



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

**HUMAN PERFORMANCE GROUP CHAIRMAN'S
FACTUAL REPORT**

A. CRASH INFORMATION

Location: 14000 block US 441, Delray Beach, Palm Beach County, Florida
Vehicle 1: 2019 International truck-tractor in combination with a 2008 Vanguard semi-trailer
Operator 1: FirstFleet, Inc., Murfreesboro, Tennessee
Vehicle 2: 2018 Tesla Model 3
Operator 2: Private Operator
Date: March 1, 2019
Time: Approximately 6:17 a.m. (local time)
NTSB #: **HWY19FH008**

B. HUMAN PERFORMANCE GROUP

Rafael Marshall, Human Performance 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, which can be found in the docket for this investigation.

D. DETAILS OF THE HUMAN PERFORMANCE INVESTIGATION

This Human Performance factual report focused on the behavioral, medical, operational, and environmental factors associated with both the International driver and Tesla driver.

1. International Driver

1.1. Background Information

The International driver was a 45-year-old male who was 5’8” tall and weighed approximately 185 pounds. The driver originally obtained his commercial driver’s license in 2003. He attended a truck driver training course at Wallace State Community College, which he stated he completed in 5 weeks.¹ He held a Florida Class A commercial driver’s license (CDL) with no restrictions and with endorsements for doubles, triples, and tankers. His CDL was renewed in January 2016 and expired November 2024. His medical certificate was valid for two years and expired November 2019. The driver’s Florida license history indicated that he was involved in a property damage crash in February 2017, for which he was cited. He was also convicted of speeding in February 2016 in a noncommercial vehicle.

The International driver joined FirstFleet in December 2015. He completed three days of training that included a road test and instruction on the electronic logging device (ELD) used to record hours of service. FirstFleet dispatched him on local routes for his first 3 months to familiarize him with the Tampa Bay region. Prior to the crash, the driver worked 55-60 hours per week making deliveries throughout Florida. He did not have a set route and was dispatched via a FirstFleet phone application.

1.2. Pre-Crash Activities

Table 1 and Figure 1 summarize the International driver’s activities, based on his statements to investigators, phone records, electronic logs, and surveillance video.^{2,3} The driver performed shiftwork and did not have a set schedule. In the month prior to the crash, he began his shift between 11 p.m. to 6 a.m. and was on duty from 1.5 hours to 11 hours, with most shifts being 7-9 hours in length. According to dispatch records, his shift on the day of the crash consisted of driving to Pero Family Farms in Delray Beach before parking the truck and ending his shift at the International Paper facility in Tampa, Florida. According to the driver, his commute home to approximately 35 minutes.

Table 1. International driver’s activity summary based on phone records and electronic logs.

Time	Activity	Location	Source
Monday, February 25, 2019			
10 p.m.	Awoke	Tampa area	Interview
10:58 p.m.	On-duty	Temple Terrace, FL	Logs
11:00 p.m.	Driving	Temple Terrace, FL	Logs
Tuesday, February 26, 2019			
12:00 a.m.	Driving	Sarasota, FL	Logs
1:09 a.m.	On-duty	Fort Myers, FL	Logs
1:21 a.m.	Driving	Fort Myers, FL	Logs
3:40 a.m.	On-duty	Miami Lakes, FL	Logs

¹ According to the Wallace State website, the commercial truck driver training course is an instructional program that assist students with the knowledge and skills necessary to prepare to sit for their commercial driver’s license.

² Human Performance Attachment – NTSB Interview with Truck Driver; Human Performance Attachment – Truck Driver Electronic Logs.

³ Human Performance Attachment – Truck Driver Phone Text Records. The International driver’s phone calls did not factor into the determination of sleep/wake times or driver distraction and are, therefore, not included in the attachment.

