



**TECHNICAL RECONSTRUCTION GROUP CHAIRMAN'S
FACTUAL REPORT**

Williston, FL

HWY16FH018

(21 pages)

**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C.**

**TECHNICAL RECONSTRUCTION GROUP CHAIRMAN'S
FACTUAL REPORT**

A. CRASH INFORMATION

Location: US-Alt 27, milepost 29, near Williston, Levy County, Florida

Vehicle #1: 2015 Tesla Model S 70D

Operator #1: Private operator

Vehicle #2: 2014 Freightliner Cascadia truck tractor in combination with a
2003 Utility 3000R refrigerated semitrailer

Operator #2: Okemah Express, LLC
Palm Harbor, FL

Date: May 7, 2016

Time: 4:36 PM EDT

Fatalities: 1

NTSB #: **HWY16FH018**

B. TECHNICAL RECONSTRUCTION GROUP

Robert Squire - Accident Investigator, Group Chairman
NTSB Office of Highway Safety
490 L'Enfant Plaza East, S.W., Washington, DC 20594

C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

D. DETAILS OF THE TECHNICAL RECONSTRUCTION GROUP INVESTIGATION

The Technical Reconstruction Group provided investigative support through the examination and documentation of the collision scene and involved motor vehicles, excluding the Freightliner truck tractor. Factual and analytic data was also acquired through review of documentation provided by the Florida Highway Patrol, Florida Department of Transportation and other NTSB investigative groups.

Primary documentation involved photography and 3D laser scanning techniques. Photographs were taken in digital format, while scanning was accomplished using the FARO Focus^{3D} x330 laser scanner. The multiple scans of a subject were processed into point clouds for further analysis. Three scan projects were completed, which included the crash scene, and the involved Tesla and the involved semitrailer. Video documentation of the immediate approach to, and through the area of the crash was also conducted following the route of both vehicles.

Factual reports prepared by other NTSB investigative groups should be consulted for additional information.

1. Roadway and Collision Evidence

The crash occurred along the eastbound roadway of US Route 27A (US-27A) at the intersection with NE 140th Court west of Williston, FL. US-27A through this area is oriented east-west and exhibit headings of approximately 208°/288° east and west respectively.¹ The two roadways are separated by a wide (approximately 60 feet) soil median with two through lanes of travel present on both roadways. The eastbound approach to the intersection exhibits a descending grade of approximately 2.15%. Based on Florida Department of Transportation (FDOT) highway profile plans, the grade crests approximately 1,132 feet west of the (approximate) center of the NE 140th Court intersection.² The grade descends over an approximate linear distance of 1,459 feet, terminating about 327 feet east of the intersection center. West of the grade crest, the eastbound roadway exhibits a slight ascending grade of 0.51%. While perceived as relatively level, the preceding ascending grade does affect the driver line of sight through the vertical curve. Other than the vertical curve, the highway is essentially straight for several miles east and west of the intersection.³

The collision occurred where NE 140th Court intersects with the eastbound roadway. The northern approach along NE 140th Court toward US Route 27A is straight and approximately level but intersects the main highway at an acute angle of about 71° (109° relative to the eastbound US-27A approach). NE 140th Court is a two-lane highway with no shoulders or turns at the intersection with eastbound US-27A.

¹ Relative to true north.

² Plans dated 2002. As referenced in this report, grade crest refers to the area of maximum elevation. The geometric intersection of the two vertical grades is approximately 237 feet further east of the maximum elevation.

³ Approximately 5 miles east, and 3.5 miles west of the intersection.

For both directions of US-27A, left turn lanes are contiguous with the left through lanes. The lengths of the turn lanes in advance of the intersection were measured at approximately 528 and 557 feet for the east- and westbound roadways respectively. The median opening at the intersection exhibited a width of about 129 feet. The offset from the westbound left turn lane to the right through lane of US-27A was about 90 feet (measured from lane centers).

The NTSB Highway Factors Factual report should be consulted for additional highway details.

The collision occurred when the Tesla, traveling eastbound on US-27A, struck the right side of the semitrailer as the combination vehicle made a left turn from westbound US-27A onto (southbound) NE 140th Court. The Tesla passed beneath the semitrailer and continued eastward after the collision. While roadway evidence was no longer visible upon the arrival of NTSB investigators, the area was photographed and documented by investigators with the Florida Highway Patrol (FHP). FHP investigators identified the area of impact as within the confines of the intersection formed by the right through lane of eastbound US-27A and the southbound lane of NE 140th Court. Documentation provided by FHP depicted a single linear tire friction mark in the eastbound right lane of US-27A in this area. The length of the mark was documented as about 11.5 feet in length. Examination of FHP photographs appear to depict the presence of a second parallel linear tire mark, although this second mark appears very faint. The marks were constrained within, and parallel to the right eastbound travel lane. The characteristics of the marks appeared consistent with vertical loading or over deflection of vehicle tires without indication of sliding. The separation between the marks appeared consistent with the wheel track of a passenger vehicle. The tire mark documented by FHP investigators would have been consistent with location of the passenger side tires of the Tesla at impact. The photographs also depicted debris from the Tesla at the southwest corner of the intersection and trailing eastward from the area of impact. The debris located at the southwest corner of the intersection appeared to consist of the Tesla's interior and exterior roof panels. Figure 1 is a FHP photographs depicting the two faint tire friction marks and vehicle debris observed near the area of impact.

