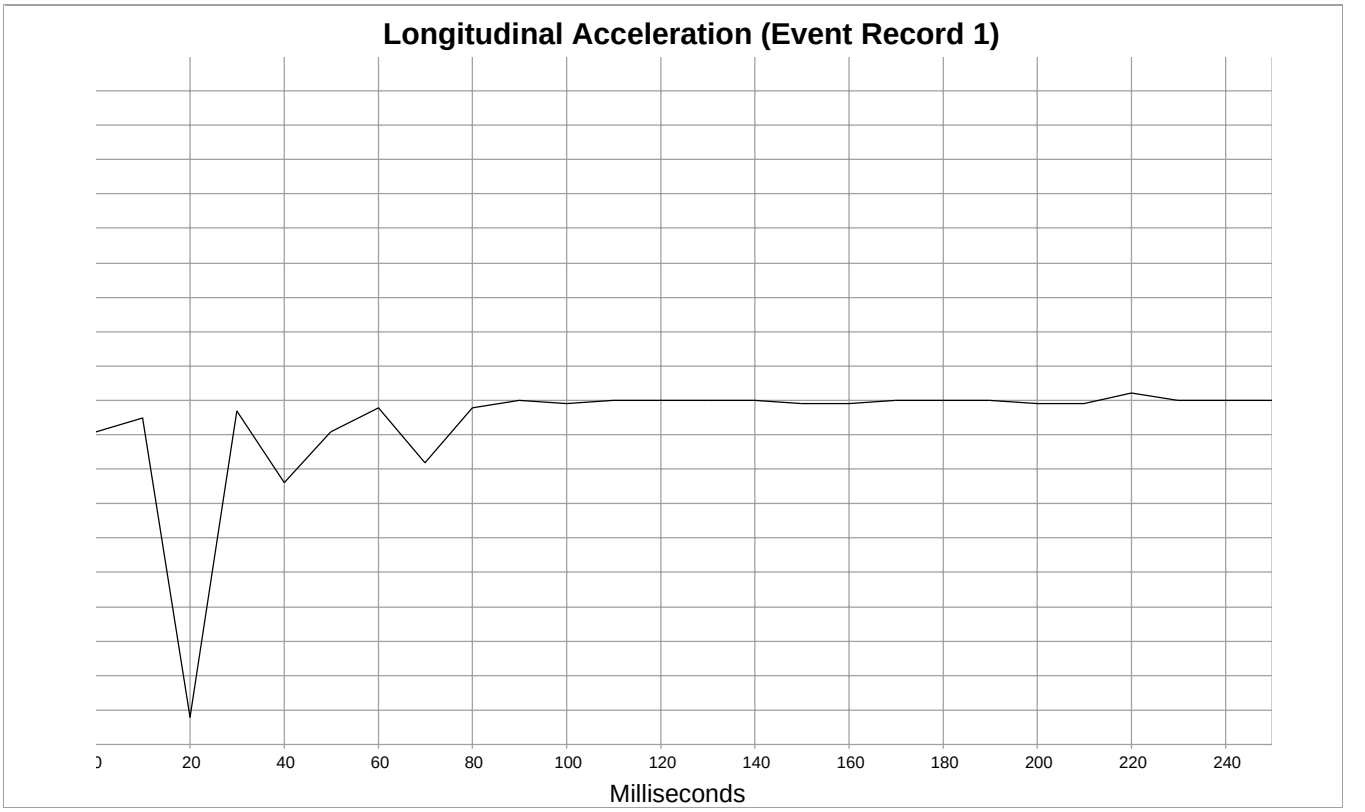
Longitudinal Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	-1 [-1]
20	-3 [-5]
30	-4 [-7]
40	-5 [-8]
50	-6 [-9]
60	-6 [-9]
70	-5 [-8]
80	-5 [-8]
90	-5 [-8]
100	-5 [-8]
110	-5 [-8]
120	-5 [-8]
130	-5 [-8]
140	-5 [-8]
150	-5 [-8]
160	-5 [-8]
170	-6 [-9]
180	-6 [-9]
190	-5 [-8]
200	-5 [-8]
210	-5 [-8]
220	-6 [-9]
230	-5 [-8]
240	-6 [-9]
250	-6 [-9]