5:35 a.m.	Driving	Miami Lakes, FL	Logs
7:18 a.m.	On-duty	Clewiston, FL	Logs
7:32 a.m.	Driving	Clewiston, FL	Logs
10:09 a.m.	On-duty	Temple Terrace, FL	Logs
10:21 a.m.	Driving	Temple Terrace, FL	Logs
10:25 a.m.	On-duty	Temple Terrace, FL	Logs
10:27 a.m.	Off-duty	Temple Terrace, FL	Logs
2:18 p.m.	Last text of the day	N/A	Phone records
Wednesday, February 27, 2019			
6 a.m.	Awoke	Tampa area	Interview
12:17 p.m.	First text of the day	N/A	Phone records
3:15-3:16 p.m.	Text conversation	N/A	Phone records
6:28 p.m.	Text conversation	N/A	Phone records
10 p.m.	Awoke	Tampa area	Interview
11:15 p.m.	On-duty	Temple Terrace, FL	Logs
11:20 p.m.	Driving	Temple Terrace, FL	Logs
Thursday, February 28, 2019			
1:15 a.m.	First text of the day	N/A	Phone records
4:14 a.m.	On-duty	Miami Lakes, FL	Logs
5:09 a.m.	Driving	Miami Lakes, FL	Logs
6:54 a.m.	On-duty	Clewiston, FL	Logs
7:15 a.m.	Driving	Clewiston, FL	Logs
10:23 a.m.	On-duty	Temple Terrace, FL	Logs
10:25 a.m.	Off-duty	Temple Terrace, FL	Logs
6 p.m.	Went to bed	Tampa area	Interview
6:38 p.m.	Last text of the day	N/A	Phone records

Friday, March 1, 2019			
1 a.m.	Awoke	Tampa area	Interview
2:06 a.m.	On-duty	Temple Terrace, FL	Logs
2:13 a.m.	Driving	Temple Terrace, FL	Logs
4:27 a.m.	First text of the day	N/A	Phone records
5:33 a.m.	Last text before crash	N/A	Phone records
5:49 a.m.	Entered Pero Family Farms	Delray Beach, FL	Surveillance
6:02 a.m.	On-duty	Delray Beach, FL	Logs
6:15 a.m.	Driving	Delray Beach, FL	Logs
6:16 a.m.	Departed Pero Family Farms	Delray Beach, FL	Surveillance
6:16 a.m.	Crash	Delray Beach, FL	N/A

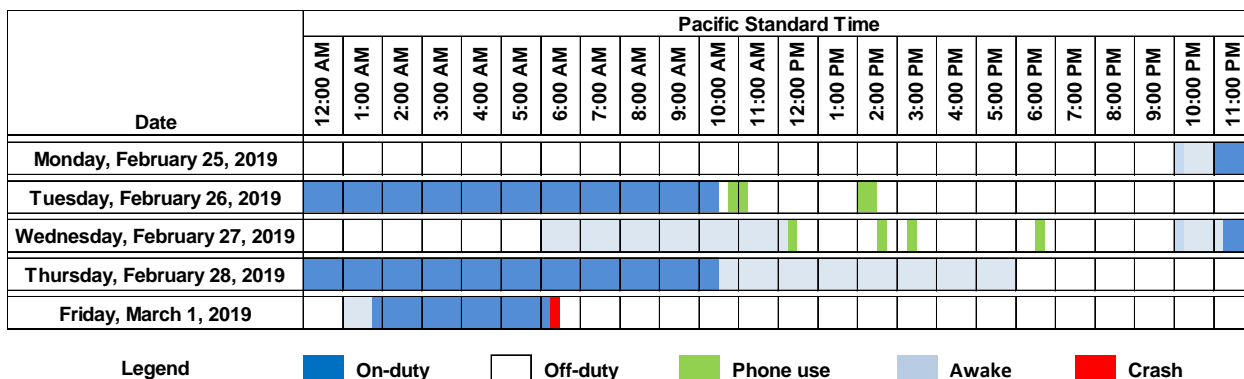


Figure 1. Verified International driver activity chart, based on interview, phone use, and electronic logs.