FHP data documented the Tesla continuing eastward after impact with the trailer and departing the right side of the roadway about 326 feet from the area of impact. Based on FHP documentation, the Tesla traveled from the area of impact toward the right roadside at an approximate angle of 1.7°. FHP photographs depict continuous wheel path impressions (left and right side) across the grass-covered roadside adjacent the highway. The photographs depict a curvilinear path as the vehicle negotiated the change in vertical grade along the fore and back slopes that paralleled the highway (creating a large drainage culvert). Scan data depicted the fore slope that descended at about a 14° angle over a distance of about 49 feet. The back slope ascended at a 14° angle over a distance of about 15 feet. The linear distance covering the segment of travel through the drainage culvert was about 334 feet following which the Tesla breached a wire fence at the top of the back slope. The fence ran parallel to the highway.

Wheel path impressions continued another 195 feet through a level grass-covered field until the vehicle collided with, and severed a wooden utility. Prior to striking the pole, the vehicle breached another wire fence that ran perpendicular to the first fence.



Figure 1: Florida Highway Patrol photograph facing eastward on US-27A at the intersection with NE 140th Court. Two parallel tire friction marks are referenced by the yellow arrows. Additional Tesla debris is located at the southwest corner of the intersection (right side of photograph).

The Tesla's position of final rest was documented about 55 feet eastward of the utility pole. Photographs of the vehicle at rest depict its position as perpendicular to the highway and its original direction of travel. Overall, the approximate linear distance traveled by the Tesla after impact with the semitrailer was 910 feet.

The collision scene was scanned on July 15, 2016. The scan area included 12 stations that extended from the intersection to driveway area where the Tesla came to rest. Figures 2 and 3 depict the linked scans as a single image and the 2D diagram based on the scan and FHP data.

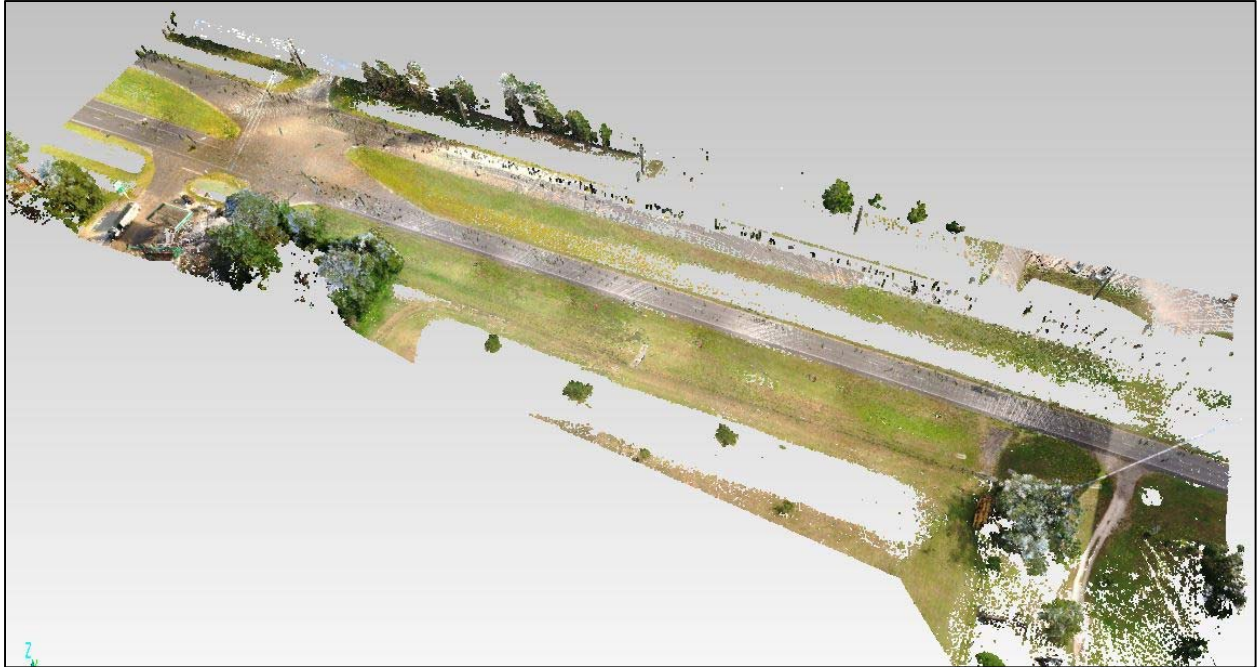


Figure 2: Image depicting linked 3D scans of the intersection of eastbound US-27A and NE 140th Court extending eastward to the residential driveway where the Tesla came to rest.