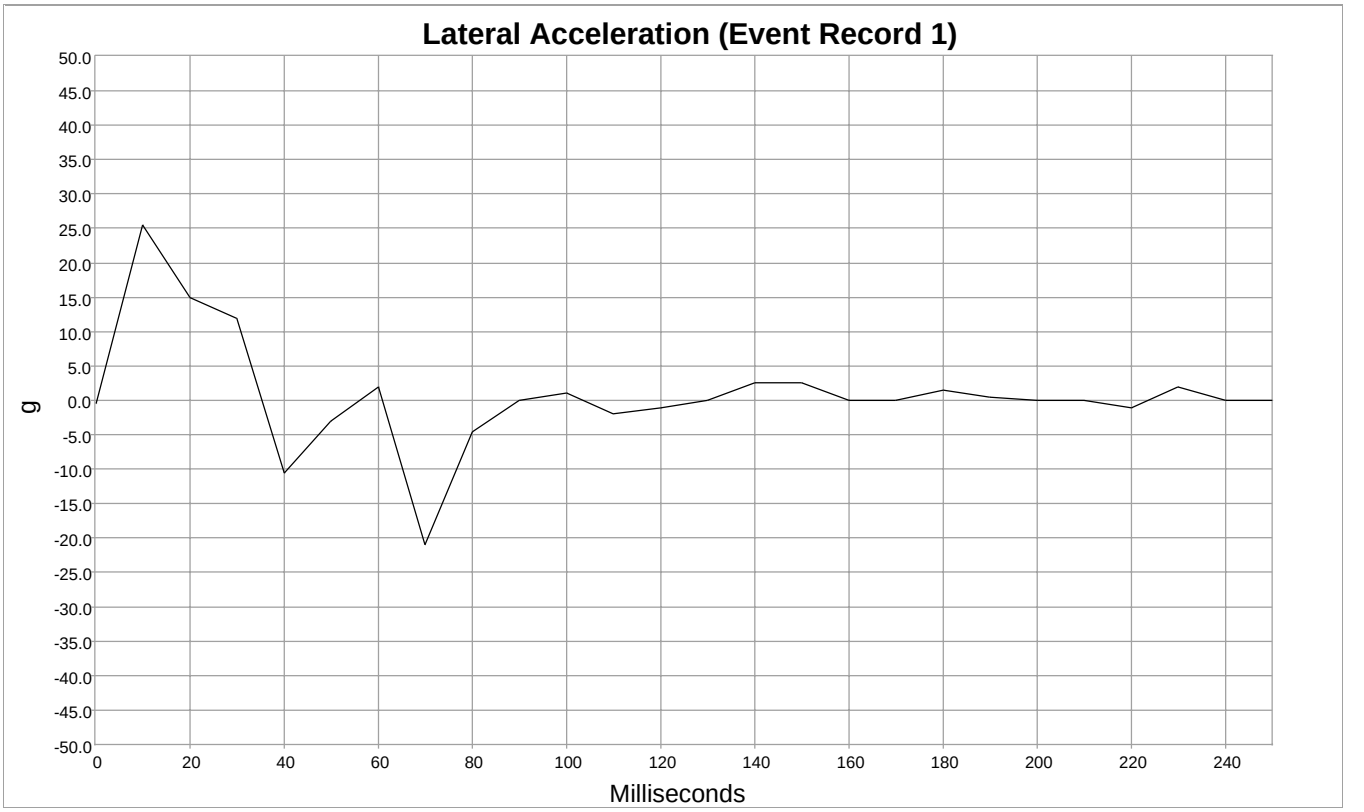
Lateral Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	1 [1]
20	1 [1]
30	1 [2]
40	2 [3]
50	2 [3]
60	2 [3]
70	1 [2]
80	2 [3]
90	2 [3]
100	2 [3]
110	2 [3]
120	2 [4]
130	2 [4]
140	3 [5]
150	3 [5]
160	4 [6]
170	4 [6]
180	4 [6]
190	4 [7]
200	4 [7]
210	4 [7]
220	4 [7]
230	4 [7]
240	4 [7]
250	4 [7]



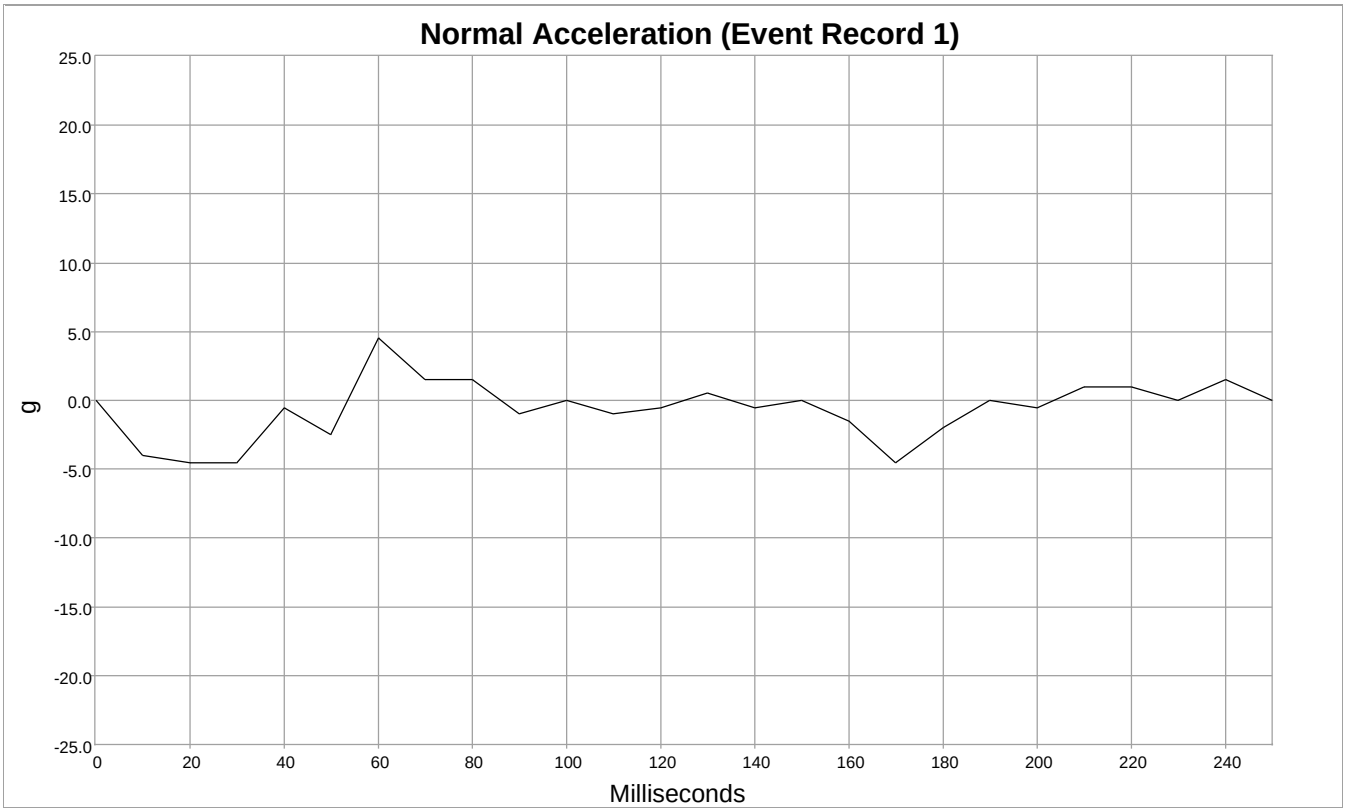
Longitudinal Acceleration (Event Record 1)

Time (msec)	g
0	-4.5
10	-2.5
20	-46.0
30	-1.5
40	-12.0
50	-4.5
60	-1.0
70	-9.0
80	-1.0
90	0.0
100	-0.5
110	0.0
120	0.0
130	0.0
140	0.0
150	-0.5
160	-0.5
170	0.0
180	0.0
190	0.0
200	-0.5
210	-0.5
220	1.0
230	0.0
240	0.0
250	0.0