The International driver was interviewed by NTSB investigators on March 5, 2019. According to the driver, he began his shift around 2 a.m. He hooked up the trailer, performed a pretrip inspection, and began driving around 2:15 a.m. He stated he arrived at Pero Family Farms in Delray Beach at 5:40 a.m.⁴ He released his trailer in a grass field parking near other FirstFleet trailers and hooked up an empty trailer. He had paperwork signed by the receiver and went to the restroom. He performed a pretrip inspection on the trailer, then proceeded towards the entrance gate of Pero Family Farms. According to the International driver, after exiting the Farm, he pulled up at the stop sign and surveyed the southbound traffic. He felt that he had plenty of time to cross US 441, so he proceeded into the intersection with the intent of making a left turn into northbound US 441. Once his tractor was in the crossover, he began looking for northbound traffic. He restated that he thought he had plenty of time to make the maneuver but added that it was dark, and the cars looked like they were further away than they were. He was about to make a left turn into the northbound lanes on US 441 when he felt a push against his trailer. He drove the tractor forward about 10 feet and exited the cab to inspect his trailer. He saw debris and scuff marks on the side of the trailer. He called out to a minivan parked on the right-hand side of the road who confirmed that a vehicle hit his trailer. Not seeing the other vehicle, the International truck driver called FirstFleet

⁴ The surveillance video from the facility indicated that he arrived at 5:49 a.m.

to inform them that he had been involved in a hit and run. He stated that he was just about to call 9-1-1 when he noticed first responders 200 yards south of his location. He learned shortly after that the driver of the other vehicle had died from the collision.

Later in the interview, the International driver stated that prior to attempting to cross the intersection, he noticed two southbound vehicles. He thought the vehicle in the right lane “flickered their (sic) lights, which he interpreted as meaning it would slow to allow him to cross US 441. He stated that it was dark, and it was difficult to judge the speed of the vehicles due to the nighttime conditions. The brightness of halogen and light-emitting diode (LED) headlights also made judging the vehicles’ relative position difficult. He also mentioned that traffic along that section of US 441 can be heavy and wondered why there wasn’t a traffic light at that intersection.

1.3. Toxicology

A sample of the truck driver’s blood was not taken by law enforcement and the driver was not taken to the hospital after the crash. FirstFleet ordered the driver to submit to a post-crash urinalysis and breath test. A urine sample was collected at 11:56 a.m. on the day of the crash. Based on this sample, the driver was negative for common drugs of abuse.⁵ The breath test taken around the same time was negative for alcohol.⁶

1.4. Health History

Investigators interviewed the driver and learned that he had a history of seizures but he claimed not to have experienced a seizure since he was 14, and he stated that he continued to take anti-seizure medication as a precaution. See the *Medical Factual Report* for additional information. The driver also mentioned that he had issues with his left eye and had worn glasses prior to 2011; but that he had eight surgeries in each eye around 2011, including refractive surgery, to improve his eyesight. During that time, he chose to have the vision in his left eye optimized for distance and the vision in his right eye optimized for reading (monovision). He described his current vision as ‘really good,’ claiming 20/10 vision in his left eye and 20/20 in his right eye.

FirstFleet provided investigators with copies of the driver’s past two DOT medical certificates but stated that the company did not keep the DOT long forms in the driver’s file. Investigators were able to obtain the driver’s two most recent long forms from the certified medical examiner’s office. According to his DOT long form, dated December 8, 2015, the driver denied having any health issues, including a history of seizures. He also did not list any prescribed medications on the form. Upon examination, the medical examiner noted no issues with the driver, and granted him a two-year medical certificate. On his DOT long form, dated November 19, 2017, the driver again denied having any health issues, and indicated that he did not take any prescription or over-the-counter medications.⁷ He reported to the certified medical examiner that he had 3

⁵ The sample was tested for marijuana, phencyclidine, cocaine, opiates, and amphetamines. See Human Performance Chairman’s attachment entitled, “Post Drug and Alcohol Test Results.”

⁶ According to 49 Code of Federal Regulations 382.303, an employer shall attempt to administer a post-crash alcohol test within 2 hours of a crash and shall cease attempts 8 hours after the crash. If the employer is not able to administer an alcohol test within 2 hours, it shall prepare and maintain on file a record stating the reasons the test was not promptly administered. Controlled substance test shall be administered 32 hours after a crash.

⁷ Primary care physician records indicate that the driver had prescriptions for several medications, including an anti-seizure medication. None of the other medications prescribe to him were incapacitating.

surgeries in the past 7 years, including eye surgery. The driver passed the vision examination, and the medical examiner noted no other issues with the driver. He was again granted a two-year medical certificate.