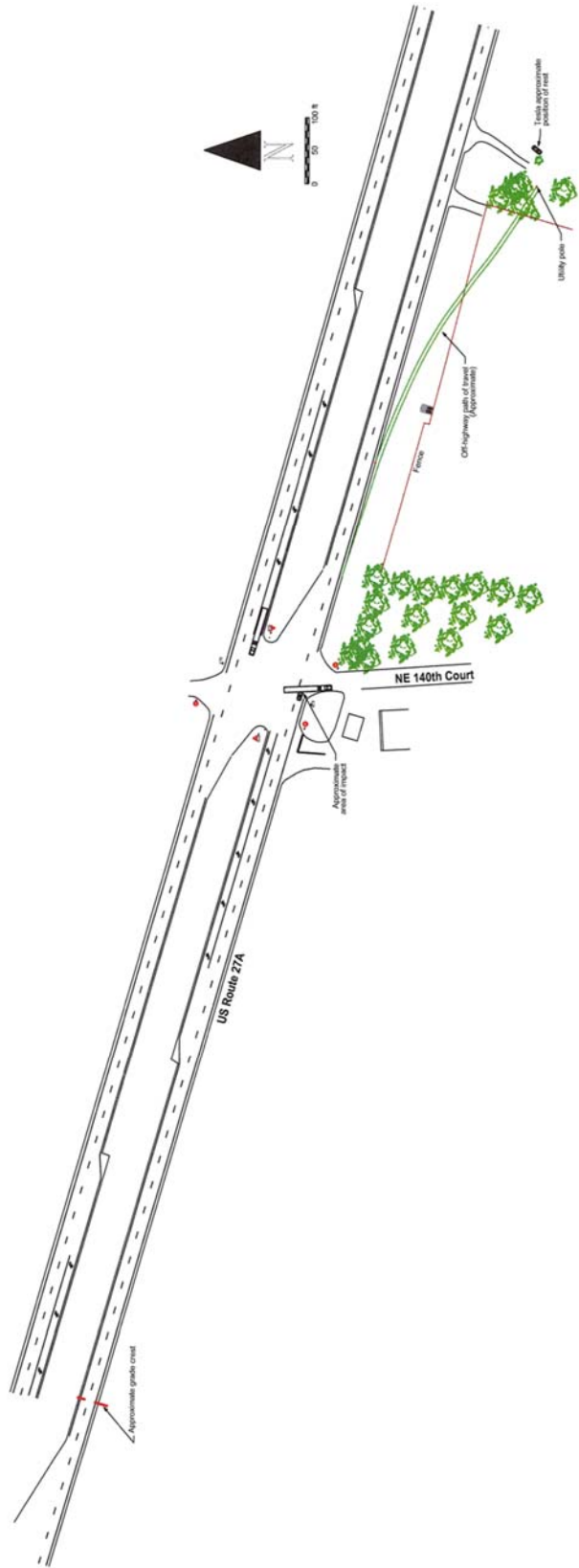


Figure 3: 2D diagram of collision area based on 3D scan and Florida Highway Patrol data.

2. Vehicle Documentation

Two of the involved vehicles were documented by 3D scanning on July 13 and 14, 2016. Those vehicles included the Tesla and Utility semitrailer. The original truck tractor involved in the collision was not available. The semitrailer was located at a salvage facility in Groveland, FL, but had not been altered following the collision. The Tesla had been stored at a secure insurance facility near Tampa, FL.

In addition to the summary provided below, the NTSB Vehicle Factors Group factual report should be consulted for additional information.

2.1. Tesla Model S 70D

The vehicle was identified as a 2015 Tesla Model S 70D, four-door sedan. The vehicle was scanned from four stations. Damage to the vehicle included the complete separation of the roof panel, which exhibited fore to aft compression similar to an accordion. The combination rear window frame and trunk lid (lift back) was observed to be inverted and folded over the rear of the vehicle. Impact damage was also observed at the left front of the vehicle forward of, and in line with the left front wheel.

The forward facing surface of the A-pillars exhibited evidence of impact (disfigurement and material damage) just below where the A-pillar had separated. Measurements acquired from the 3D scan of the vehicle (in a static position), placed the evidence of contact at a vertical height of 3.17 feet.⁴ Additional evidence of impact consisted of scrapes to the trailing edge of the hood about 44.8 inches aft of the leading edge or just forward of the windshield. The area comprising the scrapes extended laterally about 5.2 inches toward the driver's side of the vehicle and were centered about five inches from the longitudinal centerline of the vehicle. The static height of the trailing end of the hood measured approximately 3 feet. The width of the scrapes was consistent with the length of the trailer's center side marker lamp that had been mounted below the side rail on the semitrailer.

Impact damage to the left front exhibited an arced pattern with rearward displacement of the vehicle's left front fender and other structures. The damage was characteristic of an impact into a pole and was centered about 12.4 inches inboard of the left side, in line with the front wheel. The left (driver's) side wheelbase measured about four inches shorter than the right side. The vertical height of the leading edge of the hood measured approximately 2 feet.

⁴ Static position includes deflation of the left front tire, suspension damage and inoperative active suspension.



Figure 4: Florida Highway Patrol post-collision photograph depicting collision damage to Tesla. The yellow arrow indicates upper surface damage to the hood, while the red arrow indicates the pole impact damage. The rear window frame and trunk deck combination has been returned to the upright position.



Figure 5: Image depicting linked 3D scans of the Tesla. The yellow tape visible in the image was applied by other investigators to outline areas of damage.

Published dimensions for the Tesla are conveyed in Table 1.

Table 1: Published dimensional data for Tesla Model S

| 2015 Tesla Model S 70D 70 kWh battery / dual motor AWD | | |
|---|--------|-------|
| | inches | feet |
| Length (overall) | 196 | 16.33 |
| Width (overall) | 77.3 | 6.44 |
| Height (max) | 56.5 | 4.71 |
| Wheelbase | 116.5 | 9.71 |
| Ground clearance | 5.7 | 0.48 |
| Front wheel track | 65.4 | 5.45 |
| Rear wheel track | 66.9 | 5.58 |

2.2. 2003 Utility Semitrailer

The involved semitrailer was identified as a 2003 Utility VS2RA 3000R refrigerated van body trailer. The vehicle was scanned from eight stations while coupled to a two-axle yard truck tractor. An examination of the trailer and comparison with FHP photographs revealed no apparent alterations of the trailer from its post-collision condition.

Collision evidence consisted of impact damage to the lower sidewall rails on both sides of the trailer and the undercarriage between the opposing damaged rails. Damage to the passenger (right) side exhibited inward intrusion, while damage on the driver (left) side exhibited an outward deformation. The damage on both sides exhibited two distinct areas of contact. The undercarriage damage consisted of a displaced transverse floor support rail between the damage areas on the two sides.