Lateral Acceleration (Event Record 1)

Time (msec)	g
0	-0.5
10	25.5
20	15.0
30	12.0
40	-10.5
50	-3.0
60	2.0
70	-21.0
80	-4.5
90	0.0
100	1.0
110	-2.0
120	-1.0
130	0.0
140	2.5
150	2.5
160	0.0
170	0.0
180	1.5
190	0.5
200	0.0
210	0.0
220	-1.0
230	2.0
240	0.0
250	0.0



Normal Acceleration (Event Record 1)

Time (msec)	g
0	0.0
10	-4.0
20	-4.5
30	-4.5
40	-0.5
50	-2.5
60	4.5
70	1.5
80	1.5
90	-1.0
100	0.0
110	-1.0
120	-0.5
130	0.5
140	-0.5
150	0.0
160	-1.5
170	-4.5
180	-2.0
190	0.0
200	-0.5
210	1.0
220	1.0
230	0.0
240	1.5
250	0.0

System Status at Event (Event Record 2)

Multi-Event, Number of Events (1, 2)	2
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	1952
Time from Event 1 to 2 (sec)	0.3
Maximum Delta-V, Longitudinal (MPH [km/h])	-21 [-33]
Time, Maximum Delta-V, Longitudinal (msec)	210.0
Maximum Delta-V, Lateral (MPH [km/h])	30 [48]
Time, Maximum Delta-V, Lateral (msec)	180.0
Time, Maximum Delta-V, Resultant (msec)	182.5
Time, Accelerometer Range Exceeded, Longitudinal (msec)	0
Time, Accelerometer Range Exceeded, Lateral (msec)	0
Time, Accelerometer Range Exceeded, Normal (msec)	29.0

Deployment Command Data (Event Record 2)

Pretensioner Deployment, Time to Fire, Driver (msec)	0
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Lap Pretensioner Deployment, Time to Fire, Driver (msec)	0
Lap Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to Deploy First Stage, Driver (msec)	18
Frontal Air Bag Deployment, Time to Deploy First Stage, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (msec)	0
Knee Air Bag Deployment, Time to Deploy, Driver (msec)	18
Knee Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	0
Safety Belt Adaptive Load Limiter, Time to Initiation, Right Front Passenger (msec)	0
Side Air Bag Deployment, Time to Deploy, Driver (msec)	20
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	0
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Driver Side (msec)	20
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Right Side (msec)	0
Frontal Air Bag Deployment, 2nd Stage Disposal, Right Front Passenger (Yes/No)	No

Pre-Crash Data -1 sec (Event Record 2)

Safety Belt Status, Driver	Off
Safety Belt Status, Right Front Passenger	Off
Seat Track Position Switch, Foremost, Status, Driver	No
Occupant Size Classification, Right Front Passenger Airbag Suppressed (Yes/No)	Yes
Ignition Switch Status (On, Off)	Off
Frontal Air Bag Warning Lamp (On, Off)	On
Ignition Cycle, Crash	1951
Time, Ignition switch off prior to Event (sec)	0

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 2) - Table 1 of 3

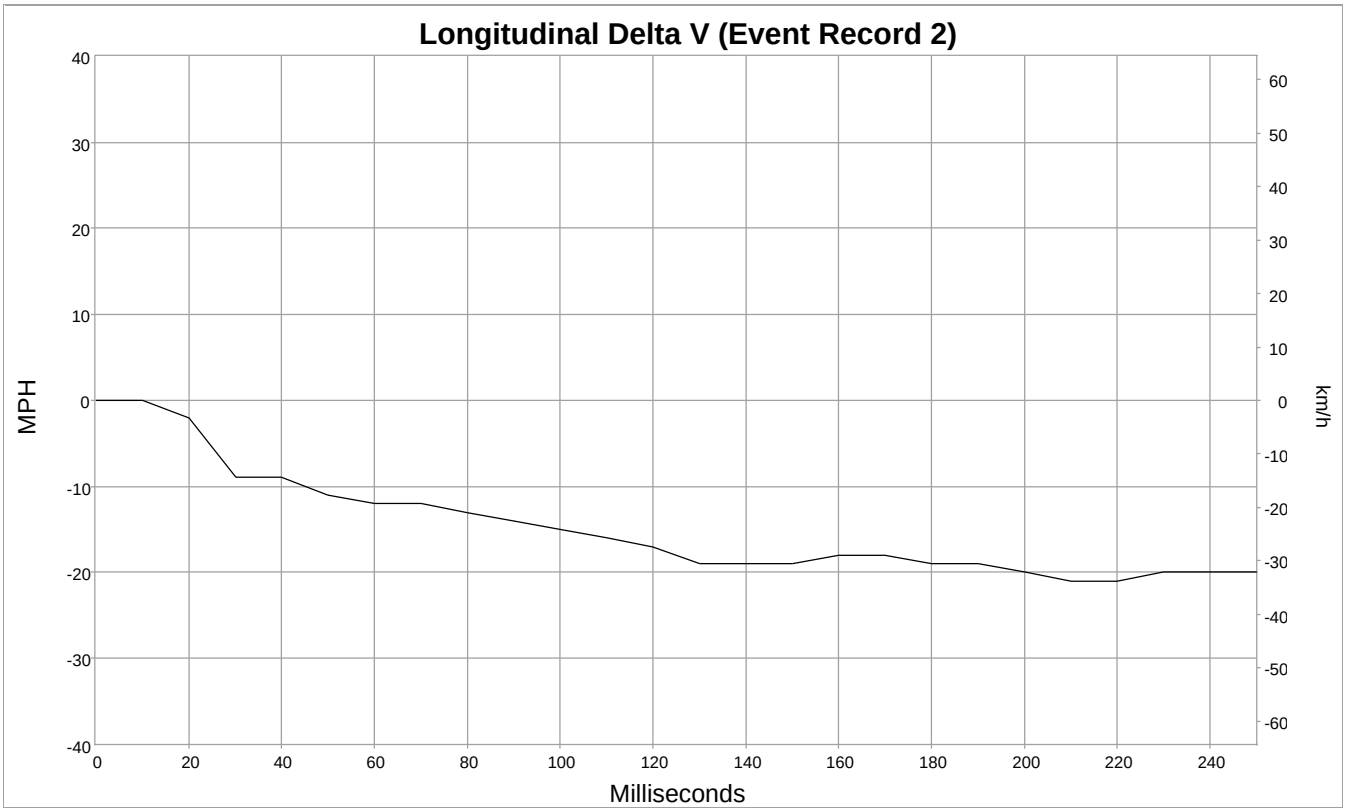
Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	ABS Activity (On, Off)	Stability Control (On, Off, Engaged)	Steering Input (deg)	Engine RPM
-5.0	80 [128]	7	Off	Off	On Non-Engaged	5	1,900
-4.5	79 [127]	7	Off	Off	On Non-Engaged	10	1,900
-4.0	78 [126]	7	Off	Off	On Non-Engaged	10	1,900
-3.5	78 [126]	7	Off	Off	On Non-Engaged	10	1,800
-3.0	78 [125]	0	Off	Off	On Non-Engaged	10	1,800
-2.5	77 [124]	0	Off	Off	On Non-Engaged	10	1,800
-2.0	76 [123]	0	On	Off	On Non-Engaged	10	1,800
-1.5	76 [122]	0	On	Off	On Non-Engaged	10	1,800
-1.0	76 [122]	0	On	On	On Engaged	0	1,600
-0.5	63 [101]	0	On	On	On Non-Engaged	20	700
0.0	63 [101]	0	On	On	On Non-Engaged	25	500