The literature on monovision refractive surgery indicate that it can lead to a decrease in contrast sensitivity and stereopsis for some patients when compared to full distance correction.⁸ Both the Federal Aviation Administration (FAA) and the Federal Motor Carrier Safety Administration (FMCSA) allow pilots and commercial drivers, respectively, to operate after monovision refractive surgery. The FAA 2019 Guide For Aviation Medical Examiners states “applicants who have had monovision secondary to refractive surgery may be certificated, providing they have corrective vision available that would provide binocular vision in accordance with the vision standards, while exercising the privileges of the certificate.”⁹ The FMCSA allows commercial drivers to operate with monovision provided that drivers pass the vision standards described in the FMCSA Medical Examination Report form MCSA-5875.^{10,11} Both the FAA and the FMCSA do not allow pilots and commercial drivers, respectively, to use monovision contact lens when operating their vehicle (i.e., wearing contact lenses in one eye for near vision and in the other eye for distant vision).

The NTSB addressed monovision in an aviation crash that occurred in 1996.¹² A McDonnell Douglas MD-88, N914DL, operated by Delta Air Lines, Inc., as flight 554, struck the approach light structure and the end of the runway deck during the approach to land on runway 13 at the LaGuardia Airport, in Flushing, New York. Three passengers reported minor injuries; no injuries were reported by the remaining 60 occupants. The NTSB determined that the probable cause of this crash was the inability of the captain, because of his use of monovision contact lenses, to overcome his misperception of the airplane’s position relative to the runway during the visual portion of the approach. This misperception occurred because of visual illusions produced by the approach over water in limited light conditions, the absence of visible ground features, the rain and fog, and the irregular spacing of the runway lights. The NTSB issued several recommendations that address monovision, including four to the FAA that are currently classified as “closed – acceptable action:”

Revise FAA Form 8500-8, “Application for Airman Medical Certificate,” to elicit information regarding contact lens use by the pilot/applicant. (A-97-86)

⁸ Garcia-Gonzalez M, Teus MA, Hernandez-Verdejo JL. Visual outcomes of LASIK-induced monovision in myopic patients with presbyopia. *American Journal of Ophthalmology*. 2010 Sep, 150(3), pp. 381-386; Alarcón A, Anera RG, Villa C, Jiménez del Barco L, Gutierrez R. Visual quality after monovision correction by laser in situ keratomileusis in presbyopic patients. *Journal of Cataract Refractive Surgery*. 2011 Sep, 37(9), pp. 1629-1635.

⁹ FAA 2019 Guide For Aviation Medical Examiners, August 28, 2019, Page 54.

¹⁰ Standard is at least 20/40 acuity (Snellen) in each eye with or without correction. At least 70° field of vision in horizontal meridian measured in each eye.

¹¹ <https://www.fmcsa.dot.gov/advisory-committees/mrb/fmcsa-medical-examiner-handbook>. Accessed September 12, 2019.

¹² National Transportation Safety Board. *Descent Below Visual Glidepath and Collision with Terrain Delta Air Lines Flight 554 McDonnell Douglas MD-88, N914DL, LaGuardia Airport, New York, October 19, 1996*.

Require the Civil Aeromedical Institute to publish and disseminate a brochure containing information about vision correction options, to include information about the potential hazards of monovision (MV) contact lens use by pilots while performing flying duties and to emphasize that MV contact lenses are not approved for use while flying. (A-97-87)

Require all 14 CFR Part 121 and 135 operators to notify their pilots and medical personnel of the circumstances of this accident, and to alert them to the hazards of monovision contact lens use by flightcrew members. (A-97-88)

Require all flight standards district office air safety inspectors and accident prevention specialists to inform general aviation pilots of the circumstances of this accident and to alert them to the hazards of monovision contact lens use by pilots while flying. (A-97-89)

1.5. Fatigue

According to the International driver, after his shift ended, he would pick his daughter up from school around 11 a.m. and watch her until his wife arrived home at 6 p.m. Once she arrived, the International driver would go to bed and sleep until it was time for his next shift. He described his sleep as sound. He would generally awake between 10 p.m. and 11 p.m. to get ready for work or to take a pill for a stomach ailment.

The International driver was off work from around 10:30 a.m. Tuesday, February 26, until about 11 p.m. Wednesday, February 27. Due to some confusion during the interview, investigators were unable to determine how much sleep the driver obtained during his day off; however, he did sleep during the night and awoke at 6 a.m. He slept again Wednesday evening around 6 p.m. before beginning his shift at 11:15 p.m. On Thursday night, the International driver slept from 6 p.m. until 1 a.m. before the shift that would result in the crash at Delray Beach.