Damage on the right side exhibited two distinct areas of contact where the trailer's lower sidewall rail was torn and displaced inward. The sidewall between these two contact areas was superficially damaged and exhibited an arced impression that extended vertically above the sidewall rail damage. The rear most area of contact was centered approximately 23.91 feet (23 feet, 11 inches) forward of the end of the trailer. The forward most area of contact was centered about 28.58 feet (28 feet, 7 inches) forward of the trailer end. A segment of windshield trim from the Tesla was observed entangled within the damage of the forward most area of contact. The distance between the two areas of contact measured 4.66 feet (4 feet, 8 inches) from the approximate centers. Overall, the areas of contact comprised a longitudinal distance of 5.91 feet (5 feet, 11 inches).⁵ The lateral distance between the Tesla's A-pillars measured approximately 5.25 feet (5 feet, 4 inches) at the widest point.

As measured in a static position, the vertical clearance below the trailer was approximately 3.42 feet. This measurement is approximately 1.29 feet lower than the published maximum

⁵ The rear most area of contact covered a longitudinal distance of about 1.5 feet (22¹¹-24⁵) while the forward most covered about 7 inches (28³-28¹⁰).

vertical height of the Tesla.⁶ The overall vertical height of the trailer measured approximately 13.3 feet, resulting in a sidewall surface area of just under 525 square feet.

Figure 6 depicts certain dimensional data as measured from the 3D scan point cloud.

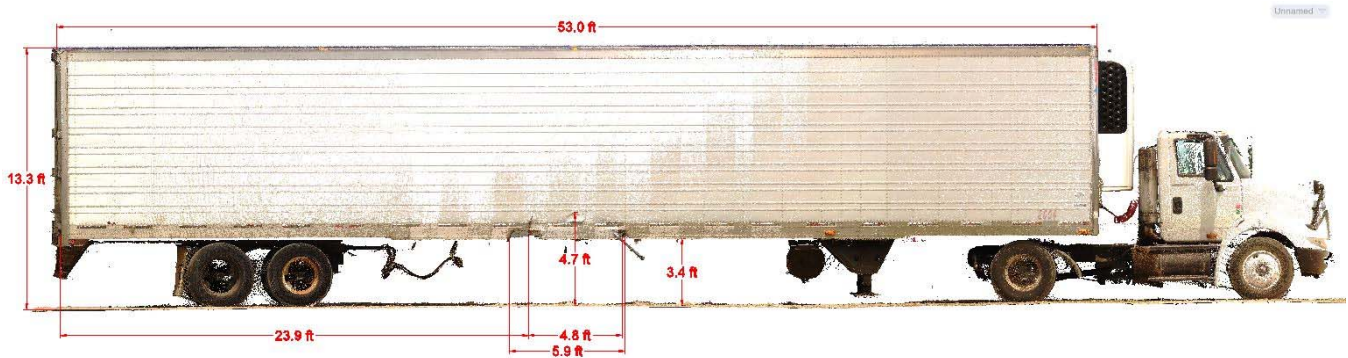


Figure 4: Screen capture image depicting certain dimensional measurements for the semitrailer acquired from the 3D scan point cloud. The truck tractor depicted in the image is not the involved Freightliner.

Figure 7 depicts a photograph of the trailer's right side damage.



Figure 5: Photograph depicting impact damage to the right side of the semitrailer. A segment of front windshield trim from the Tesla is entrapped in the forward most area of damage.

Damage to the left (driver) side of the semitrailer exhibited an outward displacement of the lower sidewall rail, but to a lesser extent than the right side. The left side areas of damage were similarly separated as observed on the right side, but were slightly forward. Figure 8 depicts a slice of the 3D point cloud at the level of the damage.

⁶ Although the static vertical measurements of the contact points between the two vehicles indicate an approximate 3-inch difference, vehicle movement and pre-collision vehicle condition likely account for this difference.

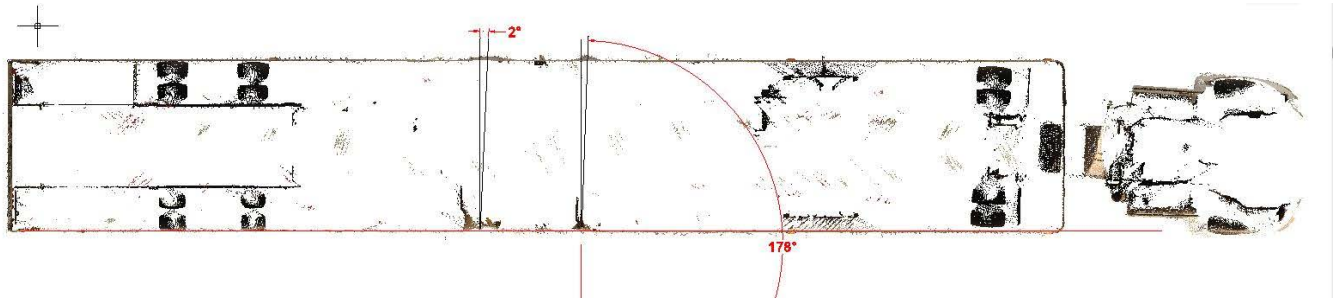


Figure 6: 3D point cloud slice depicting trailer damage at the lower sidewall.

Additional details concerning the two vehicles is available in the NTSB Vehicle Factors Group factual report.

3. Vehicle Electronic Data

Certain electronically recorded data was available from the Tesla and Freightliner truck tractor. While neither vehicle was equipped with a crash event data recorder (EDR), both had systems that either recorded, or were capable of recording certain events or vehicle operating conditions. The sections that follow offer a summary of certain aspects of the electronic data retrieved from each vehicle. The NTSB Recorders Group factual report should be consulted for more specific details.