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 2) - Table 2 of 3

Time Stamp (sec)	PCM Derived Accelerator Pedal Position, % full	Forward Collision Warning (Not Warning/ Warning)	Collision Mitigation Braking System (Not Engaged/ Engaged)	Collision Mitigation Braking System, Forward Collision Warning (On/Off)	Lane Departure Warning (Not Warning/ Warning)	Road Departure Mitigation (Not Engaged/ Engaged)	Road Departure Mitigation, Lane Departure Warning (On/Off)
-5.0	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-4.5	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-4.0	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-3.5	7	Not warning	Not engaged	On	Not warning	Not engaged	On
-3.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-2.5	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-2.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-1.5	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-1.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On
-0.5	0	Not warning	Not engaged	On	Not warning	Not engaged	On
0.0	0	Not warning	Not engaged	On	Not warning	Not engaged	On

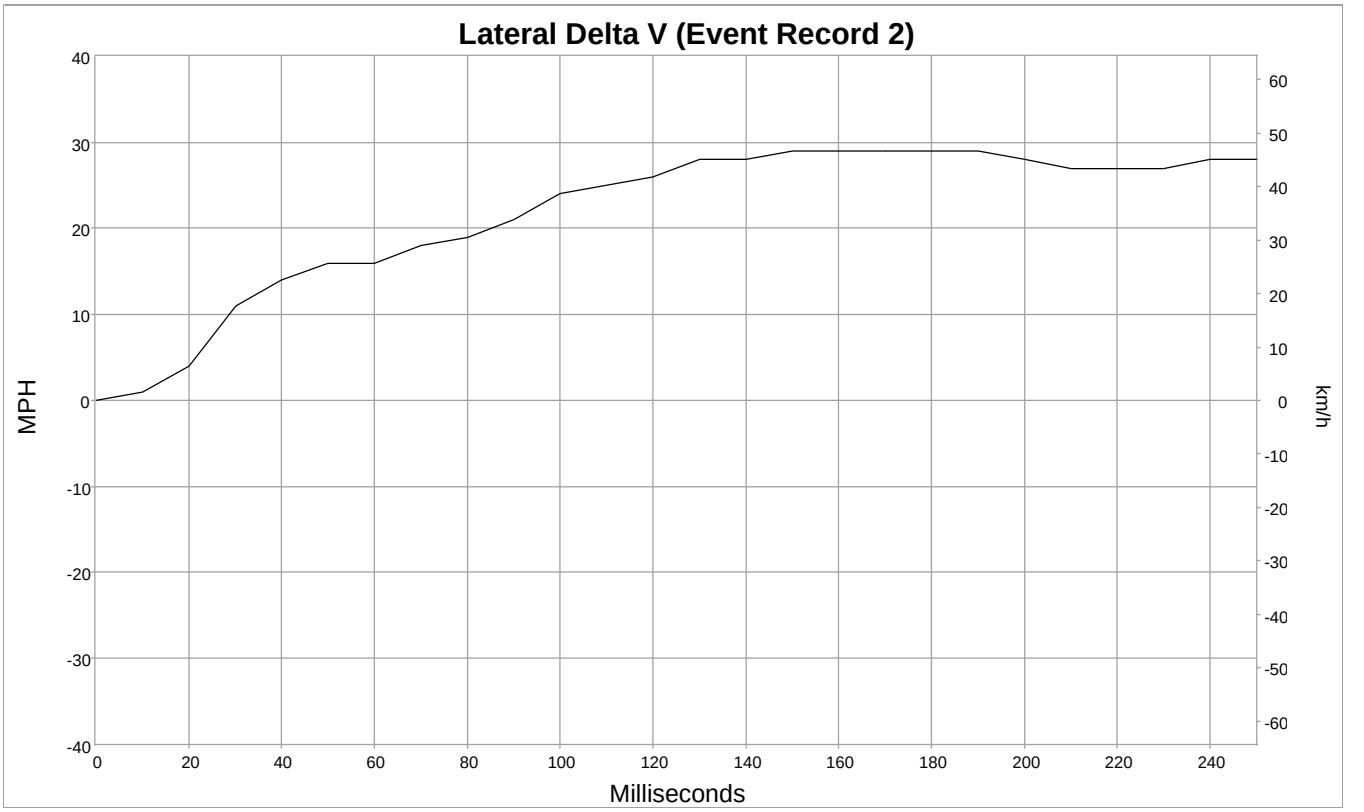
Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 2) - Table 3 of 3