1.6. Electronic Evidence

The International tractor was equipped with an Omnitrac system that functioned as the vehicle's electronic logging device and global positioning system (GPS). The system also allowed text communications between the driver and the dispatcher. When asked about the device, the International driver stated that the last time he interacted with the system was prior to leaving the Pero Family Farms facility. The system would lock the driver out once the vehicle moving. The driver did not know about the device's texting capability at the time of the interview.

The International driver stated that he had one cell phone, and it was his personal device (not issued by FirstFleet). He stated that at the time of the crash, the cell phone was on top of the dash of the tractor, near the windshield. The International driver utilized a wired headset during calls, but it was not in his ears at the time of the crash. Based on phone records, the International driver's last interaction with the phone was at 5:33 a.m.¹³

Video was obtained from surveillance cameras at Pero Family Farms and from the Tesla. As mentioned previously, surveillance video indicated that the International driver arrived at Pero

¹³ Cell phone records obtained by NTSB investigators did not show texts and calls made through downloaded applications. Investigators were unable to conduct a forensic analysis on the physical phone of the International driver.

Family Farms at 5:49 a.m. and departed at 6:16 a.m. The video also showed that as the International driver approached the stop sign at the end of the private driveway, he applied his brakes and slowed but did not come to a full stop before entering US 441. He entered US 441 after a southbound vehicle passed. He continued across US 441 towards the northbound lanes and applied the brakes as the tractor entered the crossover. The Tesla collided with the bottom of the semitrailer about one second after the brake application and it continued south on US 441 after the collision. After the collision, the International driver parked his vehicle in crossover with the cab facing north. He exited the cab to inspect the trailer. Video from another Pero Family Farms surveillance camera positioned south of the main entrance showed the Tesla continuing south on US 441 at a reduced speed, with its headlights and taillights still on.

The Tesla was equipped with a forward-facing camera that recorded video up to the point of the crash. The contents of this recording are detailed in the *Technical Reconstruction Group's Chairman Report*.

2. Tesla Driver

2.1. Background Information

The Tesla driver possessed a Class E noncommercial license that was issued 2012 and expired October 2020. The license was replaced November 2018. The reason for the replacement is not known, but it occurred within a year of Florida switching to a more secure form of driver's licenses. On his license was the designation "Safe Driver." According to the Florida Statutes, the "Safe Driver" designation indicated that, when the driver renewed his license in 2012, he did not have any revocations, disqualifications, or suspensions for the preceding 7 years or any moving violation convictions for the preceding 3 years.¹⁴

On March 28, investigators conducted a telephone interview with the Tesla driver's spouse and legal counsel.¹⁵ According to his spouse, the driver had bought the Tesla in December 2018 because it combined two of his passions – cars and computers. He had researched the car for several years before purchasing one. The driver enjoyed driving the car said nothing negative about it. He had taken it to the dealership only once to address a screeching sound from the brakes. The two other times he had an issue, he was able to have the issue addressed with a call to Tesla. On one of those occasions, the charger would not disengage from the port of the car. She did not remember the other issue for which he called Tesla. The Tesla driver's spouse stated that she had ridden in the Tesla with the driver when he used the Autopilot option.¹⁶ She described the Tesla driver as always vigilant and during those occasions.

According to his spouse, the weekend before the crash, the Tesla driver had spent time with a visiting relative, and he had also been preparing for another relative to visit the following weekend. In addition, his spouse's mother was recuperating from sickness at their house. The Tesla

¹⁴ Florida Statutes Title 23, Chapter 322, Section 121.

¹⁵ Human Performance Attachment – NTSB Interview with Spouse of Tesla Driver.

¹⁶ Autopilot describes a suite of systems that includes but is not limited to a adaptive cruise control, lane keeping, and collision avoidance.

driver’s spouse stated that he was not stressed by having so many people in the house at one time and enjoyed having family around.