3.1. Tesla

As a matter of routine operation, the Tesla electronically recorded a wide range of non-geographical operational data that was retrievable with the assistance of the manufacturer after the crash. While substantial data covering the operational life of the vehicle was available, the NTSB Technical Reconstruction Group was interested in data potentially related to events around the time of the collision. While certain data parameters are updated on a regular basis, others are event or change of state driven, such as fault detection. The manufacturer provided assistance with interpretation of the data.

As indicated by the data time stamp, preceding the collision the vehicle cruise control was set to a speed of 74 mph beginning at 4:34:21 PM⁷, although the cruise control had been engaged at slightly lower speeds preceding this setting.⁸ Before the setting at 74 mph, the record indicated a cruise control setting of 73 mph at 4:34:11 PM. The reported vehicle speed remained steady at about 74 mph (73.85-74.15 mph) until the collision. Vehicle speed data was reported by the power train drive inverter every tenth of a second.

The first indication of the collision occurred at a time stamp of 4:36:12.7 PM (approximately 75.7 seconds after the cruise control reported a change in setting to 74 mph) when several fault codes and system communications errors were triggered. Fault codes continued to accrue as a power down was commanded. Vehicle speed data continued to be reported and

⁷ Data time stamps were reported as Pacific Daylight Time and were converted to local time for this report.

⁸ Data indicates that the reported cruise control speed setting was updating every 10 seconds.

exhibited a steady decrease until reporting zero. Throughout the approach to the impact with the semitrailer, the data reported by the electronic power assist steering exhibited no substantial changes in the recorded steering angle. The steering angle data, normally reported approximately once per second by the electronic power steering assist system, remained consistent until the collision after which the data continued to report the same value.

Approximately 9.7 seconds before the collision (4:36:03 PM) data representing the motor torque demand began to exhibit a steady decrease (note that highway exhibits a descending grade). The reported demand dropped to zero at the time of the first fault report. During this time, there was no indication of brake application as reported by the status of the brake lamp switch activation.

At 4:36:21.1 PM, the airbag telltale lamp reported “on”, indicating that an airbag had deployed or a supplemental restraint system fault had been detected. Post-collision observations revealed that both driver and passenger side frontal airbags and knee airbags, as well as the driver’s side airbag had deployed. At 4:36:21, $\frac{1}{10}$ th second earlier, the recorded vehicle speed was 49.05 mph. The vehicle speed was reported at zero at about 4:36:28 PM, just under 16 seconds after the collision with the semitrailer.

While additional data reported that the headlights were “off”, it could not be determined whether the vehicle’s daytime running lights (DRL) were active. According to the vehicle owner’s manual, automatic activation of the DRL can be overridden by the operator when the vehicle is powered up.

3.2. Freightliner tractor

The engine of the 2014 Freightliner was managed by a Detroit Diesel Electronic Controller (DDEC) that had the capability to record certain parametric data associated with the operation of that vehicle. The DDEC version was not identified. FHP investigators acquired a copy of a data download report from a third party who accessed the control module on May 10, 2016. The FHP subsequently provided a copy of the 40-page report to NTSB investigators. Although no collision related events were recorded, the data provided some overview of the vehicle’s operation for almost two and a half months preceding the collision.

While time references in the data appeared to represent Eastern Standard Time, there was no indication that the electronic control module (ECM) clock was synchronized with, or adjustment to, local time during the download. The dates appeared reasonably accurate based on the final recorded events, but the times exhibited no synchronization to the local time. The DDEC report conveyed the following data:

- “Configuration Data” that conveyed certain programmed operating and reporting settings or thresholds. The report conveyed that a hard “brake event” trigger threshold, of which two could be recorded, was set for deceleration that met or exceeded a decrease in speed of 7 mph/sec (~.32 g) and a “firm brake” event would be set at 4 mph/sec (~.18g).
- “Life-to-Date” summary that conveyed certain total counts for specified parameters. The period covered by the “life to date” was reported as 07/21/15 to 05/10/16. Included within the life-to-date data were graphic and tabular data

conveying “Vehicle Speed versus RPM”, “Engine Load versus RPM” and occurrences of “Overspeed/Overrev”.

- “Trip Activity” data summary that conveyed certain total counts and maximum levels for the reported parameters. While trip activity data can be reset, it covered the same period as the life-to-date data.
- “Daily Engine Usage” data summaries that depicted graphically and in tabular form a time line of engine operation during the period of 2/29/16 through 5/10/16 just under 2½ months (up to 3 months of data recording is typical).
- “Monthly” or “Partial Monthly” summary for February and April 2016 – representing total counts for certain parameters similar to the trip activity.

Neither the recorded hard brake nor last events were associated with the collision. While two hard brake events were recorded, they were date stamped 4/27/16 and 4/30/16 with mileage that predated the final records by 2912.0 and 454.9 miles respectively. The last stop was recorded on 5/8/16 at a mileage of 301509.9 and exhibited a maximum pre-stop speed of 12 mph. Daily engine use data indicates that the vehicle moved about ½ mile that day. The last stop record is overwritten once the vehicle is placed in motion and the speed exceeds 1.5 mph.

Examination of daily engine usage data for 30 days preceding crash date concluded that engine was operated for a total of 16 days and 128 hours (112.74 driving and 15.26 at idle) for a calculated average of 8 hours/day and a total mileage of 6535.8. On the day of the crash, the daily engine use data reported that the vehicle traveled 226.1 miles with a driving time of 4h 37m (hour/minutes). Likewise on that day the engine and “off” times were reported as 1h 25m and 17h 58m respectively.