Time Stamp (sec)	Adaptive Cruise Control (Not Engaged/ Engaged)	Adaptive Cruise Control (On/Off)	Lane Keeping Assist (Not Engaged/ Engaged)	Lane Keeping Assist (On/Off)	Cruise Control (Not Engaged/ Engaged)	Cruise Control (On/Off)
-5.0	Not engaged	On	Not engaged	On	Not Engaged	On
-4.5	Not engaged	On	Not engaged	On	Not Engaged	On
-4.0	Not engaged	On	Not engaged	On	Not Engaged	On
-3.5	Not engaged	On	Not engaged	On	Not Engaged	On
-3.0	Not engaged	On	Not engaged	On	Not Engaged	On
-2.5	Not engaged	On	Not engaged	On	Not Engaged	On
-2.0	Not engaged	On	Not engaged	On	Not Engaged	On
-1.5	Not engaged	On	Not engaged	On	Not Engaged	On
-1.0	Not engaged	On	Not engaged	On	Not Engaged	On
-0.5	Not engaged	On	Not engaged	On	Not Engaged	On
0.0	Not engaged	On	Not engaged	On	Not Engaged	On



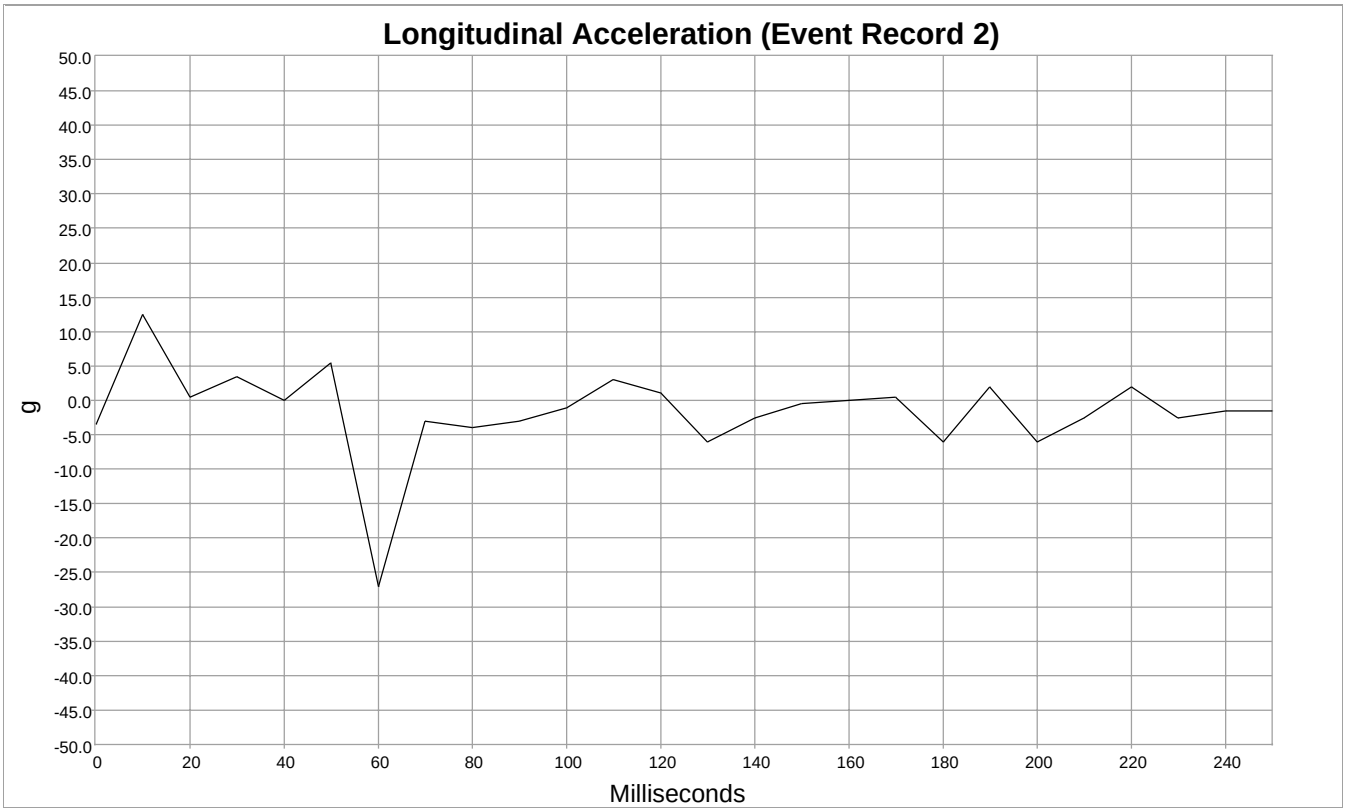
Longitudinal Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	-2 [-4]
30	-9 [-14]
40	-9 [-14]
50	-11 [-17]
60	-12 [-19]
70	-12 [-20]
80	-13 [-21]
90	-14 [-22]
100	-15 [-24]
110	-16 [-26]
120	-17 [-28]
130	-19 [-30]
140	-19 [-30]
150	-19 [-30]
160	-18 [-29]
170	-18 [-29]
180	-19 [-30]
190	-19 [-31]
200	-20 [-32]
210	-21 [-33]
220	-21 [-33]
230	-20 [-32]
240	-20 [-32]
250	-20 [-32]