2.2. Pre-Crash Activities

Table 2 describes the Tesla driver’s activities in the days prior to the crash, based on the interview with his spouse, phone records, and vehicle data provided by Tesla.¹⁷ On Tuesday, February 26, the driver worked remotely from a second home in Loxahatchee Groves, Florida, while new carpeting was being installed. Later in the day, he picked up his mother-in-law from the hospital and brought her to his house to recuperate. According to his spouse, the driver went to bed around the same time each day, and was asleep before 10 p.m. On Wednesday, February 27, the driver arose around 5:20 a.m. and was at work before 6:30 a.m. His commute to work generally took between 20-25 minutes, and he would check the navigation app on his phone for traffic conditions prior to leaving home. After leaving work between 3:30-4 p.m., he visited a mattress store to purchase a new mattress before arriving home. He went to bed at the usual time. On Thursday, February 28, the driver arose around 5:20 a.m. and was at work before 6:30 a.m. He left work between 3-3:30 p.m. to receive the new mattress let in a cleaning crew at home. The driver and his spouse went to bed around 9 p.m. and watched a movie they had seen previously. The driver did not finish the movie and was asleep by 9:30 p.m. On Friday, March 1, the day of the crash, the driver arose at the usual time and, according to his spouse, left the house around 5:50 a.m.

According to Google Maps, on the day of the crash, it would have taken the Tesla driver between 12-16 minutes to drive the 9.6 miles from his home to the location of the crash. Tesla provided investigators with several vehicle parameters from the crash trip that are described in Section 2.6 of this report.

Table 2. Tesla driver’s activities based on phone records and next-of-kin interview.

Time	Activity	Location	Source
Tuesday, February 26, 2019			
7:46 a.m.	Call made	Home (Delray Beach)	Spouse
8:00 a.m.	Arose	Home (Delray Beach)	Spouse
N/A	Drove to second home	Loxahatchee Groves	Spouse
5:30 p.m.	Arrived back home	Home	Spouse
6:45 p.m.	Last outgoing text	N/A	Phone records
9:30-10:00 p.m.	Went to bed	Home	Spouse
Wednesday, February 27, 2019			
5:20 a.m.	Arose	Home	Spouse
6:30 a.m.	At work	Boca Raton, FL	Spouse
10:03 a.m.	first text of day	N/A	Phone records
3:30-4:00 p.m.	Left work	Boca Raton, FL	Spouse
6:06 p.m.	Last outgoing text	N/A	Phone records
9:30-10:00 p.m.	Went to bed	Home	Spouse
Thursday, February 28, 2019			

¹⁷ Human Performance Attachment – Tesla Driver Phone Text Records. The Tesla driver’s phone calls did not factor into the determination of sleep/wake times or driver distraction and are, therefore, not included in the attachment.

5:20 a.m.	Arose	Home	Spouse
6:30 a.m.	At work	Boca Raton, FL	Spouse
8:31 a.m.	First text of day	N/A	Phone records
3:00-3:30 p.m.	Left work	Boca Raton, FL	Spouse
8:24 p.m.	Last text of day	N/A	Phone records
9:30 p.m.	Asleep	Home	Spouse
Friday, March 1, 2019			
5:20 a.m.	Arose	Home	Spouse
5:50 a.m.	Left house	Home	Spouse
6:04 a.m.	Entered vehicle	Home	Tesla
6:05 a.m.	Stepped on accelerator	Home	Tesla
6:17 a.m.	Crash	Delray Beach	N/A

2.3. Post-Crash Toxicology

Investigators visited the Palm Beach County medical examiner’s office and requested that toxicological specimens be sent to the Federal Aviation Administration (FAA) Forensics Laboratory for analysis. The specimens were received by the FAA Forensics Laboratory on March 6, 2019. Results from the analysis, dated April 9, 2019, indicate that the Tesla driver did not have alcohol or other common drugs of abuse in his system.¹⁸

2.4. Fatigue

According to his spouse, the Tesla driver had a regimented sleep/wake schedule. He would generally be in bed and asleep by 10 p.m. and would wake around 5:20 a.m. the next day. The Tesla driver did not take sleep aids and generally slept through the night without waking. There was no evidence that he had been experiencing any life stresses that might have affected his sleep in the days prior to the crash.

2.5. Health History

Investigators were unable to locate a pharmacy that had recent records for the Tesla driver. His spouse stated that he did not have any health issues and avidly exercised.