Table 2 represents a summary of the daily engine use during the approximate two and half months preceding the crash.

Table 2: Summary of daily engine use as conveyed by the DDEC module download report.

Daily engine use report

| Date | Recorded driving hours | Recorded idle hours | Start-up mileage | Approximate daily mileage |
|-----------|------------------------|---------------------|------------------|---------------------------|
| 5/10/2016 | 0.00 hrs | 0.00 hrs | 301509.9 | |
| 5/8/2016 | 0.07 hrs | 0.27 hrs | 301509.4 | 0.5 |
| 5/7/2016 | 4.62 hrs | 1.02 hrs | 301283.3 | 226.1 |
| 5/6/2016 | 4.27 hrs | 1.02 hrs | 301102.4 | 180.9 |
| 5/3/2016 | 0.42 hrs | 0.25 hrs | 301088.6 | 13.8 |
| 5/2/2016 | 0.30 hrs | 0.48 hrs | 301082.0 | 6.6 |
| 5/2/2016 | 0.57 hrs | 0.25 hrs | 301063.1 | 18.9 |
| 4/30/2016 | 9.02 hrs | 0.27 hrs | 300465.9 | 597.2 |
| 4/29/2016 | 14.00 hrs | 0.63 hrs | 299607.2 | 858.7 |
| 4/28/2016 | 5.33 hrs | 1.38 hrs | 299374.0 | 233.2 |
| 4/27/2016 | 13.25 hrs | 1.73 hrs | 298660.5 | 713.5 |
| 4/26/2016 | 12.12 hrs | 1.52 hrs | 297953.0 | 707.5 |
| 4/25/2016 | 5.23 hrs | 2.95 hrs | 297689.0 | 264.0 |
| 4/22/2016 | 0.90 hrs | 0.47 hrs | 297660.4 | 28.6 |
| 4/19/2016 | 6.92 hrs | 0.55 hrs | 297203.1 | 457.3 |
| 4/18/2016 | 11.82 hrs | 0.90 hrs | 296472.5 | 730.6 |
| 4/17/2016 | 11.95 hrs | 0.97 hrs | 295727.3 | 745.2 |
| 4/16/2016 | 12.02 hrs | 0.87 hrs | 294973.6 | 753.7 |
| 4/4/2016 | 0.15 hrs | 0.27 hrs | 294971.9 | 1.7 |
| 4/1/2016 | 0.00 hrs | 0.43 hrs | 294971.9 | 0.0 |

| Total days | Total driving hours | Total idle hours | Total mileage | |
|------------|---------------------|------------------|---------------|--------|
| 20 | 112.96 hrs | 16.23 hrs | 6538.0 | 6538.0 |

| Days before crash | Driving hours | Idle hours | Total hours | Hours per day | Total mileage |
|-------------------|---------------|------------|-------------|---------------|---------------|
| 18 | 112.89 hrs | 15.96 hrs | 128.85 hrs | 7.16 hrs | 6537.5 |

| 30 days preceding crash | Driving hours | Idle hours | Total hours | Average hours per day | Total mileage |
|-------------------------|---------------|------------|-------------|-----------------------|---------------|
| 16 | 112.74 hrs | 15.26 hrs | 128.00 hrs | 8.00 hrs | 6535.8 |

Figure 9 depicts a graphical representation of the daily engine usage and recorded start-up mileage.