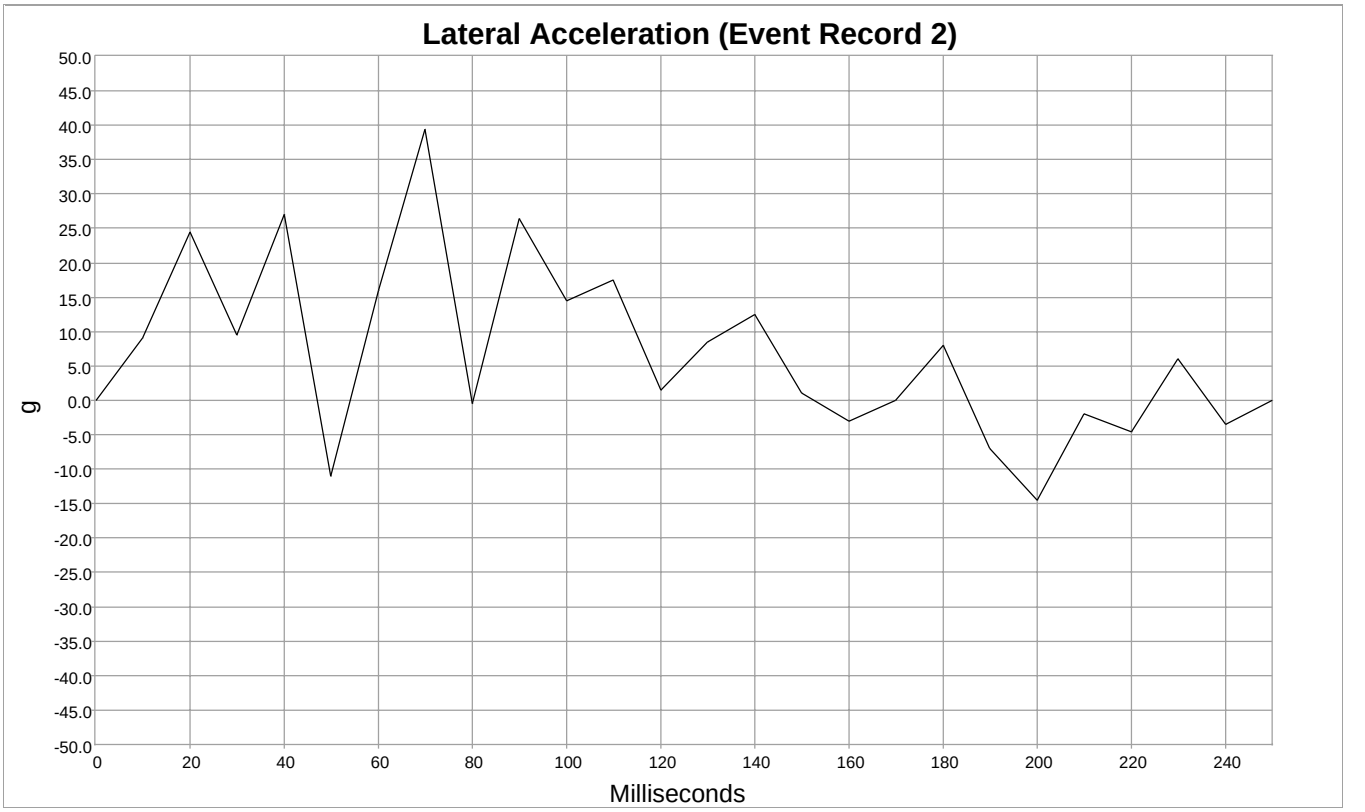
Lateral Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	1 [2]
20	4 [7]
30	11 [17]
40	14 [23]
50	16 [25]
60	16 [25]
70	18 [29]
80	19 [30]
90	21 [34]
100	24 [38]
110	25 [41]
120	26 [42]
130	28 [45]
140	28 [45]
150	29 [47]
160	29 [47]
170	29 [47]
180	29 [47]
190	29 [46]
200	28 [45]
210	27 [44]
220	27 [44]
230	27 [44]
240	28 [45]
250	28 [45]



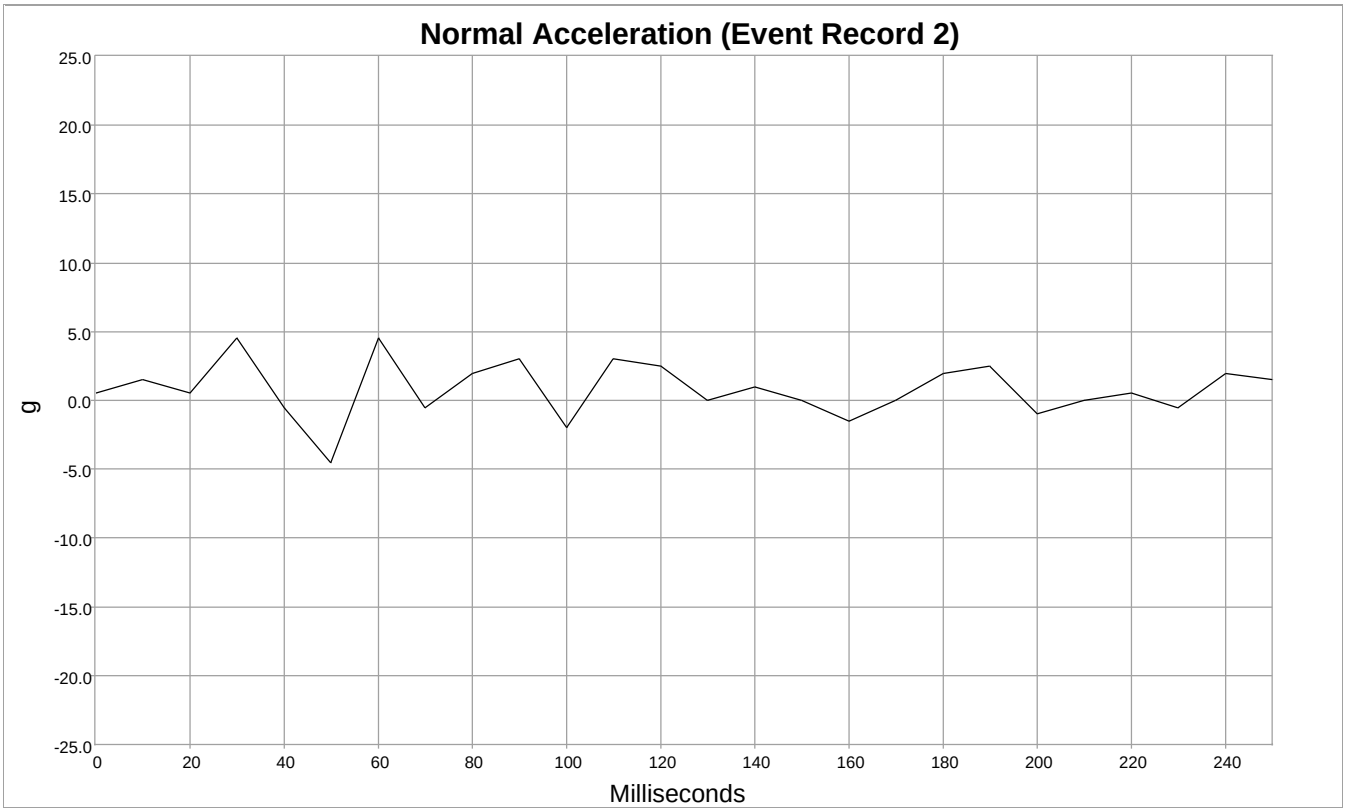
Longitudinal Acceleration (Event Record 2)