2.6. Electronic Evidence

Phone records indicate that the Tesla driver was not engaged in a phone conversation and was not texting at the time of the crash. The records also indicate that the driver did not use his phone to text or call during the three mornings prior to the date of the crash. The Tesla driver’s cell phone was returned to his spouse prior to the arrival of NTSB investigators; therefore, a forensic download and analysis of the phone’s contents, and of any other interactions the driver may have had with the phone prior to the crash, could not be performed. Tesla recorded and uploaded a multitude of parameters when its vehicles are utilized, and NTSB investigators inquired whether Tesla could determine from these data if the driver had paired his phone to the vehicle had been interacting with it through the vehicle’s interactive screen. According to Tesla, these data

¹⁸ Drugs tested include amphetamines, opiates, marijuana, cocaine, phencyclidine, benzodiazepines, barbiturates, antidepressants, and antihistamines.

had not been uploaded to its servers and was not contained in the secure digital card found in the vehicle's electronic control unit (see *Vehicle Chairman's Factual Report*).

Other data were recovered by Tesla regarding the driver's actions prior to the crash. According to the data, the driver entered the vehicle at 6:04 a.m., about 12 minutes prior to the crash. He pressed on the accelerator at 6:05 a.m. and buckled his seatbelt at 6:07 a.m.

The Tesla was equipped with a large touchscreen mounted on the center of the dash. This interface acted as the vehicle's infotainment device, but also contained inputs to control ambient temperature, air flow, Bluetooth pairings, phone calls, door locks, headlight status, and several other functions (see *Vehicle Factors Chairman's Factual*). In addition, the vehicle autonomous driving features were also activated through this interface. Based on the data, the headlights of the vehicle were on in low beam status and this status did not change for at least 45 seconds prior to crash, indicating that this vehicle was not the source of the "flickering" headlight that the International driver mentioned.

The Tesla driver set the 'Traffic Aware Cruise Control' at 69 mph 12.3 seconds before the crash and activated 'Autosteer' 9.9 seconds before the crash. The activation of both TACC and Autosteer constitute Tesla 'Autopilot.'¹⁹ This was his last interaction with the touchscreen interface. Sensors in the Tesla did not detect the driver's hands on the steering wheel 7.7 seconds before the crash.

3. General Factors

3.1. Weather

The closest official National Weather Service weather station to the crash site was located approximately 4.4 miles southwest. Observations closest to the time of the crash are shown in Table 3.

¹⁹ Tesla's Autopilot is the sequential and combined activation of TACC and Autosteer. The driver may also activate Auto Lane Change to automatically move the car into a lane. TACC is an adaptive cruise control system that maintains the set cruise speed, applies brakes to preserve a predetermined following distance when approaching a slower-moving vehicle ahead of the Tesla, and accelerates to the set cruising speed when the area in front of the Tesla is no longer obstructed. Autosteer automatically steers the car to keep it within its lane of travel. In short, TACC provides longitudinal control (acceleration and deceleration) and Autosteer provides lateral control (steering) of the car within the lane, making the Tesla Autopilot consistent with an SAE International (SAE) Level 2 automated vehicle system.

Table 3. Weather data from weather station KFLBOYNT21

Time (EST)	6:16 a.m.
Temperature	62.3° F
Dew Point	61.4° F
Humidity	97%
Pressure	30.1 in
Wind Dir.	NNW
Wind Speed	0 mph
Wind Gust Speed	N/A
Precipitation	0.01
Events	None
Conditions	Clear

3.2. Illumination

According to the United States Naval Observatory, for March 1, 2019, civil twilight began at 6:21 a.m., and sunrise occurred at 6:44 a.m.²⁰ Sunset was at 6:22 p.m., and civil twilight ended at 6:45 p.m.

A. DOCKET MATERIAL

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

LIST OF ATTACHMENTS

Human Performance Attachment – NTSB Interview with Truck Driver

Human Performance Attachment – Truck Driver Electronic Logs

Human Performance Attachment – Truck Driver Phone Text Records

Human Performance Attachment – NTSB Interview with Spouse of Tesla Driver

Human Performance Attachment – Tesla Driver Phone Text Records

END OF INFORMATION

Rafael Marshall
Human Performance Group Chairman

²⁰Civil twilight begins and ends when the geometric center of the sun is 6° below the horizon.