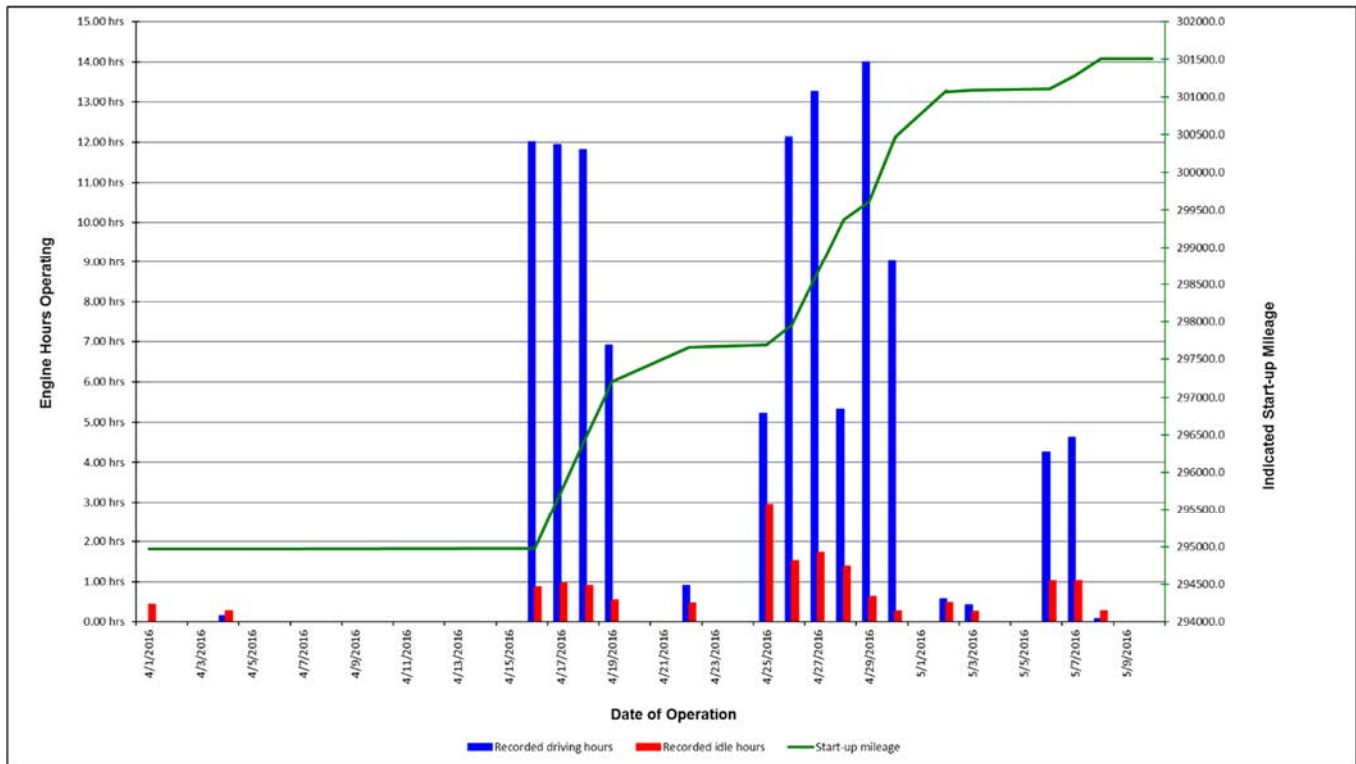


Figure 7: Graphical representation of the recorded daily usage data to include driving and idle hours and associated start-up mileage.

4. Astronomical data

The collision occurred during daylight hours. Weather conditions as recorded at the Ocala International Airport, located approximately 25.3 miles southeast of the crash, indicated clear skies. Based on the geographic location of the collision intersection, the sun azimuth and altitude were calculated using an U.S. Naval Observatory, Astronomical Applications Department application. As reported at 4:30 PM the sun azimuth was 264.2° or about 24° left (south) relative westbound highway, at an elevation angle of 46.4°. By 4:40 PM, the azimuth had increased to 265.6° and the elevation angle decreased to 44.2°.

Relative to highway orientation, the westbound direction was more likely to experience any debilitating effects from sun glare. From the intersection, a driver’s line of sight would be about 4-5° toward the grade crest. At about the time of the crash the sun azimuth would be 19-20° further left of a westbound driver’s line of sight. The elevation would not likely create direct glare, although specular reflections from oncoming vehicle surfaces could occur.

5. Driver line-of-sight

While the highway exhibited a heading that was straight, the line of sight available to opposing drivers operating near the intersection was affected by the highway crest vertical curve west of the intersection. Using the highway plan and profile data provided by FDOT, sight line distance for the left turning combination vehicle was calculated. Based on a truck driver average eye height of 7.6 feet and a distant target height of 3.5 feet, the sight line distance was calculated at 1,135 feet as measured from the area of impact.⁹ The calculated sight lines exceed the minimum AASHTO recommendations.

Similar sight line calculations were made for the eastbound Tesla driver, although the driver eye height was decreased to 3.5 feet as recommended for passenger vehicles in the AASHTO reference. The sight line distance for the eastbound passenger vehicle was calculated to be approximately 1,075 feet from the area of impact. The slight decrease in the calculated distance of the eastbound passenger vehicle is due to the difference in driver eye heights. However, the taller truck would represent a larger target.

Figure 10 depicts a site diagram with the sight line distance measurements highlighted in the eastbound travel lanes.

⁹ AASHTO (American Association of State Highway and Transportation Officials) *A Policy on Geometric Design of Highways and Streets* recommends an average eye height of 7.6 feet for truck drivers. A target height of 3.5 feet is recommended for passing and intersection sight distances. See section 3.2.6 Criteria for Measuring Sight Distance.