Time (msec)	g
0	-3.5
10	12.5
20	0.5
30	3.5
40	0.0
50	5.5
60	-27.0
70	-3.0
80	-4.0
90	-3.0
100	-1.0
110	3.0
120	1.0
130	-6.0
140	-2.5
150	-0.5
160	0.0
170	0.5
180	-6.0
190	2.0
200	-6.0
210	-2.5
220	2.0
230	-2.5
240	-1.5
250	-1.5



Lateral Acceleration (Event Record 2)

Time (msec)	g
0	0.0
10	9.0
20	24.5
30	9.5
40	27.0
50	-11.0
60	16.0
70	39.5
80	-0.5
90	26.5
100	14.5
110	17.5
120	1.5
130	8.5
140	12.5
150	1.0
160	-3.0
170	0.0
180	8.0
190	-7.0
200	-14.5
210	-2.0
220	-4.5
230	6.0
240	-3.5
250	0.0



Normal Acceleration (Event Record 2)

Time (msec)	g
0	0.5
10	1.5
20	0.5
30	4.5
40	-0.5
50	-4.5
60	4.5
70	-0.5
80	2.0
90	3.0
100	-2.0
110	3.0
120	2.5
130	0.0
140	1.0
150	0.0
160	-1.5
170	0.0
180	2.0
190	2.5
200	-1.0
210	0.0
220	0.5
230	-0.5
240	2.0
250	1.5