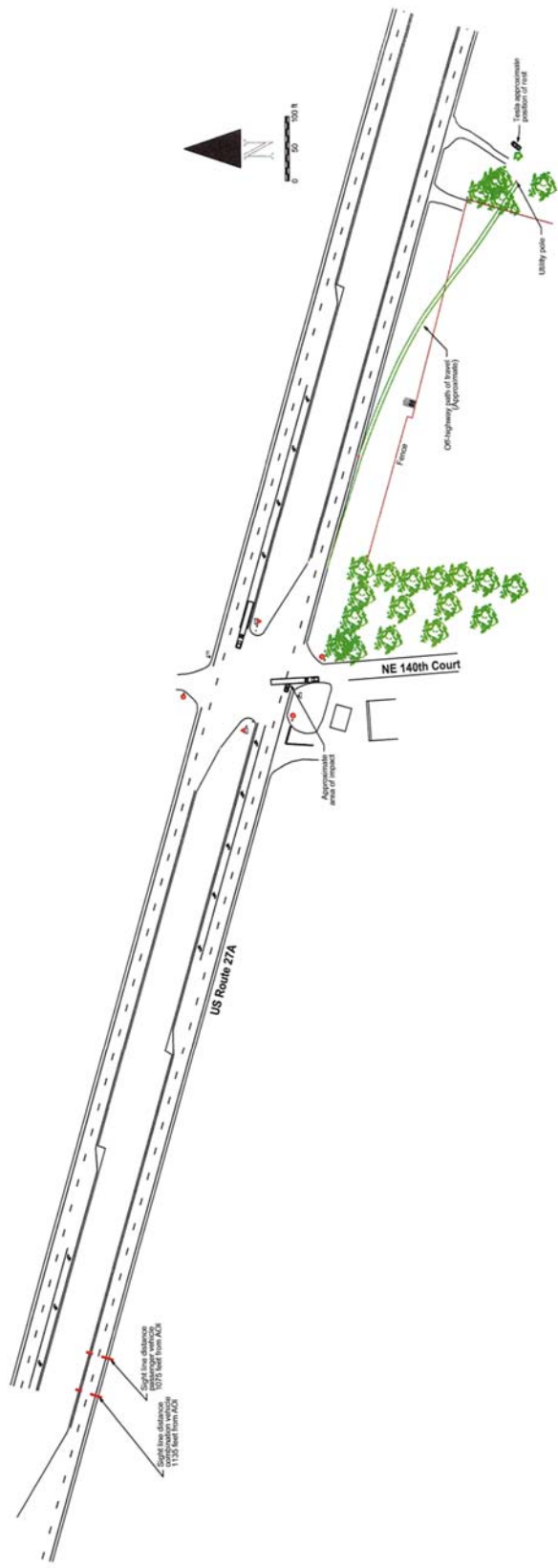


Figure 8: Crash site diagram depicting sight line distances as measured from the area of impact.

6. Witness – driver statement information

FHP investigators identified one witness to the collision. The witness submitted to a recorded interview with an FHP investigator on May 17, ten days after the crash. In that interview, the witness described traveling westbound on US-27A east of the intersection with NE 140th Court where the collision occurred. When the tractor-semitrailer combination was first observed, it was already in the left turn lane at the intersection, although the witness could not discern whether the truck was stopped or moving very slowly. No other traffic was observed in the area when the truck was first sighted.

The witness described seeing the Tesla crest the grade before the truck began its left turn and crossed the median. The Tesla was described as likely traveling in the right and did not appear to be moving at an excessive speed. The truck continued through the median at a slow speed and across the eastbound lanes. The impact was described as a white dust cloud after which the Tesla emerged from beneath the semitrailer.

As the impact occurred, the witness described having reached the westbound left turn lane for the intersection. The witness was able to slow and make a U-turn at the intersection after which a phone call was placed to 9-1-1 as the witness chased after the Tesla. The Tesla had departed the roadway but continued eastward and the witness caught up with it after it came to rest in the driveway of a private residence.

The witness told the FHP investigator that neither an obstruction to the line of sight nor sun glare were present to westbound traffic at the time of the crash.

NTSB Investigators had an opportunity to speak with the witness at his residence on July 14, 2016, just over two months after the crash. In that interview, the witness's description of the events was consistent with that provided to the FHP, although additional detail was provided in response to specific questions.

The witness stated that he was traveling westbound at about 60 mph when the truck was observed at the intersection further west. The truck was described as being in the left turn lane facing west, parallel with the travel lane. The witness was unable to discern whether the truck was stationary or moving slowly. As the witness continued toward the intersection a car, which was later identified as the Tesla, was observed to crest the grade traveling eastbound toward the intersection. The witness described seeing the Tesla for several seconds before the truck began to turn through the median.

The witness described the truck as moving at a slow but steady speed – it did not appear to suddenly increase or decrease speed as it continued toward the eastbound roadway. The Tesla was described as traveling at steady speed that did not appear to the witness as excessive. There was no detectable change in speed or heading by the Tesla as it approached the intersection. The witness described watching the Tesla for about 2-3 seconds as it approached the intersection.

As the truck began to enter the eastbound lanes, the witness lost sight of the Tesla, which was now on the far side of the truck. The witness described the rear tires of the semitrailer as occupying the left eastbound lane as a white dust cloud, “like an explosion”, was observed around the trailer. Immediately thereafter the Tesla emerged from the near side of the trailer and continued

eastward without any observable loss of speed. The witness was able to rapidly slow and make a U-turn at the intersection and chase after the Tesla.

The witness described seeing the Tesla travel off the right side of the highway. As the vehicle traversed the roadside, the witness described seeing the driver “bouncing” vertically “up and down”. The witness was unsure of the driver’s condition and was concerned that the vehicle did not initially appear to be slowing. The witness continued eastbound on the highway as the Tesla continued through a field and passed between a several trees.

The witness intercepted the Tesla as it came to a stop in the driveway of a private residence. The witness noted that the Tesla had struck, and severed a nearby utility pole. Walking to within 10 to 15 feet of the vehicle, the witness could see that the driver has sustained severe head trauma and exhibited no movement. After another call to 9-1-1, the witness reported that a county sheriff’s deputy arrived within about 10-15 minutes.

The witness conveyed that another motorist, who had been further to the east also traveling westbound, had arrived at the driveway first, after cutting across the median further east. When interviewed by FHP investigators, this second witness stated that they had not seen the collision, only the Tesla traveling off the highway. This witness did not respond to a request from NTSB investigators for an interview.

The witness stated that he remained in the driveway near the Tesla for at least an hour while police and fire personnel tended to the scene. The witness stated that at no time did he hear or see any evidence of a video, or other audio/visual entertainment device playing. The witness also stated that while on the scene no one other than police and fire personnel were seen near the vehicle.

In concluding the interview, the witness offered the opinion that both drivers had sufficient time to have seen the other vehicle and should have been able to slow or stop sufficiently to have avoided the crash.

Investigative work conducted by NTSB investigators included an attempt to interview the driver of the combination vehicle. Through an attorney, the truck driver declined to be interviewed. FHP investigators stated that they spoke with the truck driver, but took no written or recorded statement. FHP stated only that the driver reported not seeing the Tesla before beginning his turn. The driver reportedly described the impact as not substantially noticeable and that he had no indication what was struck or run-over until he stopped and assessed the situation.

E. DOCKET MATERIAL

The following attachments and photographs are included in the docket for this investigation:

LIST OF ATTACHMENTS

- Freightliner DDEC report

LIST OF PHOTOGRAPHS

None

END OF REPORT

Robert Squire
Highway Accident Investigator