Hexadecimal Data

DID #	Data
$8000	41 5B 16 15 11 9B 00 5D 00 55 00 00 11 33 00 00 20 0F 00 E9 02 06 12 00 00 00 00 00 00 00 00 00 11 11 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 43
$8020	01 05 00 00 00 00 00 00 00 00 00 00 00 00 00 FA
$8021	AA 00 01 02 00 03 00 00 00 00 00 50 07 A0 AA AA
$8022	AA 01 CC 6E E6 00 00 00 00 00 00 00 00 00 00 00 00 14 00 00 00 14 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0C
$8023	AA 01 CC 6E E6 00 00 00 00 00 00 00 00 00 00 00 00 12 00 00 00 12 00 00 00 14 00 00 00 14 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E8
$8024	AA 01 FF 80 00 40 43 00 12 12 31 00 07 9F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 58
$8025	AA 01 FF 80 00 40 43 00 12 12 31 01 07 9F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 57
$8026	AA 01 FC D0 35 00 00 77 33 00 30 00 00 00 00 00 80 07 00 13 07 00 00 00 00 00 00 00 00 00 00 00 80 07 01 13 07 00 00 00 00 00 00 00 00 00 00 00 7F 07 02 13 07 00 00 00 00 00 00 00 00 00 00 00 7E 07 02 13 07 00 00 00 00 00 00 00 00 00 00 00 7E 07 02 12 07 00 00 00 00 00 00 00 00 00 00 00 7D 00 02 12 00 00 00 00 00 00 00 00 00 00 00 00 7C 00 02 12 00 00 00 00 00 00 00 00 00 00 00 00 7B 00 02 12 00 01 00 00 00 00 00 00 00 00 00 00 7A 00 02 12 00 01 00 00 00 00 00 00 00 00 00 00 7A 00 00 10 00 25 00 00 00 00 00 00 00 00 00 00 65 00 00 0F 00 25 00 00 00 00 00 00 00 00 00 CC
$8027	AA 01 FC D0 35 00 00 77 33 00 30 00 00 00 00 00 80 07 01 13 07 00 00 00 00 00 00 00 00 00 00 00 7F 07 02 13 07 00 00 00 00 00 00 00 00 00 00 00 7E 07 02 13 07 00 00 00 00 00 00 00 00 00 00 00 7E 07 02 12 07 00 00 00 00 00 00 00 00 00 00 00 7D 00 02 12 00 00 00 00 00 00 00 00 00 00 00 00 7C 00 02 12 00 00 00 00 00 00 00 00 00 00 00 00 7B 00 02 12 00 01 00 00 00 00 00 00 00 00 00 00 7A 00 02 12 00 01 00 00 00 00 00 00 00 00 00 00 7A 00 00 10 00 25 00 00 00 00 00 00 00 00 00 00 65 00 04 07 00 05 00 00 00 00 00 00 00 00 00 00 65 00 05 05 00 05 00 00 00 00 00 00 00 00 00 1D
$8028	AA 00 00 FF FB F9 F8 F7 F7 F8 F8 F8 F8 F8 F8 F8 F8 F8 F8 F7 F7 F8 F8 F8 F7 F8 F7 F7 00 00 00 00 00 00 00 00 00 00 00 00 F7 16 00 00 00 00 00 0D
$8029	AA 00 00 00 FC F2 F2 EF ED EC EB EA E8 E6 E4 E2 E2 E2 E3 E3 E2 E1 E0 DF DF E0 E0 E0 00 00 00 00 00 00 00 00 00 00 00 00 DF 54 00 00 00 00 00 87
$802A	AA 00 00 01 01 02 03 03 03 02 03 03 03 04 04 05 05 06 06 06 07 07 07 07 07 07 07 00 00 00 00

```
                00 00 00 00 00 00 00 00 07 75 00 75 00 00 00 F5

$802B           AA 00 00 02 07 11 17 19 19 1D 1E 22 26 29 2A 2D
                2D 2F 2F 2F 2F 2E 2D 2C 2C 2C 2D 2D 00 00 00 00
                00 00 00 00 00 00 00 00 30 48 00 49 00 00 00 0D

$802C           AA 01 F7 FB A4 FD E8 F7 FE EE FE 00 FF 00 00 00
                00 FF FF 00 00 00 FF FF 02 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FC

$802D           AA 01 F9 19 01 07 00 0B CA FA F8 FA FE 06 02 F4
                FB FF 00 01 F4 04 F4 FB 04 FB FD FD 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 A5

$802E           AA 01 FF 33 1E 18 EB FA 04 D6 F7 00 02 FC FE 00
                05 05 00 00 03 01 00 00 FE 04 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2B

$802F           AA 01 00 12 31 13 36 EA 20 4F FF 35 1D 23 03 11
                19 02 FA 00 10 F2 E3 FC F7 0C F9 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 F6

$8030           AA 01 00 F8 F7 F7 FF FB 09 03 03 FE 00 FE FF 01
                FF 00 FD F7 FC 00 FF 02 02 00 03 00 00 A0 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 D5

$8031           AA 01 01 03 01 09 FF F7 09 FF 04 06 FC 06 05 00
                02 00 FD 00 04 05 FE 00 01 FF 04 03 01 22 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 08

$8007           AA 00 00 00 00 00 00 00 0E 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 F2

$803F           AA 02 00 20 00 00 18 30 00 00 00 00 00 00 00 00
                80 34 07 02 00 00 3C 00 00 10 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8011           AA 02 C4 2F 80 00 00 00 00 01 16 16 00 00 00 16
                00 00 00 00 07 00 10 7F FF 10 FF 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 FA

$8012           AA 00 04 05 A4 07 7E 05 D4 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 04 05 A4 07 7E 05 D4 00 00
                00 00 00 00 00 00 00 00 11 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2F

$8013           AA 02 C4 2F 80 00 00 00 00 01 16 16 00 00 00 16
                00 00 00 00 07 00 10 7F FF 10 FF 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 FA

$8014           AA 00 01 02 AD 04 A1 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 20 06 EA 06 EA 05 09 10 11
                BE 09 22 00 00 00 00 00 11 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 D8

$8015           AA 02 C4 2F 80 00 00 00 00 01 16 16 00 00 00 16
                00 00 00 00 07 00 10 7F FF 10 FF 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
                00 00 00 00 00 00 00 00 00 FA

$8016           AA 00 30 01 0E E8 10 EE 00 00 00 00 00 00 10 00
                00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 21
```

```
$8017          AA 02 C4 2F 80 00 00 00 00 01 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 E0

$8018          AA 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 56

$8019          AA 02 C4 3F 00 00 C4 3F 00 01 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 4D

$801A          AA 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$801B          AA 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8001          AA 01 C4 18 00 00 00 00 36 36 00 00 00 36 00 00
               00 00 00 07 07 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00

$8002          AA 01 E0 FE F8 FF 00 00 00 80 31 00 00 00 00 00
               01 3C F7 DF 07 30 04 00 00 00 00 04 3B 00 00 00
               81 1F 68 0D FF 00 0C 58 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00

$8004          00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00

$8005          AA 01 F8 F0 F0 F0 DE 03 DE 01 DE 03 00 00 00 00
               00 7F FF 00 FF 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 28 00 03 34 FC F4 00 00 00 00 00 00 01 B0
               05 18 00 02 38 02 E0 00 00 00 00 00 00 00 C7
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8008          00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8009          AA 01 B7 F8 AA AA AA AA 00 00 03 00 45 FF EB 07
               00 00 00 00

$800A          AA 00 00 31 00 00 48 72 92 12 4A 48 70 9A 27 1E
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$800F          AA 00 B6 63 99 80 00 00 C0 00 80 80 00 80 80 00
               00 80 80 00 00 00 80 C0 80 00 00 C0 80 00 00 C0
               80 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00
```

```
$8010          AA 01 F8 F8 F8 F8 F0 F0 E0 E3 00 00 00 00 00 00
               AF 00 03 10 01 00 00 00 6F 00 00 00 3F 3F 00 00
               AF 00 13 51 01 00 00 00 6F 00 00 01 3F 3F 00 00
               AF 01 00 11 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$801C          AA 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 56

$801F          00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$803E          AA 00 FF 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00

$8040          AA 02 00 00 00 00 00 00 FF FF 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00

$8041          AA 01 BF CC C4 00 00 00 8F 00 8F 8F 8F 8F 8F 8F
               8F 8F 00 00 8F 8F 00 00 8F 8F 00 00 00 8F 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00

$8043          AA 01 01 FF 01 FF 01 FF 01 FF 01 FF 01 FF 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8044          AA 00 FF 00 FF 00 00 00 00 FB 00 FF 00 00 00 00
               00 00 00 00

$8045          AA 01 FC 00 77 77 9F 32 20 01 00 00 00 00 00 00
               00 00 00 00

$8046          AA 00 C0 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```
$8050          FF FF FF FF FF FF 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 FF FF 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8051          33 50 03 00 11 10 FF 00 21 50 FF 00 13 10 FF 00
               31 10 FF 00 33 10 FF 00 21 30 FF 00 A2 10 FF 00

$8052          20 13 30 01 00 00 00 00 00 00 00 00 00 00 00 00

$8053          48 88 88 00 00 A8 96 00 00 00 00 00 00 00 00 00

$8054          AA 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8060          AA 00 00 00 00 00 00 00 00 00 00 00 07 A0 7C 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8061          AA 01 CF C0 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8062          AA 02 FF F0 0F C0 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8063          AA 00 FF FF 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
               00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8064          AA 00 F0 32 00 00 00 00 00 00 00 00 00 00 00 00
```

```
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8065   AA 00 CF FF F0 CC F0 30 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8070   AA 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

$8071   AA 01 FF FF F0 03 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$8072	AA 00 FF F9 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$E600	2E 8F
$E604	01 00 00 00
$F100	00 00 00 00
$F110	0E 37 37 39 36 30 54 56 41 41 34 36 30 4D 34 00 00
$F112	0B 43 31 43 50 30 35 38 35 59 34 4B 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$F181	37 37 39 35 39 2D 54 56 41 2D 41 34 36 30 00 00

Disclaimer of Liability

DOT HS 813 216
December 2021

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

15418-111721-v2